

Integrated plant nutrition involves a combination of a more efficient use of fertilizers with the adoption of alternative sources of nutrients, such as livestock manures, composts, legumes, green manures, *Azolla* and agroforestry. Soil conservation can be enhanced through the use of conservation tillage, contour farming and physical structures, mulches and cover crops, and silt traps and gully fields. Many of these technologies, in one form or another, have been in existence in traditional agricultural systems for centuries. There are a range of water management systems that ensure the efficient use of available water. Water conservation and harvesting can improve agricultural yields in dry areas. Where too much water has been used, leading to waterlogging and salinization, then land drainage technologies making use of collective action can be used. Where environments are very wet, then thoroughly integrated systems making use of aquaculture, livestock, trees and crop production, can be remarkably efficient and productive.

For these resource-conserving technologies to be fully effective, however, they need to be adopted by whole groups or communities of farmers or land managers.

LOCAL GROUPS AND INSTITUTIONS FOR SUSTAINABLE AGRICULTURE

'One resurrected rural community would be more convincing and more encouraging than all the government and university programmes of the past 50 years. Renewal of our farm communities could be the beginning of the renewal of our country and ultimately the renewal of urban communities. But to be authentic, a true encouragement and a true beginning, this would have to be a resurrection accomplished mainly by the community itself.'

Wendell Berry, in Enshayan, 1991

COLLECTIVE ACTION AT LOCAL LEVEL

Individual Actions Only Provide Partial Protection

The widespread and growing evidence for the economic and environmental viability of resource-conserving technologies (see Chapter 4) appears to suggest that a more sustainable agriculture is a likely outcome. Once farmers get to hear of the potential benefits, of increased yields or reduced costs, then they will adopt widely and the transition will be under way.

But without attention to local institutions, this is far from likely. Sustainable agriculture cannot succeed without the full participation and collective action of rural people and land managers. This is for two reasons. First, the external costs of resource degradation are often transferred from one farmer to another, and second, the attempts of one farmer alone to conserve scarce resources may be threatened if they are situated in a landscape of resource-degrading farms.

This need for coordinated resource management applies to most aspects of resource conservation, including pest and predator management; nutrient management; controlling the contamination of aquifers and surface water courses; maintaining landscape value; and conserving soil and water resources. There are many examples of individual initiatives

that are unlikely to succeed in the long term because of lack of collective support. These include the following scenarios.

- One farmer encourages predators through farm habitat management, but on neighbouring farms non-selective pesticides which kill predators are used, so local predator populations do not reach a viable size.
- One farmer uses crop rotations and mosaic patterns as part of IPM to keep pest populations below threshold values, with occasional use of pesticides, but neighbours' pesticide overuse leads to the development of localized resistance to pesticides.
- One farmer maintains a diverse farm of high landscape value, but neighbouring farms reduce the overall value by removing trees, hedges and ponds.
- One farmer opens up land for access to the public, but neighbours do not provide similar access.
- One farmer adopts practices that reduce nitrate leaching to groundwater, but other farmers on land overlying the same aquifer continue to apply large amounts of nitrogen or manures, or use practices which permit leaching.
- One farmer reduces livestock waste losses to surface water, but farmers upstream continue to pollute and so the water quality continues to be poor.
- One farmer attempts to save traditional seed, but does not receive sufficient support for viable multiplication.

There are fewer cases where farmers adopt regenerative technologies which cause damage on neighbouring land. One case might involve the adoption by a farmer of soil and water conservation terraces on a steep farm. These would capture and channel water along the contours, so slowing water flow and increasing percolation, but could also lead in heavy rainstorms to channelling of water on to unprotected neighbouring land. This would lead to the formation of gullies, so causing more erosion than if the whole hillside had remained unprotected. In most cases, however, the adoption by an individual of more sustainable practices produces benefits for the wider environment and society – either by not polluting the environment or by actively improving resource value.

Indigenous Collective Management Systems

For as long as people have engaged in agriculture, farming has been at least a partially collective business. Farmers and farming households have worked together on resource management, labour sharing, marketing and a host of other activities that would be too costly, or even impossible, if done alone. Local groups and indigenous institutions have, therefore, long been important in rural and agricultural development.

These may be formal or informal groups, such as traditional leadership structures, water management committees, water users groups, neighbourhood groups, youth or women's groups, housing societies, informal beer-brewing groups, farmer experimentation groups, burial societies,

church groups, mothers' groups, pastoral and grazing management groups, tree-growing associations, labour-exchange societies and so on. These have been effective in many ecosystems and cultures, including collective water management in the irrigation systems of Egypt, Mesopotamia and Indonesia; collective herding in the Andes and pastoral systems of Africa; water harvesting and management societies in Roman north Africa, India, and south-west North America; and forest management in shifting agriculture systems. Many of these societies were sustainable over periods of hundreds to thousands of years.

The manorial system of medieval Britain, a classic example of integrated farming, was sustained for some 700 years by a high degree of cooperation between farmers (Pretty, 1990b). Local groups established detailed management measures for sustainable use of village resources; they provided support and mutual help through sharing arrangements; and they took communal decisions against individuals who attempted to overconsume or under-invest in common resources. Some of the earliest pollution control measures were established at this time, controlling, for example, contamination of water courses by wastes. Local regulations, or by-laws, covered a wide range of activities and potential resource users, and provided for controlled and sustainable use of resources (Table 5.1).

Table 5.1 Medieval agriculture in Britain: selection of by-laws established between AD1150–1400 at local level and designed to prevent long-term damage to village resources

<i>Activity</i>	<i>Management measure</i>
All hunting, gathering and collecting activities	Licences required
Pig feeding	Nose-rings to discourage deep-rooting Fines for owners of destructive pigs Elected swineherd responsible for any damage
Cattle grazing	Stocking rates limited
Trees	Regulation of cutting and selling All villagers permitted only to carry own firewood Heavy fines for possession of woodcutting tools without licence Prohibition of lopping of oak and beech trees as key source of food for pigs Replacement trees planted every year
Hedges	Require regular repairs
Fencing and gates	Compulsory around gardens to prevent livestock escaping and causing damage
Rushes and reeds	Mowing controlled Gathering permitted for own use only, not for sale outside village
Manures	Not to be sold out of village
Fishing	Permitted during daylight hours only
Watercourses	Pollution by human wastes, animal offal and hemp or flax residues prohibited

Later, during the agricultural revolution of the eighteenth and nineteenth centuries, farmers' groups were central in the spreading of knowledge about the new technologies (Pretty, 1991). At a time when there was no ministry of agriculture, no research stations and no extension institutions, farmers were extremely effective at organizing their own experiments and extending the results to others through tours, open days, farmer groups and publications. Farmer groups and societies were central to the diffusion of new technologies. The first were established in the 1720s and increased in number to over 500 by 1840. These groups offered prizes for new and/or high quality livestock, crops and machines; encouraged experimentation with new rotational patterns; held regular shows and open days; bought land for experimental farms run by the group; arranged tours to visit well-known innovators; and articulated farmers' needs to national agencies and government.

But indigenous local groups can have shortcomings. Some groups may institutionalize unequal but secure access to natural resources, such as in tank management and water allocation in southern India during times of water scarcity (Mosse, 1992), common property management in the open field system in Britain (Pretty, 1990b) and access to forest resources in Nepal. In highly stratified societies, it cannot be assumed that existing institutional arrangements are equitable. The persistence of an indigenous system does not necessarily indicate it has the support of all the community.

Forms and Functions of Local Institutions

The success of sustainable agriculture depends not just on the motivations, skills and knowledge of individual farmers, but on action taken by local groups or communities as a whole. This makes the task facing agriculture today exceptionally challenging. Simply letting farmers know that sustainable agriculture can be as profitable to them as conventional agriculture, as well as producing extra benefits for society as a whole, will not suffice. What is also required will be increased attention to community-based action through local institutions. Local institutions are effective because 'they permit us to carry on our daily lives with a minimum of repetition and costly negotiation' (Bromley, 1993). Local organizations do this in a variety of ways (Box 5.1).

The problem with the term 'local' is that it can mean anything that is not national. But 'local' does have its own special characteristics. It provides the basis for collective action, for building consensus, for undertaking coordination of responsibilities, and for collecting, analysing and evaluating information (Uphoff, 1992a). It does not happen automatically. It requires the presence of institutions at these local levels.

The uniting factor is that these have in common the prevalence of face-to-face interpersonal relationships, which are more frequent and intense within small groups (Uphoff, 1992a,b). The fact that people know each other creates opportunities for collective action and mutual assistance, and for mobilizing resources on a self-sustaining basis. People feel more mutual rapport and a sense of obligation at these levels than at district or sub-district levels, which are really political constructions. At the household or individual levels, decisions and actions oriented towards

Box 5.1 Functions of local organizations and institutions

The functions of local organizations and institutions are to:

- organize labour resources for producing more;
- mobilize material resources to help produce more (credit, savings, marketing);
- assist some groups to gain new access to productive resources;
- secure sustainability in natural resource use;
- provide social infrastructure at village level;
- influence policy institutions that affect them;
- provide a link between farmers and research and extension services;
- improve access of rural populations to information;
- improve flow of information to government and NGOs;
- improve social cohesion;
- provide a framework for cooperative action;
- help organize people to generate and use their own knowledge and research to advocate their own rights;
- mediate access to resources for a select group of people.

Sources: Uphoff, 1992c; Cernea, 1991, 1993; Curtis, 1991; Norton 1992; IFAP, 1992

sustainable development are not likely to be long lasting unless they are coordinated with what other households are also doing.

It is also important to distinguish between the terms institution and organization. Here the conventions of Norman Uphoff (1992c), Alan Fowler (1992) and others are followed. There are many types of institutions, some of which are also organizations, such as banks or local governments and others which are not, such as the law or taxation. An institution is a complex of norms and behaviours that persists over time by serving some socially valued purpose, while an organization is a structure of recognized and accepted roles.

Institutions can be organizations and vice versa. Marriage is an institution that is not an organization, while a particular family is an organization with roles but not an institution, which has longevity and legitimacy. The 'family', on the other hand, is both an institution and an organization. In this chapter the concern is with institutions that have an organizational basis.

THE PERILS OF IGNORING LOCAL INSTITUTIONS

Throughout the history of agricultural development, it has been rare for the importance of local groups and institutions to be recognized. Development professionals have tended to be preoccupied with the individual, assuming that the most important decisions affecting behaviour are made at this level. As a result, the effectiveness of local groups and institutions has been widely undermined. Some have struggled on. Many others have disappeared entirely.

The Suffocation of Local Institutions

Without realizing it, governments have routinely suffocated local institutions during agricultural modernization. Local management has been substituted for by the state, leading to increased dependence of local people on formal state institutions. Local information networks have been replaced by research and extension activities; banks and cooperatives have substituted for local credit arrangements; cooperatives and marketing boards have replaced by input and product markets; and water users' associations have replaced local water control.

In South-East Asia, the Green Revolution technologies forced through social and institutional changes that were neither planned nor controlled (Palmer, 1976, 1977; see Chapter 3). In Malaysia, farmers had to be members of farmers' associations if they were to get access to credit and inputs. These were established and controlled by extension workers, and could contain 1000 to 2000 members. Extension workers conducted credit assessments for each member and had the power to reject or accept requests. In the Philippines, farmers were obliged to join smaller *Samahang Nayon* groups and on joining had to accept the whole technical package, including inputs and the guidance of the extension workers. If so, they received coupons to go the rural banks for a loan to buy subsidized fertilizer. As fulfilment of all these conditions was a prerequisite for giving land title, this created strong hostility among farmers. Such hostility is common if farmers and rural people are forced or coerced into forming groups.

In their study of 30 years of government coordinated rural development in India, Jain et al (1985) show how, initiative by initiative, the state has systematically undermined the efforts of local people. Their analysis of local administrative regions in five states containing some one million people has shown that poverty-alleviation programmes had not reached the poor. The scale of self-deception is extraordinary. The state believes it is having an impact, but the field evidence says otherwise (Box 5.2) State activities have substituted for local initiatives; they have concentrated on infrastructural investments rather than people; they have favoured the use of direct subsidies; and they have pursued schemes that are harmful to local people. Jain and his colleagues indicate that *'the foremost reason for this unfortunate state of affairs is that the people themselves have no place in rural development, as every available space is occupied by the bureaucracy. The community, which was once central to the rural development strategy, is now peripheral to it'*.

As local institutions decline, so cultures change and become less resilient. In western Kenya, the *kokwet* resource management groups of the Marakwet formerly had responses laid down for every contingency. They had a regular rota for checking irrigation structures and making small running repairs, imposed fines for illegal use, and called occasional groups of young men together for large repairs, and held ceremonies with dancing, beer drinking and ox-roasting to celebrate the upkeep. Elspeth Huxley (1960) described the decline of this management mechanism in the 1950s. At one breach of a canal where a landslide had occurred, one old man said they now waited for the government to come and mend it, as the

Box 5.2 A selection of indicators showing the widespread bias against the most needy of poverty alleviation efforts in India, 1950-85

In selected areas (blocks, districts or states):

- 75% of households helped under poverty-alleviation programmes were above the poverty line, and so should have been ineligible;
- 74% of total loans by a bank in one very poor state was for tractors, which did not help any small farmers;
- 80% of credit extended to a large number of farmers was to those above the poverty line;
- 75% of training opportunities were taken up by those above the poverty line;
- support to bonded families was too little to eliminate any bondage;
- only 12-15 per cent of children in child development and nutritional programmes were from farming families with no animals or land;
- almost no immunized children are from families below the poverty line;
- 80% of drinking water wells dug in one block were concentrated in just the larger and wealthier villages.

Source: Jain et al, 1985

'young men are tired and no longer interested'. She recognized then that: *'the end has begun; and with that old, traditional way of mending furrows will go the songs and laughter, the roasted oxen and all-night dance, the tests of skill and courage for young men. Progress will make them into clerks and storekeepers, messengers and teachers, houseboys and politicians, instead of masters of the rivers high above the plain'*.

Increased Degradation in India

When traditional social institutions collapse or disappear, it is common for natural resources to degrade. In India, the loss of local institutions for the management of common property resources has been a critical factor in the increased over-exploitation, poor upkeep and physical degradation over the past 40 years.

N S Jodha (1990) studied the importance of common property resources to rural people in 82 villages scattered over 7 states of India. Almost all rural poor households depend for their fuel, fodder and food items on common resources. Income from these resources also accounts for 14-25 per cent of total household income for these groups. The rural rich, by contrast, depend on them much less (Table 5.2). But since the 1950s, the area of common property resources has declined by at least 30 per cent, and in some villages by more than 50 per cent. Coupled with this is the dramatic increase in population pressure on the remaining resources. Most villages have seen at least a three-fold increase in the number of

Table 5.2 Extent of dependence of poor and wealthy households on common property resources (CPRs) in dryland regions of India

State	Household category	CPR contribution to income (%)	CPR contribution to fuel supplies (%)	CPR contribution to animal grazing (%)	Days of CPR employment per household
Andhra Pradesh	Poor	17	84	—	139
	Wealthy	1	13	—	35
Gujarat	Poor	18	66	82	196
	Wealthy	1	8	14	80
Karnataka	Poor	20	—	82	185
	Wealthy	3	—	29	34
Madhya Pradesh	Poor	22	74	79	183
	Wealthy	2	32	34	52
Maharashtra	Poor	14	75	69	128
	Wealthy	1	12	27	43
Rajasthan	Poor	23	71	84	165
	Wealthy	2	23	38	61
Tamil Nadu	Poor	22	—	—	137
	Wealthy	2	—	—	31

Source: Jodha, 1990

people per hectare of common land, resulting in a dramatic decline in the number of products that local people can gather from the commons. Species diversity has declined and species mix has changed. The number of trees and shrubs has also fallen, and so people must spend more time collecting to get the same amounts of products.

The physical degradation is a product of both over-exploitation and poor upkeep. It is the inability to enforce local regulations that has led to poor upkeep. These failures have come about because of the abolition or complete collapse of traditional formal or informal management practices (Jodha, 1990; Chambers et al, 1989b). Compared with the 1950s, only 10 per cent of the villages still regulate grazing or provide watchmen; none levy grazing taxes or have penalties for violation of common regulations; and only 16 per cent still oblige users to maintain and repair common resources.

The future is bleak in the absence of these disappearing institutional structures. There is considerable evidence that when collective management is replaced by private operation, then resource degradation occurs. This is nowhere more apparent than when it comes to groundwater issues (T Shah, 1990; Datta and Joshi, 1993). Both over-extraction leading to groundwater depletion and over-irrigation leading to increased waterlogging and salinity have occurred because collective local management has been replaced by unfettered private operation. In just Haryana and Gujarat alone, some 2.1 million ha are seriously degraded by salinity and waterlogging. Farmers cannot solve these

problems alone, as 'drainage technology in indivisible and cannot be executed in parts' (Datta and Joshi, 1993). Individuals investing in isolation will not improve the lands. Yet when farmers are organized in groups, substantial yield improvements for wheat, mustard and millet have occurred.

In the coastal region of Gujarat, large areas are experiencing saltwater intrusion into depleted aquifers (T Shah, 1990). Saline water has made irrigation impossible in many areas, with farmers' incomes falling rapidly in recent years. As Tushaar Shah put it: 'the conditions for farmers located in the saline zones, both large and small, is desperate', yet in the neighbouring areas not yet affected farmers continue to pump because 'they are certain that wells will soon become saline regardless of how much they themselves restrain pumping if others do not restrain pumping as well'. Clearly, destruction will continue unless farmers stop operating privately. In Tamil Nadu, private water extraction, favoured by state policies and cheap or free electricity, has undermined collective management systems. Farmers have opted out of local organizations and so overuse common goods (Mosse, 1992; Reddy, 1990). In Tamil Nadu alone, there are some 36–39,000 tanks of various sizes. Many are now in a state of disrepair, silted up and encroached upon. Falling water tables and degraded tanks are a result of the state's progressively increasing control over irrigation systems, the trend to private water use and management, and the systematic undermining of local institutions.

State-Imposed Institutions

Just as bad as ignoring existing local institutions is the practice of imposing new ones without consideration of the likely impacts on local people. Outside interventions are liable to warp and weaken local institutions. There are dangers that the state will suffocate local initiative and responsibility, or capture and harness local initiatives and resources for other purposes. Local politicians may seek to take over local successes or gain reflected glory from them. As has been indicated above, not all initiatives are seen by local people as legitimate.

In West Africa, governments have tended to restrict the freedom of local, self-help organizations, suppressing them by favouring state-created groups. Peter Gubbels (1993) says that: 'the historical trend in many West African countries has been to deny the establishment of community-based indigenous organization, and to suppress those already in existence by restricting their freedom and autonomy... Looking at these experiences over more than 30 years of agricultural development, it is difficult to argue that the failure of agricultural development for the mass of peasant farmers has primarily been due to technical or financial shortcomings. Indeed, there is evidence to suggest that this failure is partially due to government control over indigenous processes of agricultural development'.

It has been argued that the great success of Kofyar farmers in Nigeria has occurred precisely because they were ignored by development programmes, and so were free to develop and adapt new cropping systems according to changing needs and demands (Netting et al, 1990).

In India, the presence of panchayats has been one reason why voluntary

agencies have tended to support the formation of new institutions in recent years (Agarwal and Narain, 1989). The panchayat poses two major problems for resource management at local level. They tend to be both the product of village factionalism and dominated by the more powerful groups in the village. This raises fears among the rest that the benefits will be expropriated for the privileged few. Another problem is that panchayats are too far removed from the grassroots to be effective agents for good resource management. A village often consists of several hamlets and a panchayat usually covers several villages. As a result, *'these panchayats are just too big to become an effective forum for village-level environmental management'*. Well-intentioned development efforts focusing on panchayats as the appropriate local body can cause many problems. In Maharashtra, the social forestry directorate has tried to involve panchayats in the management of village woodlots, but even though Agarwal and Narain visited many villages, in none did they find that *'the panchayat leaders cared to explain to the villagers that these village woodlots were a community resource. Most villagers were shocked to hear this. They believed these trees were all government trees'*.

Some Comparisons of Individual and Group Approaches

Studies of agricultural development initiatives are increasingly showing that when people who are already well organized or who are encouraged to form groups, and whose knowledge is sought and incorporated during planning and implementation, they are more likely to continue activities after project completion (de los Reyes and Jopillo, 1986; Cernea, 1987, 1991, 1993; Kottak, 1991; USAID, 1987; Finsterbusch and van Wicklen, 1989; Bossert, 1990; Uphoff, 1992a; Bunch and Lopez, 1994; Pretty et al, 1994a). If people have responsibility, feel ownership and are committed, then there is likely to be sustained change.

A study 4–10 years after the completion of 25 World Bank-financed agricultural projects found that continued success was associated clearly with local institution building (Cernea, 1987). Twelve of the projects achieved long-term sustainability and it was in these that local institutions were strong. In the others, the rates of return had all declined markedly, contrary to expectations at the time of project completion. At project completion, staff had estimated rates of return between 15 per cent and 30 per cent; in reality they had disastrously fallen to 2.7 per cent on average.

This clearly indicated that projects were not sustainable where there had been no attention to institutional development and farmer participation. Michael Cernea (1987) commented: *'such a high number of unsustainable projects was certainly not expected... I have often been struck by how little interest there has been in learning the true reason for failure... Not only does the failure to consider the cultural context of a project undercut the technical package promoted by the investment, but it leads to projects that at best are less effective than they could be or, at worst, outright failures'*.

In the Muda Irrigation Project in Malaysia, water users' associations were *'established carefully, patiently and successfully, taking into account farmers' resource needs, their willingness to cooperate, the physical location of*

their plots' (Cernea, 1987). The endurance of these associations after the project completed was the single most important factor in ensuring the continued benefits to farmers. In contrast, the negative rate of return of the Hinvi Agricultural Development Project in Benin was caused by the disintegration of the cooperatives developed for the cultivation of oil palm. These had been imposed on the farmers and run by a parastatal with no self-management delegated to farmers. The technical and agricultural package financed by the project failed to account for traditional land tenure systems. The farmers also opposed the organizational arrangements imposed on them, so when these collapsed, the technical innovation (growing of oil palm) collapsed too. Seven years after completion, more than 75 per cent of members had opted out, refusing to work in cooperative blocks and had returned to cultivating food crops.

In India, Anil Agarwal and Sunita Narain (1989) have indicated that *'all good cases of environmental regeneration... are invariably those cases where voluntary agencies have set up an effective institution at the village level... It is the creation of a village level institution which brings people together, spurs them into action and ensures the protection and development of the natural resource base'*.

NEW CHALLENGES DURING INTERVENTION

Establishing Self-Reliant Groups

The process of establishing self-reliant groups at local level must be an organic one and so should not be forced or done too quickly (Orstrom, 1990; Röling, 1994). The International Federation of Agricultural Producers (1992) describes four essential elements of any self-supporting farmers' organization. They should have developed a financing capacity with resources of their own, the major part of which are obtained directly or indirectly from the membership. They should have developed a structure for electing farmer representatives. They should have obtained recognition as a legitimate voice of farmers. They should have developed self-reliance for planning, for management and for the provision of effective services.

The Gal Oya irrigation scheme in Sri Lanka provides some of the best evidence for the success of local groups and how they can best be established. Over the years, dramatic and lasting changes in the efficiency and equity of water use have been made (Uphoff, 1992a, 1994). At least 13,000 farmers are now involved in an area exceeding 10,000 ha. Despite many difficulties, including ethnic conflict, budget cutbacks, massive turnover of trained organizers, and bureaucratic interference, farmers' associations have maintained themselves and progressed institutionally. Water use efficiency almost doubled and yields were raised about 50 per cent over a larger service area. Norman Uphoff (1994) indicates this is because of the particular process of group formation and development itself. This has eight distinct elements and is characterized throughout by attention to the development of learning processes.

1. **Use of catalysts.** If people are not already organized, then organizers, animators or motivators will be needed.
2. **Starting with informal organization.** Begin by focusing on a particular problem and bring a small group together to solve it. The sequence 'work first and organize later' brings forward better leadership and more support among members. This is in contrast to an alternative approach of calling a meeting and forming an organization before doing work.
3. **Evolve a formal structure.** Let groups evolve from informal to formal status at their own pace.
4. **Mobilizing a new kind of leadership.** Farmer representatives and village extensionists are chosen by their groups not by election but by consensus. If the representatives must be acceptable to all members, then factional leaders are less likely to come forward. Those selected feel accountable to every member, as all had assented to their selection. Their terms of reference are prepared by the members of the group.
5. **Importance of small groups at base.** It is easier to create and maintain a better sense of solidarity and mutual responsibility in small groups. The wider impact on rural development occurs through the federation of these groups within higher level associations that offer benefits of scale.
6. **Problem solving process.** Groups regularly follow a process taking them from prioritizing problems through action and self-evaluation of progress. The philosophy is embodied by the catalysts being told there is no disgrace in making a mistake, only in not identifying them, learning from them, and avoiding repeating them.
7. **Start with limited number of tasks.** Groups start with one or two tasks, then expand when they wish. Groups starting with too many tasks tend to do them poorly and so cease to function. In Gal Oya, organizations proceed to deal with crop protection, credit, bulk input purchasing, mortgage releases, settlement of domestic disputes, land consolidation and even dealing with drunkenness.
8. **Make provision for horizontal diffusion.** It is important that farmer-to-farmer elements of communication and learning be established and sustained. This gets away from the more common vertical communication style.

Dealing with Inequity and Distorting Existing Groups

It is sometimes assumed that groups are easy to establish. This is not the case, particularly if they are to be concerned with equitable decision making and improvement of the livelihoods of poorer groups. This is partly because traditional institutions often institutionalize inequitable access to productive resources. Some of the already established institutions are full of local biases and so may not be the best representatives of local people (Matose and Mukamuri, 1992).

In Tamil Nadu, tanks have been the traditional form of irrigation for at least 2000 years (Mosse, 1992). Cultivators hold rights to a share of water from the tank and these are part of a wider system that also defines rights to shares in crop produce, to artisanal and ritual services, and to worship local deities during festivals. These systems tended to give privileged

access to dominant groups, though they did ensure security to the poorest groups in times of scarcity. Today, a wide variety of situations exist. In some villages, informal rights and responsibilities still exist. In others, existing rights are overlooked by the powerful, who protect water by force. But, says David Mosse (1992), 'where they exist, institutions of community management are likely to be based upon and protect the interests of a dominant caste group'.

The Centre for Water Resources of Anna University, Madras is working with communities on the rehabilitation of irrigation tanks, where it has had to initiate social change so as to improve agricultural performance. Existing systems of water allocation are often the critical constraint. The first task has been to establish water users' associations by first reconciling some of the differences between interest groups. In one village, where there were three types of water distribution in operation, various meetings first led to agreements to change the local rates of labour payment. The project team then arranged several practical collective tasks, such as repairing sluices, cleaning channels and agreeing a site for a community well. These led to the formation of a village water users' society, the structure of which was agreed over the course of a further 12 farmers' meetings. This group has clear rules for protection of resources and distribution of benefits. They have undertaken long neglected maintenance, so increasing tank capacity; imposed fines for cattle trespass; and most significantly shifted the local balance of power. In creating new rights, this group has provided the context for changing social relations.

It is impossible to say, without knowledge of the particular local circumstances, whether existing local groups should be built upon or entirely new ones formed. Sometimes there are no existing farmers' organizations, such as in parts of West Africa (Gubbels, 1993). If they do exist, they are more likely to be based on export-oriented cash crop production, rather than organized for farmers in the poorer, more remote areas. Sometimes existing organizations institutionalize unequal access to resources or opportunities. In both these cases, it would be necessary to build new organizations.

One problem is that external institutions are usually neither sufficiently patient nor capable of only spending small amounts of money when it comes to supporting local groups. As a result, they tended to distort and undermine local efforts (IFAP, 1992). Funders face specific circumstances and constraints that are very different to receiving organizations. Quick results are important to show success and that funds were spent well. In addition, money once committed is preferably spent in large sums, as this cuts administrative costs. The result of this is first a confidence upswing rapidly followed by a downswing: 'the confidence upswing usually starts with a success story. It attracts considerable publicity. The organization is over-rewarded as funders become extremely favourable towards the organization. This leads inevitably to unrealistic expectations about what the organization can do next. Disappointment follows. Confidence downswing usually starts with dissatisfaction by one funder. News spreads fast, and funders become distrustful. They pull out, as no funder wants to be associated with a failure' (IFAP, 1992).

One example of where an external institution wanted to move too quickly, and so skip the complexities of local social changes, was the Hill Resource Management Program of Haryana, India. There users' groups for natural resource management were established to fill the gap left by the decline and near disappearance of indigenous management systems (Poffenberger, 1990; Misra and Sarin, 1988). The project began in Sukhomajri, where Gujar herders agreed to stop grazing the severely degraded hills if a dam were built to supply irrigation water. This 'social fencing' initiative established water users' associations in four communities during the pilot phase, who managed irrigation water and cutting of fibrous and fodder grasses from the regenerating hills. The impact on agriculture was remarkable: yields rose by 100–400 per cent, diversification increased, livestock were stall fed and fodder grass yields on the hills rose by 400–600 per cent. For the expansion phase the Haryana Forest Department became the lead agency, building 57 dams in 39 communities. But only in 30 per cent of these communities has the department successfully established management societies. In the long run the whole effort may be jeopardized as local people become less involved in participatory planning and management.

All this can be avoided if external agencies move slowly, do not expect immediate results, build up leadership, and measure success in terms of developing social relations and institutional strength. When this is done, local groups become stronger and more self-reliant, so improving the livelihoods of their members and the environments of their communities.

Evolving Roles

Groups commonly form to take charge of a new activity and/or manage a new resource, such as water users' associations for irrigation, credit groups for loans' access, water point committees to manage pumps or farmers of a common micro-catchment to control soil erosion. But such local groups do adapt and change their roles and responsibilities as internal and external conditions change. It is common for them to pass through several phases, growing increasingly strong. Local people themselves recognize these as being stages on the route to sustained action. In one self-evaluation in Sri Lanka, farmers identified the health of their own groups by referring to the fullness of the moon. The full moon signifies fulfilment and achievement of the highest order, and is represented by the indicators hardest to achieve (Box 5.3).

In the early stages, groups focus on establishing agreed rules for management and decision making. These can then be used by members as a vehicle to channel information or loans to individual members. Once small homogenous groups have successfully achieved initial goals and confidence has grown, it is common for members to turn their attention to development activities that will benefit themselves as well as the community at large. This may involve the nominating of individuals to receive specialized training, such as in soil and water conservation, pest control, veterinary practice, horticulture or book-keeping, so that they will be able to pass knowledge back to the whole group in their new role as

Box 5.3 Local indicators of health in farmers' organizations, Sri Lanka

In a self-evaluation of farmer organizations supported by the National Development Foundation, an NGO in Sri Lanka, farmers were encouraged to produce their own indicators which would identify successful or healthy farmer groups. They indicated that groups pass through three phases before they reach full unity, which they visualized in terms of the moon.

New moon groups have regular attendance at meetings by more than 90% of members; there is punctuality by all who come; and more than 75% of members participate in common activities.

Half moon groups regularly clear and maintain tank bunds. They also help others in need, including non-members, by offering their labour and not drawing on the group fund.

Three-quarter moon groups implement common decisions; have common property and use it for the benefit of all members, eg a sprayer that is rented out to members at lower than market rate. The group take over a member's share of common work when she or he is unable to do it for some valid reason; and share benefits among members, eg watered land for vegetable cultivation, in disregard of ownership.

Full moon groups help poorer members with loans from the group fund, eg for buying the decided variety of seed paddy; help redeem the mortgaged land of members; and have the strength to face external forces.

Source: Mallika Semanarayake, personal communication; Harder, 1991

paraprofessional or extension volunteer (Shah et al, 1991; Pretty et al, 1992).

As confidence further grows with success and resource bases expand, group activity can evolve to an entrepreneurial stage where common action projects and programmes are initiated. These are held under group ownership and might comprise investing in fruit orchards, afforesting an upper watershed, terracing a hillside, investing in agricultural tools and draught animals for hire to the community, organizing community-run wildlife utilization schemes; establishing workshops and small factories; and building housing for tribal families (Rahman, 1984; D'Souza and Palghadmal, 1990; Shah et al, 1991; Fernandez, 1992; Murphree, 1993). These group activities benefit group members as well as having a wider ecological and social impact.

In Nepal, the Small Farmer Development Project has clearly shown the economic benefits at local level of people working in groups (Rahman, 1984; Uphoff, 1990). Group organizers from a development bank helped form groups of 10–15 people, who agreed to conduct transactions with the bank as a group, to elect a leader, to meet at least once per month and to save Rs5 each month per person to create revolving funds. Loan applications were submitted to the field office of the bank and once the group received funds it was responsible for these as a group. The project has helped to improve agricultural yields; diversity of production has

increased; recovery rates for loans are greater than 90 per cent; and social indicators all show general improvements in welfare of the poor.

The groups typically begin by channelling loans to individuals, and then expand their action gradually to take collective and community-oriented action. *'Once the farmers organise themselves into groups for the purpose of acquiring credit, they start gradually realising that there are many things they can do collectively which they had not thought of before.'* (Rahman, 1984)

In one case of intergroup cooperation, seven groups in Tupche borrowed Rs250,000 to instal handlooms in a cottage factory. The factory belongs to all 126 members of the 7 groups, employs 50 previously unemployed local people, and is avoiding the capital intensive urban-based development model by producing a technology corresponding to local skills and needs.

Recreating a Sense of Community

When groups are established for the first time, or resuscitated, then one of the universal benefits of membership expressed by people is the renewed sense of community. This is surprising, as many would assume it is for the economic benefits alone that they have become organized.

In the UK and Australia, members of farmer and community groups commonly state that the important benefits of membership are not so much yield improvement, economic returns and so on, but more the pleasures of problem sharing, friendship and enjoyment of others' company (Wibberley, 1991; Campbell, 1994b,c). This has been a particularly notable effect of the Landcare programme in Australia, where typically independent and 'frontier-spirited' farmers have, in coming together in groups for the first time, achieved significant environmental and social changes (see Chapter 5).

Co-operation and empowerment has proved to be possible in the most unlikely of social settings, and the nature of farming is being transformed by a network of rural community groups committed to the development and dissemination of productive and sustainable farming and land use. The programme has achieved great success, but the factor noticed by commentators, local people and farmers alike is the sense of cohesion brought back into rural communities. New relationships are breaking down mistrust: *'It is the first time in Australian history that I'm aware of that farmers and government are working to the same end. They are usually at each others' throats'* (farmer quoted in Alexander H, 1993). As Andrew Campbell, former national facilitator of Landcare put it: *'the tangible benefits are in a sense misleading, as the most important impacts of landcare are the intangibles – the social cohesion and solidarity, the sharing of stresses, new ideas and intellectual stimuli'*.

A recent study of more than 150 local initiatives in Scotland has illustrated the importance local people give to group action. Groups brought environmental, social and employment benefits in the form of increased conservation of resources, a greater sense of community measured in terms of enthusiasm and commitment, and improved direct rural employment (Bryden and Watson, 1991). But the problems faced by these initiatives suggest they are successful despite, rather than because

of, the good intentions of support agencies. In particular, there was a mismatch between the needs of community initiatives and the support offered by agencies, mainly because funding agencies have narrow mandates and are set up to serve different situations. Most important, external agencies routinely undervalued the social benefits of community enterprises. Most support agencies miss this, yet local people put this high on their list of benefits.

LOCAL GROUPS FOR SUSTAINABLE AGRICULTURE

Range of Groups

Six types of local group or institution are directly relevant to the new needs for a more sustainable agriculture (Pretty and Chambers, 1993a, b).

- **Community organizations**, such as for hill resource management in India, agricultural development in Nepal and Pakistan, and soil and water conservation in France.
- **Natural resource management groups**, such as for irrigation tank management in India, for soil and water conservation in Kenya, for irrigation in the Philippines and Sri Lanka, and for soil and water conservation in Australia.
- **Farmer research groups**, such as in Zambia, Botswana, Ecuador and Colombia, and Britain during the agricultural revolution of the eighteenth and nineteenth centuries.
- **Farmer-to-farmer extension groups**, such as for soil regeneration in Honduras and for irrigation management in Nepal.
- **Credit management groups**, such as in southern India, Bangladesh and Nepal.
- **Consumer groups**, such as women's consumer-producer groups in Japan.

These groups are quite different for those arising out of the long tradition of the cooperative movement, in which community-wide action has been encouraged through the forming of cooperatives or collectives. Many of these collective approaches to extending technologies to rural people have resulted in inequitable development, with benefits being captured by the relatively well off. Large cooperatives, in which the needs of different members vary enormously and which are too large for widespread participation, have to be managed by small groups, usually comprising the most wealthy, to whom decision making has been delegated. They are thus inevitably less effective in meeting the needs of the poor.

Local Research Groups

The normal mode of agricultural research has been to conduct experiments under controlled conditions on research stations, with the results being passed on to farmers. In this process, farmers have no control over experimentation and technology adaptation. Farmer organizations

can, however, help research institutions become more responsive to the diversity of local needs, if scientists are willing to relinquish some of their control over the research process. But this implies new roles for both farmers and scientists, and it takes a deliberate effort to create the conditions for such research-oriented local groups. None the less, there have been successes in both industrialized and Third World countries.

In the USA, the Land Stewardship Project in Minnesota organizes farm families into peer-support and information-sharing groups as part of a Sustainable Farming Association (Kroese and Butler Flora, 1992). These groups encourage farmers to experiment with alternative farming practices on their own farms and at their own pace, and facilitate the exchange of information among nearby farmers about what they have learned. Experiments are done by individual farmers attempting to solve their own particular problems. Other farmers learn from them and extension agents pass on the results.

The data, of course, cannot be aggregated for cross-farm comparisons in the way that results from conventional research are used. But as Ron Kroese and Cornelia Butler Flora put it: *'This is not as problematic for the farmers as it is for academics, as the process of sustainability means adapting technology to the specific conditions of one's own farm. The documentation of the efforts, despite flaws, allows for further dissemination of technology... Participating farmers are most enthusiastic about their current experiments. They question each other in detail, analyse what they have done, or explain why it does or does not work. The lack of competitiveness as people share research results is in contrast to the usual coffee-shop talk of whose yield is highest, whose row is straightest, and who has the fewest weeds'*.

What is equally interesting is the impact farmers say being members of these groups had on themselves. They felt less alone and more a part of a wider effort for agricultural improvement.

In Botswana, farmer research groups have become central to the research strategy of the Ministry of Agriculture, where technologies are tested under both farmer-managed and farmer-implemented conditions (Heinrich et al, 1991; Norman et al, 1989). The key component of the approach is local research-oriented and extension-oriented farmer groups, which have become a powerful means for examining the potential of a range of technologies under farmer management. The process involves researchers presenting a wide range of options gathered from many sources to farmers in villages. Sub-groups of farmers selecting the same options conduct trials, and meet monthly to discuss progress and observations. As harvest approaches, field days are held to share interesting results with farmers outside the groups. The impact of this approach has been to change fundamentally the relationship between the researchers and farmers, increase the linkages with NGOs and to improve crop yields with low input technologies (Box 5.4).

As local people develop the capacity to learn from and to teach each other, so they develop further their own capacity to conduct their own research. There are many recent innovations in farmers' own analyses that point the way to innovative learning and self-spreading (Chambers, 1992b; Guijt and Pretty, 1992; Lightfoot and Noble, 1992). In India,

Box 5.4 The impact of the research-oriented and extension-oriented farmer groups in Botswana

The strong and sustained dialogue between farmers and researchers has:

- given greater flexibility to the research process, as technology options can easily be moved into the testing phase, and researchers respond rapidly to needs and interests of farmers;
- increased the range of topics under joint examination, so increased diversity of options open to farmers;
- led to attitude change in scientists, as they appreciated the benefits to all that could be achieved and enjoyed the personal success;
- developed improved linkages between on-station commodity researchers and FSR teams, as demand for their technologies and feedback from farmers grew;
- increased the total research capacity beyond the available research resources;
- increased linkages with NGOs, as they became involved with the groups;
- led to significant increases in grain (sorghum and millet) yields with low external input technologies – increases over 3 years were 71% for double ploughing, 23% for rowplanting and 56% for small applications of phosphorus (20kg/ha).

Sources: Heinrich et al, 1991; Norman et al, 1989

villagers who have been trained as extension volunteers by the Aga Khan Rural Support Programme are now training the staff of other NGOs in participatory methods. Farmers are both more effective and efficient trainers of other farmers, taking less than 10 per cent of the time that external agents need to train the extension volunteers (Shah, 1994a). In Bolivia, farmers working with World Neighbors have developed innovative ways of conducting their own research on potatoes, as well as trained some 3000 other farmers (Ruddell, 1993; Beingolea et al, 1992). Farmers also work on the radio as broadcasters in Niger and Peru (McCorkle et al, 1988; AED, 1991); and monitor research and conduct surveys (Jiggins and de Zeeuw, 1992).

These approaches all build the capacity of local people to conduct their own investigations and solve their own problems. All have shown that such informal learning is a low cost method of enabling farmer groups to adapt, choose and improve their farming systems. They also provide leadership experience for villagers.

Farmer-to-Farmer Exchanges to Enhance Local Capacity

There is growing experience in farmer-to-farmer extension, visitation and peer training as mechanisms to support agricultural improvement. These can take several forms. Most common are farmer exchange visits, in which farmers are brought to the site of a successful innovation or useful practice, where they can discuss and observe benefits and costs with

adopting farmers. Professionals play the role of bringing interested groups together and facilitating the process of information exchange. During the visits, participants are stimulated by the discussions and observations, and many will be provoked into trying the technologies for themselves. For farmers *'seeing is believing'*, and the best educators of farmers are other farmers themselves (Jinrawet et al, 1987).

Such farmer-to-farmer extension has resulted in the spread of *Leucaena* contour hedgerows in the Philippines (Fujisaka, 1989); peanuts after rice and sesame before rice in north-east Thailand (Jinrawet et al, 1987); management innovations for irrigation systems in Nepal (Pradan and Yoder, 1989); post-harvest cassava treatment in Ecuador (CIAT, 1989); agroforestry in Kenya (Huby, 1990); green manures in Honduras (Bunch, 1990); and a range of watershed protection measures in India (Mascarenhas et al, 1991; Shah, 1994a,b).

In irrigation management, it has become increasingly clear that physical improvements do not solve all the problems causing poor performance (Pradan and Yoder, 1989; Yoder, 1991). Farmer-to-farmer extension is now being used to show farmers what they can achieve with good organization and local governance. In Nepal, farmers from a weakly-managed system are taken to visit several well-managed systems, where they have the opportunity to talk to local groups and hear how they manage water. In this way the visitors see that each group has evolved different rules and practices to suit the local conditions, and that these rules and regulations are continually changed (Box 5.5).

Box 5.5 The process and impact of a farmer-to farmer extension exchange in Nepal

The Gadkar Irrigation System in Nuwakot District is 105 ha in size and was constructed under the World Bank-financed Rasuwa-Nuwakot IRDP in 1979. A water users' committee was established but, because the members were district officials and large farmers, the allocation of water was inequitable. The chairman and vice-chairman dominated the committee, and used it to protect their own privileged access to water. Two delegations of 20 farmers and 20 officials were taken to three well-functioning farmer-managed irrigation systems.

As Pradan and Yoder put it: *'Visiting delegates were amazed at the accomplishments of the farmers in constructing and maintaining technically difficult irrigation systems, in their ability to establish fair rules and regulations, and the power of the organization to discipline its members. They saw what they could do as a group, rather than complain about poor management of the system by the agency that had constructed it for them'*.

The impact of the visit was that the previous committee was dissolved at a community meeting, and a new one elected. The incidence of water theft declined; the committee were able to allocate water fairly and impose rules, such as the growing only of maize in the pre-monsoon period rather than thirsty rice; the committee employed water guards; and farmers began to contribute a substantial amount of labour for maintenance.

Source: Pradan and Yoder, 1989

As a result of these exchanges, farmers have, on return to their communities, elected new leaders, collectively made new operating rules, improved canal maintenance, adopted systematic record keeping, held regular meetings at a regular meeting place, changed cropping patterns, and mobilised labour and resources for maintenance (Pradan and Yoder, 1989). All of this has created a greater sense of ownership. Robert Yoder (1991) put it: *'Treating the symptom, that is upgrading the physical system, when the cause of poor performance is governance, may temporarily improve system performance but experience has shown that there is little, long-term gain unless institutions are also strengthened... All the trainees made the connection between effective governance and agricultural productivity.'*

Sometimes expert farmers are hired by farmers' groups. In Ecuador, a cassava farmer from the Colombian north coast was hired to advise Ecuadorian farmers' associations (CIAT, 1989). This farmer-to-farmer approach has been an effective form of extension as, in just 3 years, the number of cassava-drying farmer associations in Ecuador grew to more than 20 with nearly 400 members. The cost of extension and applied research was cut to about one-third of what it had been, mostly by eliciting the cooperation of organized farmers.

But one of the greatest constraints for promoting wider use of farmer-to-farmer exchanges lies in the quality of available facilitators. They must be well acquainted with the farmers; they must know about the different systems and practices present in the various communities; they must be able to facilitate discussions, interjecting where necessary to guide the conversation; and they must be able to stimulate the discussion while not dominating it. They must, therefore, have all the qualities of the new professionalism described in Chapter 6.

Local Credit Management Groups

It has long been assumed that poor people cannot save money. Because they are poor and have little or no collateral, they are too high a risk for banks and so have to turn to traditional money lenders. These inevitably charge extortionate rates of interest and very often people get locked into even greater poverty while trying to pay off debts.

Recent evidence is emerging, however, to show that when local groups are trusted to manage financial resources, they can be more efficient and effective than external bodies, such as banks. They are more likely to be able to make loans to poorer people. They also recover a much greater proportion of loans. In a wide range of countries, local credit groups are directly helping poorer families both to stay out of debt and reap productive returns on small investments on their farms. The Grameen Bank, first established in Bangladesh, is perhaps the best-known example. First established in the 1970s, it has spread to reach 1.6 million members, giving many the opportunity to escape the trap of indebtedness. Its principles are being increasingly widely applied.

In the remote Northern Areas of Pakistan, the Aga Khan Rural Support Programme has helped to establish more than 1700 male or mixed village organizations, and 900 women's organizations, for resource and financial management, catering for some 53,000 households (AKRSP, 1994). Village

groups originally organized to help construct a physical improvement, such as an irrigation channel, road or bridge, have also helped local people to save small amounts of money and to create collateral for credit provision. It had long been assumed that the desperate poverty of local people would make such an effort worthless. But with local control and responsibility, groups have been able to save substantial sums.

The success of the AKRSP approach is now being replicated elsewhere in Pakistan. The National Rural Support Programme was established in 1991 to build a countrywide network of grassroots organizations which would enable local communities to plan and undertake their own development (NRSP, 1994). To do this, they help to organize the rural poor into multipurpose community organizations (COs) or sectoral organizations of special interest groups. The key to success has been the mobilization of local resources through a savings and credit programme, combined with technical assistance to improve agricultural production. By mid-1994, NRSP had helped to establish 420 COs with some 12,200 members.

Another notable success has grown up in southern India, where the NGO, Myrada, has shown the value of small groups to credit supply (Fernandez, 1992; Ramaprasad and Ramachandran, 1989). Years of relying on banks and local cooperative societies to supply credit had rarely helped the poor. But when they started to work with small independent groups with members feeling they could trust each other, they noticed that *'not only was the money managed more carefully, there was a far greater commitment and responsibility from the groups towards repaying the amount of money, something that had not unduly bothered them when they were part of the cooperative'* (Ramaprasad and Ramachandran, 1989).

It was realized that members of small groups participated more, had common concerns and needs with others and, once they had developed their own rules and decision making, they expanded their resource base and took up common action programmes. Groups are first organized around a collective need, such as for a drainage system, desilting a tank or even in one case for an elephant trap. They then develop a role in savings and credit management. The strength of the approach is that no two groups end up being alike. There are, however, common principles known to all. All groups evolve their own set of rules, with each deciding its own interest rates to members as well as the types of loans it will permit. All agree that leadership responsibility must be shared, with no office bearing titles. All groups encourage members to save. All hold money in a common fund. All advance loans for consumption as well as production purposes. All can engage in providing or running community services.

What is particularly significant for the programme is that some 95–98 per cent of loans are repaid. This contrasts with just 20–25 per cent for banks making loans under Integrated Rural Development Programmes. In addition, the total advanced far exceeds the total fund size, implying an efficient rolling use of funds. By mid-1992, some Rs108 million (US\$3.6m) had been lent out by more than 2000 local groups to their 48,000 members. The total common fund is Rs24 million, implying that each rupee had been lent out and repaid five times. The number of loans made is much greater than what banks can cope with. In four years, groups in Talavadi

advanced 26,454 loans, in Bangarpet 5293 and in Holalkere 8376, while one branch of a bank finds it difficult to handle 400 loans in a year. The majority of loans are taken out for consumption purposes, and many of these for very small sums, often less than Rs100 (Table 5.3). Rather than borrowing money from a moneylender to pay for a funeral, marriage or food before the harvest, now rural households are able easily to borrow small amounts of money. Small amounts are vital for small farmers. As Aloysius Fernandez (1992) put it *'while a farmer may be eligible for a loan package that can buy him 20 sheep, what he wants and can manage is only two sheep. A credit group understands such priorities much better than a bank can'*.

Table 5.3 Measures of success of local credit groups programme of Myrada in southern India

Measures of performance	Talavadi	Thally	Kamasumudram
Number of local groups	72	58	110
Number of members	1754	1569	2500
Fund size (Rs million)	1.31 m	0.904 m	0.626 m
Total advanced (Rs million)	nd	1.2 m	2.09
Number of loans advanced	26,454	6515	5293
Proportion of loans for consumption purposes (mostly food)	77%	82%	19%
Proportion of loans for less than Rs 500	98.5%	nd	81%
Proportion of loans for less than Rs 100	38%	nd	12%

nd = no data

Source: Fernandez, 1992; Ramaprasad and Ramachandran, 1989

Perhaps the most significant aspect of Myrada's programme is that its success has led to an important national policy change. The convention in India has been that banks must lend only to individuals. But this has recently changed. The Reserve Bank of India issued a government order and NABARD followed with guidelines instructing all banks to relate to local groups as institutions. This has opened the way for ensuring that many more poor and needy people have access to much needed credit via their local groups.

All of this is in stark contrast to the way credit supply to local groups is normally managed. If only one institution is present in the community, with powers to refuse membership, then the poor and women are liable to be excluded. This has happened in Malawi, where the farmers' clubs established to channel credit to poor farmers have the autonomy to select their own members (Kydd, 1989). No collateral is required and repayment rates are more than 90 per cent. Yet as only one group is formed per community, only 20 per cent of households are in credit groups, most of those excluded having less than one ha of land each (see Table 2.4). The wealthy are those with access to credit.

SCALING UP FROM THE LOCAL LEVEL

Joining Together for Wider Impact

There are a growing number of local successes in community based and participatory planning. But these tend to remain local and so do not spread. Locally based organizations are good at having an integrated view of problems, tend to have a power base with local links and receive ready feedback. But their major difficulties lie both in commanding technical expertise and trying to solve problems arising out of the wider political context, such as product pricing and labour markets (Bebbington, 1991). Local institutions working alone are very unlikely to influence state policies. The problem is that existing platforms for decision making have not been set up for natural resource management, nor do they correspond to ecosystems to be managed (Röling, 1993). A major challenge for sustainable agriculture lies in widening the impact of local groups and ensuring the persistence of successful initiatives.

One way to ensure stability of groups is for them to join with others to work on influencing district, regional or even national bodies. Such intergroup cooperation might involve several groups coming together to federate and pool resources and knowledge. This can open up economies of scale to bring greater economic and ecological benefits. The emergence of groups and federated groups also makes it easier for government and non-governmental organizations to develop direct links with the poor. This can in turn result in greater empowerment of poor households, as they draw on public services.

Scaling up can occur through the establishment of federations or coordinating networks. Smaller organizations can federate to produce larger organizations, which can have a regional lobbying role and can express political concerns to state level. Moving up does not necessarily imply institutional growth, as this can be a threat in itself. But it may help to spread good ideas through a geographical area. At this level, organizations with greater membership carry greater political clout, can begin to influence policy and are able to draw on technical expertise.

The Federation of Free Farmers in the Philippines is a nationwide effort, directly supporting low input and sustainable agriculture (Montemayor, 1992). It has a membership of some 250,000 farmers, organized into village chapters. Local groups are linked to municipal chapters, provincial associations, and then to regional and national offices. A wide range of services are offered to members and, at national level, the federation has been able to influence policies on land tenure and fertilizer supply. The Agriculture Department was convinced, for example, to allow farmer-borrowers to buy organic fertilizer instead of being limited to inorganic products under the government credit programme.

Another advantage for local institutions of these scaled-up networks or federations is that they present a united front to funding agencies and governments. These create the opportunity for more efficient and more effective disbursement of funds by donors, with lower administrative costs. In Burkina Faso, ACORD has helped local groups produce village portfolios that are consolidated into a coherent regional planning

document. This has resulted in many more groups having access to external support, as well as the strengthening of existing planning institutions (Box 5.6).

Box 5.6 The advantages of scaling up as part of the approach of the NGO ACORD in Burkina Faso

ACORD has used participatory methods in its programme of support to local groups in Burkina Faso. It aims to assist groups to recognize change as one way to improve their situation, and this is achieved through a continuing cycle of analysis, reflection and action. A survey of past efforts showed that projects failed because villagers did not consider them as their own, but externally imposed; that limited management capacity hindered implementation; and that some village groups had internal problems that were aggravated by the project. At the regional level, there was no overall policy to tackle the particular needs of the area.

Since 1983, this programme has strengthened village groups, encouraged links between them, and facilitated their access to financial and other support from other agencies. The problem for many funders was their inability both to identify suitable groups or projects to support and to follow up on what they funded. ACORD, through its process of participatory animation, built up *village portfolios* that corresponded to the individual needs of the groups into a coherent regional planning document. This allowed donors to invest in the diverse areas of support that had been locally identified. This process, apart from reinforcing local planning capacities, succeeded in channelling an average of between US\$1–2.5 million each year to properly identified projects. This guaranteed a better utilization of funds as well as increasing the accessibility of such support to many more groups.

This indicates the importance of strengthening local groups, and at the same time coordinating and directing external support to them.

Source: Roche, 1991

Farmers' Federations in Ecuador

A good example of the success of locally based farmers' organizations comes from the Andean province of Chimborazo in Ecuador (Bebbington, 1991). There is a strong tradition of organization among indigenous farming communities, mainly originating from demands for land, religious rights, affordable transport and better infrastructure. In response to the weakness of government services, federations of groups have now initiated their own research and extension programmes, and, unusually, have attained high levels of control over the research and extension process.

Although this process uses demonstration plots, field days, extension visits, seed multiplication and input distribution systems, farmers in these organizations control, implement and own a large part of these activities. The main activity of federated organizations is to help members conduct trials aimed at raising yields without increasing production costs or risks. These are conducted with the help of agronomists hired by the groups. Through this process, technologies are progressively adapted and, most

importantly, information on the changes is made available to members through a variety of extension methods, including training courses, meetings and radio programmes. Farmer extensionists also go on courses given at the national agricultural research institute. They are trained in formal agricultural science, but can now assess this in the context of their own local knowledge. Some become more 'modern' than others, but all end up with an understanding of both formal and informal agricultural science.

Most farmers' groups aim to sustain and enhance rural livelihoods through strong organization, and want to increase local income generation so that they do not have to migrate out in search of work so much. Now that they spend more time at home, they are able to strengthen family and community ties, as well as avoid the deep personal and economic costs of migration. The range of services offered by these federated organizations includes more than just extension. Some also run subsidized seed and input distribution, forestry projects, guinea pig projects, veterinary services, school vegetable projects, artisanal workshops, radio services, community water projects and health education services.

Consumer Groups in Japan

Federated groups of consumers can also be important actors in the quest for a more sustainable agriculture and regenerated rural communities. In Japan, women have formed remarkably successful consumer groups to make direct links with farmers and manufacturers of other goods (Furusawa, 1994, 1992, 1991). These consumer-producer groups come in all sizes, are based on relations of trust, and put a high value on face-to-face contact. There are now some 800-1000 groups in Japan, with a total membership of 11 million people and a turnover of more than US\$15 billion each year for all activities.

Some are small ventures in which a few households, say 10 to 30, make a link with a single farmer, who supplies food of a particular quality, usually organic. One medium-sized group is the Young Leaves co-operative, begun by Hiroshi Ohira, who farms in Tokyo. It now has 400 household members and 11 farmers, who supply vegetables, rice, root crops and fruit. Farming is intensively organic. Members buy about 75 per cent of their food through Young Leaves. Prices are decided at an annual meeting of producers and consumers, and there tends to be little year-to-year variation. Sometimes prices are higher than normal market prices, sometimes they are lower.

The largest group is the Seikatsu Club, which has a membership of more than 200,000 households and branches all over Japan. It was set up in 1965 by a housewife living in Tokyo, who wanted to find a way of avoiding the high price of milk. Her idea was to band together with 20 other customers in the neighbourhood and buy milk directly from the distributors. Over the next few years, they also began to purchase food, clothes and cosmetics wholesale. In 1971, club members began to deal directly with farmers and take care of distribution themselves. Soon after, agreements with farmers were reached for rice, meat and fish. Members then began to order soap powder to replace detergents that they felt were polluting rivers and lakes. In 1978 a new headquarters was set up in

Setagaya and the first Seikatsu Club housewife was elected to local government the following year. As groups became frustrated with inaction in local and national institutions, they have increasingly entered the political arena (Box 5.7).

The turnover of the Seikatsu Club is now 40 billion yen (US\$320-350 million). The club believes that '*women can begin to create a society that is harmonious with nature by taking action at home*' (Clunies-Ross and Hildyard, 1992). A survey of changes in members' lifestyle after joining one group, the Society for Reflecting on the Throwaway Age, is revealing. Formed in 1973, it now has 1800 members, including 80 farmers, some 72 per cent of whom have noticed a difference in eating habits; 42 per cent take better care of things and do not waste them; 43 per cent have more interest in social affairs; 36 per cent started to recycle used oil; and 20 per cent noticed changes in the way they raised children (Furusawa, 1991).

Box 5.7 The widening influence of members of the Seikatsu Club in Japan

Unlike other consumer groups, the Seikatsu Club has entered politics. It has members and the resources to influence Japanese society in a fundamental way. It has built alternative cultural centres in local areas and carried out national campaigns of potentially far-reaching significance.

There are now 31 members of the Seikatsu Club holding elective positions in local government in the Kanto area. When the campaign against synthetic detergents was in full swing, women members had presented evidence to local government concerning the dangers of such detergents, but they were brushed aside by male officials. This experience made it clear that unless they themselves gained office, their efforts would come to nothing. And so they entered politics as independents, steering free of vested interests and established parties, and emphasizing that politics begins with daily life. With the slogan *Political Reform from the Kitchen*, they have successfully appealed to public concern over issues of safe food, conservation of nature, women's rights, peace and grassroots democracy.

Another campaign aims to transform both people and cities under the banner *From Collective Buying to All of Life*. This has led to the setting up of free schools and workers' collectives so that people can begin to free themselves from the grip of the centralized economy.

Source: Furusawa, 1992

NATIONAL INITIATIVES FOR LOCAL GROUP ACTION

Scaling-up of local efforts may occur in spite of, rather than because of, policies at national level. It is rarer for national policies to be set up explicitly to encourage local action. Two notable examples are from Australia and India.

Landcare Groups in Australia

In Australia, a community-based revolution called Landcare is turning farming and conservation on its head by encouraging groups of farmers to

work together with government and rural communities to solve a wide range of rural problems (Campbell, 1992, 1994b,c; Woodhill, 1992). More than 2000 voluntary community groups are currently working to develop more sustainable systems of land use, supported by a national 10-year funding programme. Landcare aims to combine elements of community and environmental education, action research and participatory planning, so as to tackle a range of agricultural production and conservation issues. It is working in a wide range of environments and providing policy makers with the opportunity to react to local needs.

Involvement of farmer groups in soil conservation is not new to Australia. The earliest forms of the current landcare groups were established for soil conservation programmes in Western Australia and Victoria in the early 1980s. Their activities broadened in the mid-1980s to focus on soil, water, flora and fauna, rather than just soil conservation, and taking a more bottom-up and group-oriented approach. These programmes grew much faster than expected with a minimum of resources, and were credited with enhancing the extent and the quality of land-user involvement in land conservation activities.

The level of attention to landcare increased dramatically in mid-1988, when an historic partnership was forged between the National Farmers Federation (NFF) and the Australian Conservation Foundation (ACF). The NFF and ACF jointly developed a National Land Management programme, which proposed a ten-year programme of funding support for landcare groups. Andrew Campbell, former national facilitator for Landcare, described the impact of this on policy and the public: *'The joint thrust of two powerful lobby groups, unlikely bedfellows from opposite ends of the political spectrum, presented a fascinating image to the media. The potent political ingredients of timing, a discrete package with broad voter appeal, against a background of exponential growth in community awareness of environmental issues, ensured that landcare became 'flavour of the month' (Campbell, 1994).*

The prime minister announced in mid-1989 that the 1990s would be the Decade of Landcare and outlined a A\$340 million funding programme based to a large degree on the NFF-ACF document. By October 1989, the total number of landcare groups in Australia was about 350, a number which doubled by July 1990. Despite tough economic conditions in rural communities, the explosive growth of the landcare movement has continued, now with over 2000 groups, comprising more than one-third of the farming community.

Landcare groups usually form when farmers at a local level perceive a problem (such as salinity, erosion, weeds, rabbits or tree decline) requiring cooperative efforts and decide to form a group to take practical action. The concerns of landcare groups typically evolve from a focus on the immediate problem which catalysed the formation of the group, to a broader range of environmental, social and economic issues as groups mature. The term 'landcare' itself has evolved in Australia and is now used both in a narrow sense to refer to voluntary local land conservation groups, and more broadly to refer to an emergent philosophy of participatory approaches improving land management planning, policy making, research, extension and education. Landcare groups are now complemented by a spectrum of initiatives including participatory

education programmes (Land Literacy), and group projects targeting specific issues such as conservation cropping (SoilCare), and farm profitability and business management (Farm Advance and Farm Management 500).

Some of the most far-reaching and powerful of the landcare initiatives are the land literacy programmes, as these involve children, who have a critical role to play in the future if some of the existing institutional, political and economic barriers to sustainable agriculture are to be shifted (Campbell, 1994b,c). Land literacy refers to activities designed to help people read and appreciate the signs of health (and ill-health) in a landscape, and to understand the condition of and trends in the environment around them. Many of the most important land degradation problems are complex, insidious and not visually obvious. For land degradation problems, it is wise to assume that prevention is cheaper and more effective than cure. But it is difficult to get people excited about prevention, if they cannot see or appreciate the problem. There is a wide range of land literacy programmes complementing the activities of Landcare groups in Australia (Box 5.8). These are described in more detail in Campbell (1994b).

Box 5.8 Land literacy in Australia: the example of Saltwatch

Saltwatch began in Victoria in 1987 as a participatory community education initiative conceived by the Victorian Salinity Bureau. It is now taking place in five States. By 1992, more than 900 schools and 50 Landcare groups were involved in gathering and analysing tens of thousands of water samples from creeks, rivers, reservoirs, irrigation channels and bores. Each school or community analyses its data and sends it to a central agency for processing, receiving in return a computer-generated overlay map of water quality in the district. This is often displayed in the school, store, hall or the pub. Data are stored on school computers as well as in government agencies, and groups are encouraged to look at trends over time within their district. The composite maps are used for interpretation, discussion and planning further action such as excursions, rehabilitation projects and interpretative displays. Schools and community groups have access to education kits, manuals and curriculum materials, and training programmes for teachers in land literacy have been developed.

Source: Campbell, 1994b

It is still too early to measure many of the physical impacts of landcare. But there have been major individual and institutional changes. Many people involved in landcare are learning more about their own land, about the land in their district and about issues they may have rarely considered in the past. Group leaders in particular have gained great satisfaction from seeing other people get involved, from influencing others through their interaction in the group and occasionally from group projects. Extension staff have also changed, becoming more than providers of information. They are evolving into facilitators of learning and are being trained to work with groups, helping them become self-reliant.

Some groups have already created a climate of opinion more favourable to the adoption of resource-conserving practices and some have achieved notable successes in land management improvements particularly suited to group action, such as controlling rabbits and weeds. Landcare, by involving committed people closest to the land, has the potential to be the first step in evolving new land use systems, and new relationships between people and land, which build upon human resources instead of discounting them or seeing them as part of the problem.

But the programme is not without problems (Campbell, 1994b,c). The learning and satisfaction at local level is often tempered by growing frustration: about the level of knowledge and resources available seriously to tackle problems; about the few people who really understand what needs to be done and the amount of poor land management still occurring; and about the bureaucracy, paperwork and politics of landcare, particularly for project funding. Many professionals have little training in people skills or participatory methods and they find it hard to be accountable to local people. They tend to constrain and hold back progress. A key constraint, therefore, remains the existing institutional cultures, which are yet to be oriented towards genuine community involvement and self-reliance.

Joint Forest Management in India

As the result of a series of laws and policies evolved over the past century which have nationalized community and private forest lands, and gradually eroded the rights and concessions of surrounding forest communities, the state governments' forest departments now own 95 per cent of India's forest lands. These agencies have an historic mandate to maximize revenue and protect the forests from expanding local populations. Yet they have been largely unsuccessful: less than half of India's forest lands remain under closed canopy forests and the remaining forest lands are in various stages of degradation (SPWD, 1992; Singh, 1990).

During the late 1970s, and 1980s, enlightened officials in several states began to realize they could never hope to protect forests without the help and involvement of local communities. They helped to establish local forest protection committees (FPCs) or hill resource management societies, which were given the responsibility of protecting degraded land and granted rights to the use of a range of timber and non-timber forest produce. Success in the form of biological regeneration and increased income flows was so spectacular (Dhar et al, 1991; Pandit, 1991; Campbell, J 1992), that the national government issued an order on 1 June 1990, requesting all states to undertake participatory forest management. This also encouraged the involvement of NGOs as intermediaries and facilitators. Many states have now passed their own orders and regulations, *'outlining rules for reversing decades of confrontation between forest departments and local communities, and pointing the way to a new form of joint forest management undertaken in partnership with local communities'* (Campbell, J 1992).

By 1992, the area managed by nearly 10,000 formal and informal forest protection committees was some 800,000 ha, including 100,000 in Madhya

Pradesh, 150,000 in Orissa, 200,000 in Bihar and 300,000 in West Bengal (SPWD, 1992). One survey of 12 FPCs in Midnapore District of West Bengal revealed that of 214 wild plants species observed in regenerating sal forests, 155 were now used by local people. The mean income to tribal and caste households was some Rs 2500, contributing between 16–22 per cent of total farming income (SPWD, 1992). Old attitudes are changing, as foresters appreciate the remarkable regeneration of degraded lands following community protection and the growing satisfaction of working with, rather than against, local people.

The lack of tenure is a potential future problem, as community groups may feel less secure in their commitment without clear time horizons. Forest agencies may also be inclined to take back forests once they are regenerated and now productive. In some parts of Bihar and Orissa, however, the local committees have grown in significance such that new political movements have developed out of forest protection and utilization. As V K 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'*.

An example of the types of local rules developed by the forest protection committees is shown in Box 5.9. These rules are a sign of strong local institutions with rights and access to resources. They are the foundation for sustainable development. In some cases, fines have been imposed not only on villagers but also on forest guards and, in others, communities have taken action on social issues, punishing anti-social drinking and abuse. In Madhya Pradesh, the benefits have included improvements in fuelwood,

Box 5.9 Examples of rules formulated by forest protection committees in Madhya Pradesh in India

Grazing

'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 villagers of other villages to do so. We shall keep our cattle at home and all cases of violation would be reported to the forest officer'.

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'.

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'.

Firewood

'No villager would carry the fuelwood head load for sale outside the village. The defaulters would be charged Rs51 per head load'.

Source: Bahuguna, 1992

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 organizations (Bahuguna, 1992).

SUMMARY

Although there are many potentially productive and sustainable technologies available to farmers, a transition to a more sustainable agriculture will not occur without the full participation and collective action of rural people. The development of a more sustainable agriculture depends not just on the motivations of individual farmers, but on the action by groups or communities as a whole. This makes the task facing agriculture exceptionally challenging.

The problem with national and international institutions is that they have tended to substitute for local action, so smothering any existing initiatives or institutions. As local groups and institutions have been ignored, so many have disappeared entirely. This has led both to increased degradation and to decreased capacity in local people to cope with environmental and economic change.

It is increasingly well established, however, that when people who are already well organized, or who are encouraged to form new groups, they are more likely to continue activities after project completion. There are six types of local group relevant to the needs for a more sustainable agriculture. These are community organizations; natural resource management groups; farmer research groups; farmer-to-farmer extension groups; credit management groups; and consumer groups.

The process of establishing and/or supporting self-reliant groups is not easy. It should not be rushed into nor forced on local people. It needs external catalysts or facilitators, and should focus on building the capacity of people to develop new ways of learning and new forms of leadership. These groups have led to direct economic benefits for many rural people, as well as improvements in natural resources. What many comment upon, however, are the more intangible benefits of rediscovered social cohesion and solidarity. As confidence grows with success, groups evolve new roles and responsibilities, often joining with other groups to achieve a wider impact.

As yet, the scaling-up of local efforts has occurred largely in spite of, rather than because of, policies at national level. However, there are emerging examples of national policies designed to encourage these approaches, in which local groups do not substitute for local government services, but are seen as partners. If these local institutions are not to be suffocated or coopted, as they have been in the past, then external institutions must begin to play a role quite different from the norms of the past. They will have to focus much more on facilitating change in others. This means they will have to become enabling institutions.

EXTERNAL INSTITUTIONS AND PARTNERSHIPS WITH FARMERS

'Tea rooms were constructed of materials that could be found easily and near at hand. Rare and expensive materials were avoided. A log or branch from a nearby grove of trees, a stone by the roadside, were collected and incorporated into the final design. The original spirit of tea-room architecture is the same. It is an architecture built by gathering things close at hand... As a result, the tea room seems not to have been designed but built through a process of natural accretion.'

Kisho Kurokawa, 1991.

THE CONVENTIONAL INSTITUTIONAL CONTEXT

The previous two chapters have given details of the resource conserving technologies and the local groups and institutions necessary for agriculture to become sustainable. The third essential element is the way external institutions are organized and the way they work with other institutions and farmers. In the process of agricultural modernization, external institutions have tended to ignore and so suffocate local knowledge and initiative.

The complexities involved in achieving a diverse and productive sustainable agriculture mean that organizations will have to adopt new ways of working. This implies greater multi-disciplinarity, more structured participation with farming communities in research, extension and development activities, the evolution of learning processes in organizations and the development of a whole new agricultural professionalism itself.

Why Learning is so Difficult

For many reasons, existing agricultural institutions, whether universities, research organizations or extension agencies, find it difficult to learn from farmers and rural people. This is because of their internal structures, the

way they develop their staff and the ways these staff interact with people outside their institutions (Korten, 1980; Chambers, 1992a; Roche, 1992; Pretty and Chambers, 1993a,b).

The first problem is that organizations are characterized by restrictive bureaucracy and centralized hierarchical authority. Their staff spend more time looking inwards and upwards towards seniors than outwards towards clients. They follow long-established norms of behaviour, filtering and passing information up to seniors. If they have ideas about how changes can be made to improve performance, it is difficult for them to get these heard. This is chiefly because staff are afraid to make mistakes, as they expect to be punished rather than rewarded for invention. Mark Easterby-Smith (1992) describes a typical organization: *'a combination of power culture and highly centralized controls, with rigidly designed systems and procedures, produces behaviour amongst managers that makes learning almost impossible. In particular, the tendency to make scapegoats out of those who made mistakes leads to a general aversion to taking risks, and managers, afraid of being punished as harbingers of bad news, tend to concentrate on providing only good news to their superiors'*. In such contexts, new initiatives are bound to fail.

The second problem is that the majority of agricultural professionals are specialists. They see only a narrow view of the world, yet are encouraged to continue to work in this way by internal reward systems and incentives. The performance of researchers, for example, is commonly measured by the number of scientific papers they have published in prestigious journals. Without a good publishing record, they will be unable to get promotion (McRae et al, 1989). Whether the research has had a positive impact on farmers' livelihoods is mostly irrelevant. As Patrick Madden and Thomas Dobbs (1990) put it: *'Disciplinary work generally receives greater recognition and acceptance than does multidisciplinary work in peer-oriented professional journals, in university tenure and in promotional processes'*.

But specialist professionals tend to have higher status than those working more closely with farmers and rural people (Chambers, 1985). Specialists in agriculture, such as genetic engineers and biotechnologists, focus on controlled environments with organisms or small parts of them, such as cells or genes. Changes to crops and animals are made without regard to the real-world context of these crops/animals. By contrast, those with the lowest status and pay in agriculture are the community development and extension workers, who work with rural people using a wide range of social and technical skills. They work in the complex and uncontrollable real world.

This is also true of many other professions. In medicine, it is the transplant and micro surgeons, dealing with their patients as machines, who have the highest status. They do not need to know anything about the social context of their patients. By contrast, community health workers come into contact with sick people in their environment, with all its complexity and uncertainty. They are probably more concerned with preventative medicine. Yet they have low status and are certainly paid much less than surgeons.

The third major problem restricting or preventing learning about the complexities of a changing world is that organizations commonly get misleading feedback from their peripheries. This is partly because of the methods and approaches they use to gather information and measure performance. Both questionnaire surveys and brief development tourism visits are deeply flawed because of the selective nature of information coming from them. Senior staff are left with falsely favourable impressions of the impact of their work and so they themselves have few reasons for initiating or encouraging change.

Self-Deception and Questionnaire Surveys

A major reason why agricultural professionals and institutions have had only a partial view of rural realities relates to the widespread reliance on questionnaire surveys. The formal survey with a preset questionnaire has long been the standard choice for those needing information on rural resources and people. The questionnaire is commonly designed by senior professionals and given to enumerators who interview a sample of people 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. Many informants are selected to account for all variation and the resulting data are statistically analysed. Surveys are used at practically all levels, from the large-scale census to small-scale village level research, by governments and NGOs; and for planning, research and extension.

But questionnaire surveys do not always produce useful and relevant information. This is because of the structure of the questionnaire forms themselves, the perceived need to interview large numbers of people, and the nature of the interaction between the outsider and local people.

The questionnaire designer has to determine well in advance what questions will be included on the form. But those who design these instruments, themselves outsiders, do not know in advance what issues are important for local people. So they tend to add more and more questions, to ensure all relevant issues are covered. This leads, in some cases, to forms of absurd length, with several hundred questions taking hours to administer. Such questionnaires, therefore, eliminate the possibility of capturing the unique and spontaneous insights which might arise in the course of a conversation or interview.

Rarely is attention paid to the nature of the interviewing process. Questioning and answering are ways of speaking that depend on culturally shared and often tacit assumptions about how to express and understand beliefs, experiences, emotions, and intentions. Yet in the structured survey, many of the contextual grounds for understanding are systematically removed or ignored. As a result, surveys have lost the capacity to understand what respondents mean by what they say. In the drive for standardization, the multiple perspectives on problems and issues that relate to local context are lost, and the whole process of learning is impoverished.

Another problem is the tendency for people to want to please interviewers by giving them what they want. The stranger tends to be looked on as a guest and the duties of the host are often regarded as

sacrosanct. Not understanding the real purpose of the survey, the respondents try to please their guest by giving what is assumed to be the required answer. Very often, the ill-trained enumerator makes this all too easy by prompting with suggested answers. The enumerator also has a quota to fulfil, but the respondent does not know that. As Gerry Gill (1993) has put it: *'The stranger then produces a little board, and clipped to it, a wad of paper covered in what to the respondent are unintelligible hieroglyphics. He then proceeds to ask questions and write down answers – more hieroglyphics. The respondent has no idea of what is being written down, whether his or her words have been understood or interpreted correctly. The enumerator, being simply a data-gatherer, has no way of knowing – and no responsibility to know – whether the answers being given are correct or whether they make sense to the broader framework of the survey. The interview complete, the enumerator departs and is probably never seen again'*.

Over the past 30 years, the structured questionnaire has developed into 'an industry' in which practitioners have become 'slaves to the methodology' (Ashby in Rhoades, 1990). Despite many critiques of this mode of data gathering (Chambers, 1983, 1992c; Fowler and Mangione, 1990; Rhoades, 1990; Gill, 1993), official surveys, such as sample censuses of agriculture or household expenditure surveys, are as popular as ever.

Self-Deception and Rural Development Tourism

At the other end of the spectrum to the over-structured approach of the questionnaire are the brief field visits made by development professionals, which they use as their basis for understanding complex rural life. Such 'rural development tourism', though, is beset by invisible biases that ensure that professionals not only see a small and selected portion of rural life, but also that they believe that this is an accurate picture. Robert Chambers (1983) characterized these biases of rural development tourism into four main types. These are:

- spatial biases, in which it is the better off communities, and people living near to roads and services that are visited, and those who are remote and poorer missed;
- time biases, in which visits are made during the seasons when roads are open and people are better off, rather than say during the wet season when people are starving and desperate; and in which visits are made during office working hours, when rural people are busy in the fields, rather than in the early mornings or evenings;
- people biases, in which development tourists speak only to rural leaders and articulate people, who tend to represent the elite, dominant and wealthy groups, and so are not exposed to the perceptions of women, the poorest, the weakest and so on;
- project biases, in which a showcase village or technology is repeatedly selected to show to outsiders, who assume this is typical of all efforts.

What all this implies is that institutions come to believe that this selective information represents a complete picture. They misunderstand the poor and non-elite, and so are surprised when technologies they develop are

rejected. Contrary to learning about local conditions, development professionals have tended to impose their own criteria and constructs. As local criteria are almost always more diverse, the result is the reduction of diversity to simplicity. This may result in a fair representation of some people's views, but certainly will not be fair for a whole community of diverse needs and values.

A classic example of this comes from the way official definitions of poverty differ from local people's perceptions. Standard definitions of poverty arrive at a poverty line based on external concepts of welfare. This is often described as the minimum amount of goods and services necessary to live a decent life. But the common focus on money income for measuring poverty has major flaws because local perceptions are ignored in the process (Chambers, 1993; Mukherjee, 1992; RRA Notes, 1992; Glewwe and van der Gaag, 1990).

Most people themselves do not characterize well-being so strictly and simply. N S Jodha's work over a 20-year period (1988) with people of 2 villages in Rajasthan showed that they had 38 local criteria for economic status. For those that had become poorer by official measures since the early 1960s, it was found that they had actually become better off in all but one of their own criteria. These improvements included fewer households working as attached labourers, fewer residing in the landlord's yard, fewer marketing produce only through landlords, fewer with members having to migrate out seasonally to search for work, more making cash purchases during the festival season, more eating green vegetables, more where maternity feeding to mothers provided up to a month or more, and more with sturdier housing. Similar examples of such diversity of local indicators of well-being have been described in many other countries (RRA Notes, 1992; Grandin, 1987).

Another example relates to the way local people judge modern crop varieties. They do not always see them in the same way as researchers and extension workers. Their criteria for evaluating and making choices are frequently so different that sometimes the best products of research services are rejected, while others judged inappropriate are chosen by farmers as favourable (see Chapters 2 and 3).

In Colombia, a high yielding variety of bush beans (*Phaseolus vulgaris*) was rejected by farmers because the variable colour made marketing difficult; another variety rejected by researchers for its small bean size was acceptable because, as one farmer put it 'is good for consumption purposes because it swells to a good size when cooked – it yields in the pot' (Ashby et al, 1987). In the Philippines, sweet potato varieties bred for high yield and sweet taste were rejected by upland farmers who preferred rapidly vining varieties that prevented weed growth and rain-induced soil erosion. They also selected tolerance to weevil damage during the underground storage phase as an important characteristic, as this meant the potatoes could be harvested only as required (Acaba et al, 1987). In Andhra Pradesh, India, women farmers working closely with agricultural scientists from ICRISAT appreciated the most productive and pest-resistant characteristics of the researchers' most favoured variety of pigeonpea, yet declined to grow it because of its bitter taste (Pimbert, 1991).

The lack of understanding of local perceptions and needs is not necessarily restricted to modern, high-external input agriculture. If the resource conserving technologies and social organizations described in Chapters 4 and 5 are forced on rural people, then they too will go the way of 'modern' agricultural technologies. The emerging danger is that agricultural professionals, in promoting new technologies that are low cost, sustainable and productive, will forget the diverse conditions and needs of rural people. If this occurs, then the widespread adoption of resource-conserving technologies will remain as remote as ever.

'PARTICIPATION' IN DEVELOPMENT

Multiple Interpretations of Participation

There is a long history of community participation in agricultural 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 mobilization 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 (Montgomery, 1983; USAID, 1987; Baker et al, 1988; Reij, 1988; Finsterbusch and van Wicklen, 1989; Bagadion and Kortén, 1991; Cernea, 1991; Guijt, 1991; Kottak, 1991; Pretty and Sandbrook, 1991; Uphoff, 1992a; Narayan, 1993; World Bank, 1994b).

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 agricultural support institutions must, therefore, be greater involvement with and empowerment of diverse people and groups, as sustainable agriculture 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.

In conventional rural development, 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. The confusion is complete when technical work is known to be completely inappropriate. Norman Hudson (1991) describes the reaction of a visitor to a project where food for work was used as an incentive for people to participate: *'But you are planting the wrong species at the wrong time in the wrong place, and the survival rate will be almost zero.'* The project officer said *'I know. It hurts my professional pride too. But there are people starving in this District, and this project brings them food.'*

In another project in Kenya, this time on integrated pest management, farmers were given improved maize, sorghum and cowpea seeds, 50 kg of fertilizer, farm implements, construction materials for new granaries and tractors for ploughing. All were provided free, except for the ploughing, which was at cost, to help trigger the process of adoption. In spite of all this, the project's view was that *'the participating farmers are expected to apply the recommendations after the project ends'* (Kiss and Meerman, 1991).

This paternalism undermines sustainability goals and produces results which do not persist once the project ceases (Reij, 1988; Fujisaka, 1989; Treacy, 1989; Kerr, 1994). Few have commented so clearly and unequivocally as Roland Bunch (1983, 1991) on the destructive process of giving things away to people or doing things for them. He suggests five major problems:

- give-aways blind people to the need for solving their own problems;
- people become accustomed to give-aways and come to expect them;
- give-aways are 'monstrously expensive';
- give-aways hide people's indifference to programme efforts; and
- give-aways destroy the possibility of there ever being a multiplier effect.

Despite this, development programmes continue to justify subsidies and incentives, on the grounds that they are faster, they can win over more people, the people cannot help themselves or that the people are just so poor that justice demands they are given one chance. But as Roland Bunch (1991) put it: *'Obviously, though, programmes must do something for the people. Were they able and willing to solve all their own problems, they would have done so long ago... It should be emphasised that anything we do that people can do for themselves is paternalistic.'*

As little effort is made to build local skills, interests and capacity, local people have no stake in maintaining structures or practices once the flow of incentives stops.

'Participation' in Soil and Water Conservation Projects

Soil and water conservation is one field of agricultural development long characterized by multiple interpretations of participation. For close to a century, rural development policies and programmes have taken the view that farmers are mismanagers of soil and water, and so must be advised, lectured, paid and enforced to adopt conserving practices and technologies (see Chapters 2 and 3). Yet most projects have adopted the rhetoric of participation to describe these activities (Box 6.1). Very impressive physical results have been achieved in the short-term and projects assume, therefore, that maintenance will occur after the project. But, the disappearance of soil and water conservation structures, such as 120,000 ha of earth bunds built in Burkina Faso in the 1960s and 20,000 ha of narrow-based terraces constructed in Kenya in the 1950s, is so common that there would appear to be a sad future for many contemporary efforts based on a similar controlling participation (Reij, 1988; Hudson, 1991; Gichuki, 1991). Three examples from Africa illustrate the confusion.

A major project in Niger was described by the implementing agency in this way: *'People's participation is the power behind the Keita project. From decision-making - to planning - to action: local farmer-livestock owners have been consulted and actively taken part in every step'* (FAO, 1992). Yet some 2.76 million work-days were paid for with World Food Programme rations, which served as *'incentives to participate in land reclamation and training courses offered by the project'*. The project, therefore, believes its own success: *'the techniques for soil and water conservation have been learned readily by local farmers and should continue to be used after the project ends'*. Of course, this may be the case. But history suggests that these structures are unlikely to be sustained.

In Ethiopia some 200,000 km of terracing were constructed during the 1980s with food for work (Mitchell, 1987). But an evaluation indicated that *'the target group is not questioned as to their needs and preferences, nor do they participate in project planning. They implement the project in the sense that they perform the constructing and planting tasks assigned them. Participation is either compulsory via peasant association campaigns or paid through food for work.'* (SIDA, 1984).

This participation was extraordinarily controlling: *'when the conservation work is completed, a technician from the project... comes to inspect. If the work has been carried out in a technically acceptable manner, then full payment is awarded. If not, payment is delayed until the work has been corrected'*. In the same document, the project indicated that it *'expected that peasants will, in future, bear the costs of whatever maintenance is carried out'*, yet also that *'the use of food for work... has diminished farmers' commitment to the maintenance of soil conservation structures'*. In fact, some 40 per cent of terraces were already broken in the first year after construction (SIDA, 1984).

This effort in Ethiopia was described by FAO (1986) as *'one of the largest and most successful soil conservation projects in the world... (with) Peasant Associations able to mobilise organized labour quickly and efficiently'*. A total of 34.3 million person-days of work was devoted to conservation, involving the *'co-operation of some 8000 Peasant Associations'*, according to FAO (1986, in Ostberg and Christiansson, 1993).

Box 6.1 The changing rhetoric over participation and soil conservation

Ostberg and Christiansson (1993) describe how the rhetoric over participation and soil conservation has changed in recent years in FAO documents. The tone struck in a 1986 booklet *Protect and Produce: Soil Conservation for Development* was that precious soil is threatened everywhere. *'One thoughtless action by one human being can remove for ever tens of tonnes of soil from each hectare that he or she farms. In a few days the legacy of thousands of years of patient natural recycling can vanish for good. It is terrifying to consider what is at stake.'*

It is clearly thought that farmers do not know their job: *'when the wrong crop is selected, or the wrong farming technique chose, yield inevitably drops. Erosion follows... The causes of soil erosion are well known. So are the techniques with which to combat it'*.

As Ostberg and Christiansson suggest *'the FAO publication offers advice on how to inform and train farmers... The technical fixes are there. With the right incentives farmers can be persuaded to switch to new farming practices and maintain existing conservation work'*.

A later 1990 blueprint for soil conservation contains a chapter entitled *'Encouraging participation'*. It suggests that land users themselves are best suited to plan and implement their own solutions. *'But the rest of the chapter is hardly distinguishable from what is said about most development cooperation. Picking verbs from the text it becomes obvious who is considered to be in the know. Some are to motivate, introduce, teach, persuade, alert, make aware'*.

By 1992, it had become time for a revised edition of *Protect and Produce*. The passage quoted from the 1986 edition remained the same, as did the general perspective. Population increase is regarded as the major cause of land degradation.

But a new perspective is emerging, as shown by the following quotes: *'success stories are rare enough to be notable'*, *'the general approach to soil conservation has been faulty'*; *'governments should become facilitators instead of being agencies that implement conservation projects'*. The emphasis, as Ostberg and Christiansson put it, is at last on people finding their own solutions.

Source: Ostberg and Christiansson, 1993

The arrogance of external agents is pervasive. Apparently, *'farmers' participation was shown by their contributions of labour for infrastructure development'*, and the project expected these structures to be maintained because *'training... will help in sustaining activities when the donor pulls out. The privilege of being trained will keep the individuals responsible in the activities he [sic] was trained for'* (reported in Oxfam, 1987).

Another project in Tanzania has completely removed livestock from whole communities, with tens of thousands of animals removed from individual districts (Mndeme, 1992; Christiansson, 1988). Such a policy was only possible *'after mustering the cooperation of the ruling party and government machinery at village, district, regional and national levels. Inevitably*

some of the actions necessary to reverse soil degradation processes are a bitter pill to swallow'. Despite this, the project believes that: 'the favourable results of destocking have sparked an interest in taking similar measures, particularly in the region's other districts' (Mndeme, 1992).

Most soil and water conservation projects have paid and continue to pay local people in cash or food for their 'participation' (Kerr, 1994). But this is self-defeating. According to Chris Reij (1988): 'practice shows that where people are paid for soil and water conservation, the end of the project almost invariably leads to a stop in the construction of conservation works'.

Types of Participation

Although there are many ways that development organizations 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 6.1). 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 to 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 of development is to achieve sustainable development, 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 almost always 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 very 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. Rarely were components of functional or interactive participation present.

Another study of 121 rural water supply projects in 49 countries of Africa, Asia and Latin America found that participation was the most significant factor contributing to project effectiveness, maintenance of water systems and economic benefits (Narayan, 1993). Most of the 121 projects, however, referred to community participation or made it a specific project component, but only 21 per cent scored high on interactive participation. Clearly, intentions did not translate into practice. It was when people were involved in decision making during all stages of the project, from design to maintenance, that the best results occurred. If they were just involved in information sharing and consultations, then results were much poorer.

According to the analysis, it was quite clear that moving down the

Table 6.1 A typology of participation: how people participate in development programmes and projects

Typology	Characteristics of each type
1. Passive participation	People participate by being told what is going to happen or has already happened. It is a 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 using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings 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 people'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 on-farm research falls in this category, as farmers provide the fields but are not involved in 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 institutions 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. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

typology moved a project from a medium to highly effective category. Deepa Narayan (1993) summarized the study in this way: *'The good news is that beneficiary participation in decision making is critical in determining project effectiveness, maintenance of water systems, environmental effects, community empowerment and strength of local organizations. The bad news is that so far relatively few externally supported projects have achieved meaningful beneficiary participation. Even fewer have empowered women.'*

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 agriculture. 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.

Alternative Systems of Learning and Action

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 programmes, projects and initiatives, these approaches represent a significant departure from standard practice. Some of the changes under way 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, 1992b,c; Pretty and Chambers, 1993a,b).

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 (Box 6.2). 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. But this diversity and complexity is a strength. Despite the different ways in which these approaches are used, there are important common principles uniting most of them. 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 inquiry and interaction, their use has to be participative.
- **Multiple perspectives.** A central objective is to seek diversity, rather than characterize complexity in terms of average values. The assumption is that different individuals and groups make different

Box 6.2 A selection of terms and names for alternative systems of learning and action

Agroecosystems Analysis (AEA), Beneficiary Assessment, Development Education Leadership Teams (DELTA), Diagnóstico Rurale Participativo (DRP), Farmer Participatory Research, Groupe de Recherche et d'Appui pour l'Auto-Promotion Paysanne (GRAAP), Méthode Accélérée de Recherche Participative (MARP), Participatory Analysis and Learning Methods (PALM), Participatory Action Research (PAR), Participatory Research Methodology (PRM), Participatory Rural Appraisal (PRA), 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 Organizational Assessment (ROA), Rapid Rural Appraisal (RRA), Samuhik Brahman (Joint trek), Soft Systems Methodology (SSM), Theatre for Development, Training for Transformation, and Visualization in Participatory Programmes (VIPP).

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 inquiry and interaction. 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.
- **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 to 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, and debate changes the perceptions of the actors and their readiness to contemplate action. Action is agreed, and implementable changes will therefore represent an accommodation between the different conflicting views. 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. 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 action imply a process of learning leading to action. A more sustainable agriculture, with all its uncertainties and complexities, cannot be envisaged without all actors being involved in continuing processes of learning.

Participatory Methods

In recent years, the creative ingenuity of practitioners worldwide has hugely increased the range of participatory methods in use (see *RRA Notes*, 1988–95; IDS/IIED, 1994; Pretty et al, 1995; 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 visualization and diagramming (Table 6.2). It is the collection of these methods into unique approaches, or assemblages of methods, that constitute systems of inquiry or interaction.

Participation calls for collective analysis. Even a sole researcher must work closely with local people (often called 'beneficiaries', 'subjects',

Table 6.2 Participatory methods for alternative systems of learning and action

<i>Group and team dynamics methods</i>	<i>Sampling methods</i>	<i>Interviewing and dialogue</i>	<i>Visualization and diagramming methods</i>
Team contracts	Transect walks	Semi-structured interviewing	Mapping and modelling
Team reviews and discussions	Wealth ranking and well-being ranking	Direct observation	Social maps and wealth rankings
Interview guides and checklists	Social maps	Focus groups	Transects
Rapid report writing	Interview maps	Key informants	Mobility maps
Energizers		Ethno-histories and biographies	Seasonal calendars
Work sharing (taking part in local activities)		Oral histories	Daily routines and activity profiles
Villager and shared presentations		Local stories, portraits and case studies	Historical profiles
Process notes and personal diaries			Trend analyses and time lines
			Matrix scoring
			Preference or pairwise ranking
			Venn diagrams
			Network diagrams
			Systems diagrams
			Flow diagrams
			Pie diagrams

'respondents' or 'informants'). Ideally, though, teams of investigators work together in interdisciplinary and intersectoral teams. By working as a group, the investigators can approach a situation from different perspectives, carefully monitor one another's work and carry out a variety of tasks simultaneously. Groups can be powerful when they function well, as performance and output is likely to be greater than the sum of its individual members. Many assume that simply putting together a group of people in the same place is enough to make an effective team. This is not the case. Shared perceptions, essential for group or community action, have to be negotiated and tested in a complex social process. Yet, the complexity of multidisciplinary team work is generally poorly understood. A range of workshop and field methods are used to facilitate this process of group formation.

In order to ensure that multiple perspectives are both investigated and represented, practitioners must be clear about who is participating in the data-gathering, analysis and construction of these perspectives. Communities are rarely homogenous and there is always the danger of assuming that those participating are representative. Those missing, though, are usually the poorest and most disadvantaged. Sampling is an essential part of these participatory approaches and a range of field methods is available.

Sensitive interviewing and dialogue is a third element of these systems of participatory learning. For the reconstructions of reality to be revealed, the conventional dichotomy between the interviewer and respondent should not be permitted to develop. Interviewing is, therefore, structured around a series of methods that promote a sensitive and mutually beneficial dialogue. This should appear more like a structured conversation than an interview.

The fourth element is the emphasis on diagramming and visual construction. In formal surveys, information is taken by interviewers, who transform what people say into their own language. By contrast, diagramming by local people gives them a share in the creation and analysis of knowledge, providing a focus for dialogue which can be sequentially modified and extended. Local categories, criteria and symbols are used during diagramming, which includes mapping and modelling, comparative analyses of local perceptions of seasonal and historical trends ranking and scoring to understand decision making, and diagrammatic representations of household and livelihood systems. Rather than answering questions which are directed by the values of the researcher, local people are encouraged to explore creatively their own versions of their worlds. Visualizations, therefore, help to balance dialogue, and increase the depth and intensity of discussion.

Local people using these methods have shown a greater capacity to observe, diagram and analyze than most professionals have expected. Yet the view that 'they may have worked in country x, but they will not work here' is extraordinarily common. It is almost always wrong, with the problem being the conventional attitudes of the professionals exposed to the methods.

The Trustworthiness of Findings

It is common for users who have presented findings arising from the use of participatory methods to be asked a question along the lines of 'but how does it compare with the real data?' (see Gill, 1991). It is commonly asserted that participatory methods constitute inquiry that is undisciplined and sloppy. They are said to involve only subjective observations and so respond just to selected members of communities. Terms like informal and qualitative are used to imply poorer quality or second-rate work. Rigour and accuracy are assumed, therefore, to be in contradiction with participatory methods.

This means that it is the investigators relying on participatory methods who are called upon to prove the utility of their approach, not the conventional investigator. Conventional research uses four criteria in order to persuade their audiences that the findings of an inquiry can be trusted (see Lincoln and Guba, 1985; Guba and Lincoln, 1989). How can we be confident about the 'truth' of the findings (internal validity)? Can we apply these findings to other contexts or with other groups of people (external validity)? Would the findings be repeated if the inquiry were replicated with the same (or similar) subjects in the same or similar context (reliability)? How can we be certain that the findings have been determined by the subjects and context of the inquiry, rather than the biases, motivations and perspectives of the investigators (objectivity)? These four criteria, though, are dependent for their meaning on the core assumptions of the conventional research paradigm (Lincoln and Guba, 1985; Kirk and Miller, 1986; Cook and Campbell, 1979).

Trustworthiness criteria were first developed by Guba (1981) to judge whether or not any given inquiry was methodologically sound. Four alternative, but parallel, criteria were developed: credibility, transferability, dependability and conformability. But these 'had their foundation in concerns indigenous to be conventional, or positivist, paradigm' (Lincoln, 1990). To distinguish between elements of inquiry that were not derived from the conventional paradigm, further 'authenticity' criteria have been suggested to help in judging the impact of the process of inquiry on the people involved (Lincoln, 1990). Have people been changed by the process? Have they a heightened sense of their own constructed realities? Do they have an increased awareness and appreciation of the constructions of other stakeholders? To what extent did the investigation prompt action?

Drawing on these and other suggestions for 'goodness' criteria (Marshall, 1990; Smith, 1990), a set of 12 criteria for establishing trustworthiness have been identified (Pretty, 1994) (Box 6.3). These criteria can be used to judge information, just as statistical analyses provide the grounds for judgement in positivist or conventional science. An application of an alternative system of inquiry without, for example, triangulation of sources, methods and investigators and participant checking of the constructed outputs, should be judged as untrustworthy.

However, it should be noted that it will never be possible to be certain about the trustworthiness criteria. Certainty is only possible if we accept

Box 6.3 A framework for judging trustworthiness

1. *Prolonged and/or intense engagement between the various actors*
For building trust and rapport, learning the particulars of the context and to keep the investigator(s) open to multiple influences.
2. *Persistent and parallel observation*
For understanding both a phenomenon and its context.
3. *Triangulation by multiple sources, methods and investigators*
For cross-checking information and increasing the range of peoples' realities encountered, including multiple copies of sources of information; comparing the results from a range of methods; and having teams with a diversity of personal, professional and disciplinary backgrounds.
4. *Analysis and expression of difference*
For ensuring that a wide range of different actors are involved in the analysis, and that their perspectives are accurately represented.
5. *Negative case analysis*
For sequential revision of hypotheses as insight grows, so as to revise until one hypothesis accounts for all known cases without exception.
6. *Peer or colleague checking*
Periodical reviews with peers not directly involved in the inquiry process.
7. *Participant checking*
For testing the data, interpretations and conclusions with people with whom the original information was constructed and analysed. Without participant checks, investigators can make no claims that they are representing participants' views.
8. *Reports with working hypotheses, contextual descriptions and visualizations*
These are 'thick' descriptions of complex reality, with working hypotheses, visualizations and quotations capturing peoples' personal perspectives and experiences.
9. *Parallel investigations and team communications*
If sub-groups of the same team proceed with investigations in parallel using the same system of inquiry, and come up with the same or similar findings, then we can depend on these findings.
10. *Reflexive journals*
These are diaries individuals keep on a daily basis to record a variety of information about themselves.
11. *Inquiry audit*
The team should be able to provide sufficient information for a disinterested person to examine the processes and product in such a way as to confirm that the findings are not figments of their imaginations.
12. *Impact on stakeholders' capacity to know and act*
For demonstrating that the investigation has had an impact, including participants having a heightened sense of their own realities, and an increased appreciation of those of other people; the report could also prompt action on the part of readers who have not been directly involved.

the positivist paradigm (see Chapter 1). The criteria themselves are value-bound and so we cannot say that 'x has a trustworthiness score of y points', but we can say that 'x is trustworthy because certain things happened during and after the investigation'. The trustworthiness criteria should be used to identify what has been part of the process of gathering information and whether key elements have been omitted. Knowing this should make it possible for any observer, be they reader of a report or policy maker using the information to make a decision, also to make a judgement on whether they trust the findings. In this context, it becomes possible to state that the 'data no longer speak for themselves'.

FARMER PARTICIPATORY RESEARCH AND EXTENSION

Farmer Experimentation

Research organizations have a poor record when it comes to participation with farmers. As has been shown in Chapter 2, the central feature of agricultural modernization has been to impose simple technologies on complex environments. If we are to be serious about the development of a sustainable agriculture, it is critical that local knowledge and skills in experimentation are brought to bear on the processes of research.

The problem with agricultural science is that it has poorly understood the nature of 'indigenous' and rural people's knowledge (Scoones and Thompson, 1994). For many, what rural people know is assumed to be 'primitive' and 'unscientific', and so formal research and extension must 'transform' what they know so as to 'develop' them. An alternative view is that local knowledge is a valuable and under-utilized resource, which can be studied, collected and incorporated into development activities. Neither of these, though, is satisfactory. The former is characteristic of the modernizing tendencies in agriculture that emphasize the 'transfer of technology' (Chapter 2), and the latter of the more populist debates about indigenous technical knowledge and 'farmer first' approaches, which seek to ensure that local knowledge is at least given credit and value (Chambers et al, 1989; Röling and Engel, 1989; Warren, 1991; Reijntjes et al, 1992).

More recently, there has been a wider recognition that neither local knowledge nor western science can be considered as unitary bodies of stock of knowledge. Instead they are just different epistemological constructions within particular social, economic and ecological settings (Chapter 1). Knowledges are socially constructed, and so constantly changing and evolving within society. Interactions and changes thus depend on the dynamic interplays between actors and institutions, and the power relationships between them (Long and Long, 1992; Röling, 1988, Scoones and Thompson, 1994). Within this context, understanding processes of agricultural innovation and experimentation has been an important focus.

Farmers have always experimented to produce locally adapted technologies, practices, crops and livestock (Chambers et al, 1989;

Brouwers, 1993; Scoones and Thompson, 1994). They are continuous adaptors of technology and their systems are rarely static from year to year. Paul Richards (1989, 1992) has likened this process of adaptation to a performance, in which the actors change the nature of the performance according to the specific conditions they experience.

The problem is that researchers commonly do not understand or even accept that farmers are experimenters. They assume that farmers are conservative and bound by tradition. Static and unchanging practices can, therefore, upon investigation at a particular time, be characterized, analyzed and so 'developed'. But such an analysis can give nothing better than a snapshot of a complex and changing reality. It is important, therefore, to begin to see technologies in a different light, not as fixed prescriptions but as indicators of what can be achieved. What agriculture needs is a willingness among professionals to learn from farmers. As Robert Rhoades (1987) put it: *'the farming profession requires experimenters, risk takers, innovators; intensifiers and diversifiers; colonisers or pioneers; addicts for new information; and practitioners of great common sense'*.

Another important aspect of change is illustrated by the fact that when farmers are faced with a new technology or practice, they rarely reject all their existing practices. Rather, they take the new and experiment with it. Perhaps a new variety is grown first in the kitchen garden or in a single row along a field boundary. They watch and observe. If the variety proves itself, the farmer increases production. All the while, they maintain their own bank of germplasm and existing practices. Such an approach to experimentation is inevitably to be more adaptive and holistic than normal agricultural science.

David Millar (1993) has described the many different ways that farmers in northern Ghana conduct experiments and how these are determined by, and in turn influence, their way of seeing the world. He describes curiosity experiments, in which farmers see something interesting elsewhere, such as a combination of cassava cropping or the use of camphor to control pests in stored sorghum, and so set up various tests to compare the new with the old. They conduct problem solving experiments, to deal with problems of Striga weeds or post-harvest losses of yams. One farmer, Nafa, said: *'I encountered the problem and I have adopted crop rotations to find out which rotation best fights gill (Striga). I with my three brothers found out that a continuous cultivation of millet on the field for three or more successive years would kill gill. With other farmers, we are trying to see how long it would take gill to come back if other crops are grown after millet'*.

They also conduct adaptive research, modifying the crop technologies passed to them by government research, and peer pressure research dictated by religious and cultural values.

The Case of Farmer Experimentation in Eighteenth-Century Britain

Farmers were the driving force of the agricultural revolution that occurred in rural Britain during the seventeenth to nineteenth centuries (Pretty, 1991). During a period in which there was no government ministry of agriculture, no national agricultural research or extension institutions, no

radio or television, no pesticides or inorganic fertilizers, and poor rural transport infrastructure, aggregate cereal and livestock production increased to unprecedented levels. In the 150 years after 1700, wheat production grew four fold, and barley and oats three fold; the numbers of cattle supplied to markets tripled and of sheep doubled (Beckett, 1990; Mingay, 1989; Holderness, 1989; Chartres, 1985). This remarkable achievement was brought about in two ways: the extension and experimentation by farmers of new technologies that intensified on-farm resource use; and the conversion of common pastures and woodlands to private farming.

New crops offered diversified opportunities to farmers by allowing intensified use of land. Increased fodder supply meant more livestock and so increased supply of manures improved soil fertility. Selective breeding of livestock produced more efficient converters of feed to meat, so permitting slaughter at an earlier age and higher stocking rates. New labour-saving machinery released farmers from the labour bottlenecks at cereal and hay harvests; and new tools and techniques improved the efficiency of seed sowing. Underfield drainage increased cropping options on marginal land; and irrigation of watermeadows increased the supply of fodder, particularly during the late winter shortage. Complementarities with urban and industrial growth, the British population having tripled between 1700–1850, also meant increased soil fertility as agriculture assimilated industrial and human wastes.

Until the last two decades, orthodoxy has held that the British agricultural revolution began about 1760 and ended in the early 1800s (Ernle, 1912). Credit for progress was given to a few, now famous, innovators: Tull for his corn drill; Townshend for turnips; Coke for the Norfolk Four Course rotation; Bakewell for livestock breeding; and Young for promoting all of these. The conventional view is that, once exposed to these innovations, the majority of farmers adopted them and the revolution occurred. However, claims for innovation rapidly driving production growth have not survived scrutiny.

What is now clear is that Tull, Townshend, Coke, Bakewell and Young were simply good popularizers rather than innovators. All 'their' innovations were being practised by some farmers 50 to 100 years before they were born. The lasting fascination for 'inventors' has diverted attention away from the process of experimentation, technology diffusion and local adaptation. Yet in the British agricultural revolution farmers were centrally involved in all three processes. Farmers made diffusion active rather than passive through farmer-to-farmer extension mechanisms; and there is considerable evidence that technologies, once adopted, were the focus of experimentation so as to make the appropriate adaptations to suit local conditions.

Farmers conducted field trials to test the efficacy of various manure and nutrient treatments on soils; they tested corn drills against other methods of seed sowing; they introduced new crops into rotations on some fields, while leaving others unchanged; they tested irrigated against dryland meadows; and they tested new methods of pest control. As Caird (1852)

put it '*the detail is everywhere varied by the judicious agriculturalist to suit the necessities and advantages of the particular locality*'. Farmers were concerned with integrating the results of experiments into their farm economies and so analyzed results to discover which were the most profitable options. To many, experiments were seen as a necessary part of farming.

Arthur Young said that '*experiment is the rational foundation of all useful knowledge: let everything be tried*' (Young, 1767). He published *Experimental Agriculture* in 1770, comprising some 900 pages of detailed results of 5 years of experiments on 120 ha of various soils. He had begun confidently expecting conclusive answers, but concluded the task in a different mood: '*I entered upon the following experiments with an ardent hope of reducing every doubtful point to certainty; and I finished them with the chagrin of but poorly answering my own expectations. Where I imagined 2 or 3 trials would have proved decisive, 40 have been concluded in vain.*' (Young, 1770)

Robert Bakewell's approach to experiment was open-minded: '*I would recommend to you and others who have done me the credit of adopting my opinions to pursue it with unremitting zeal as far as shall be consistent with prudence and common sense, always open to conviction when anything better is advanced.*' (Bakewell, 1787 in Pawson, 1957)

And George Culley, in a letter in 1801, wrote, '*I often say that we have a deal to learn yet. And every wise humble man will learn every year and every day*' (Macdonald, 1977).

And yet these considered comments of farmers seem to have been very largely forgotten since the end of the agricultural revolution. They conflict with the predominant view of the agricultural experiment, namely that it is the domain of scientists and takes place solely on the research station or in the university. Many take the view that 'scientific' agriculture began with the establishment of the Royal Agricultural Society of England in 1838 and Rothamsted Experimental Station in England in 1843. Despite the immense benefits to agriculture they have brought, they have also served to hide the experimental practices of farmers. The result is now a deeply held belief that the first scientific experiments occurred only after the 1840s. A recent text on the history of agricultural science in Britain begins at 1840 (Rossiter, 1975); and two earlier books by E John Russell, a former director at Rothamsted, suggest that the 'first experiments' began in earnest at Rothamsted, before which any experiments were conducted by academics working alone. In neither of his seminal books is the role of farmers once mentioned (Russell, 1946, 1966).

Farmer Adaptations to Scientists' Designs

The problem with modern agricultural science is that technologies are finalized before farmers get to see them. Clearly, if the technologies are appropriate and fit a particular farmers' conditions or needs, then they stand a good chance of being adopted. But if they do not fit and farmers are unable to make changes, then they have only the one choice. They have to adapt to the technology or reject it entirely. And such rejection is common. The history of development interventions is littered with examples of bright new technologies rapidly tarnished by lack of

widespread adoption or maintenance. Ask any farmer or development professional and they will tell you of tractors inoperable for the sake of a key spare part, of terraces broken or degraded, of irrigation systems in disrepair and so on.

The alternative to these scenarios is to seek and encourage the involvement of farmers in adapting technologies to their conditions. This constitutes a radical reversal of the normal modes of research and technology generation, as it requires interactive participation between professionals and farmers. The term participatory technology development (PTD) has been applied to the process and methodology by which various partners cooperate in technology development (Jiggins and De Zeeuw, 1992; Reijntjes et al, 1992; Haverkort et al, 1991). It is a process in which the knowledge and research capacities of farmers are joined with those of scientific institutions; while at the same time strengthening local capacities to experiment and innovate. Farmers are encouraged to generate and evaluate indigenous technologies, and to choose and adapt external ones on the basis of their own knowledge and value systems.

But, of course, researchers and farmers participate in different ways, depending on the degree of control each actor has over the research process (Table 6.3). The most common form of 'participatory research' is researcher designed and implemented, even though it might be conducted on farmers' fields. Many on-farm trials and demonstration plots represent nothing better than passive participation. Less commonly, farmers may implement trials designed by researchers. But greater roles for farmers are even rarer. Sam Fujisaka (1991a) describes researcher-designed experiments on new cropping patterns in the Philippines. Even though farmers 'participate' in implementing the trials, there was widespread uncertainty about what researchers were actually trying to achieve. Farmers misunderstood experiments, and rejected the new technologies. The reason, as he explains, was that *'co-operation between farmers and researchers implies two groups continually listening carefully to one another. Claveria farmers are avid listeners to... researchers. The challenge is for all on-farm researchers to complete the circle'*.

Where the technology is not indivisible, farmers are more likely to try it, adapting it through experimentation to their conditions. A now classic case is the diffused light stores for potatoes developed with farmers by Robert Rhoades and colleagues at CIP in Peru. In the mid-1970s, a CIP seed specialist, Jim Bryan, observed farmers in Kenya, Peru and Nepal storing potatoes in diffused light. He assembled a collection of slides on traditional storage practices and convinced colleagues at CIP to investigate these practices. After considerable on-station and on-farm research, the technologies developed were introduced into some 25 countries (Rhoades and Booth, 1982).

But Rhoades and Booth were surprised to find that *'adoption had not proceeded as we expected and certainly not as the sociological adoption literature indicated'* (Rhoades, 1987). Out of some 4000 cases checked, some 98 per cent of farmers had changed the basic technology to adapt it to their own farming conditions, household architecture and budgets. In particular,

Table 6.3 Types of participatory research

Designed by	Implemented by	Comments
Researcher	Researcher	The most common form of research: on farm trials and demonstration plots
Researcher	Farmer	The most common form of 'participatory' research
Farmer	Researcher	Very rare
Farmer	Farmer	The mode of farmers' own research and experimentation; very rare in programmes; some village or community organizations doing themselves

Source: adapted from Biggs, 1989

they found that farmers did not drop their old storage practice (seeds kept in darkness), but simply incorporated the use of diffused light storage alongside existing practices. They frequently adopted only the elements of the package that interested them, actively playing a role in the design and alteration of stores to their conditions. Partial adoption was, therefore, not a failure or 'incomplete', but effective if it worked for the farmer.

Even if changes are not permitted, farmers will try anyway. The Dumoga Irrigation Project in Indonesia illustrates what happens in conventional irrigation projects, in which technical information on soils, landform and natural waterways is used to construct the design. Local knowledge on prior use of waterways, farmers' own structures and boundary patterns is rarely incorporated. Douglas Vermillion (1989) describes what happened during implementation: *'The farmers interviewed frequently reported approaching construction labourers or supervisors in the field to suggest changes and were usually told that the design has been established by the government and could not be changed. Often farmers relocated the construction markers when the crews had left. Others waited until construction was finished and the contractors had moved on, before altering the structures'*.

Farmers made many kinds of alterations. They relocated channels, diverted or ponded streams, abolished project channels, redirected channels into streams, made new flumes, destroyed project flumes and made use of existing structures. One of the farmers' main objectives was to minimize the number of channels and maximize the reuse of water. Farmers frequently redirected water into natural streams, which were checked to make ponds, so that the water could be reused downstream. But still the project did not permit this, as it defined *'all natural streams as drainage ways. Every six months it routinely destroyed farmer-built brush weirs along small streams and natural depressions within the command area with the intent of 'normalizing the drainageways' to prevent obstruction of drainage'* (Vermillion, 1989).

When farmers are able to modify technologies, adapting them to their local conditions, then they are often able to make significant improvements. It was the active participation of farmers in irrigation

design and implementation that made the National Irrigation Administration in the Philippines so successful in its work (see Case 18, Chapter 7).

Even when technologies are successful, farmers may still want to change them. In the Philippines, farmers adopting rice-fish farming systems developed by researchers have been able to increase rice yields by 4 per cent per crop, raise vegetables on the banks of raised dikes and so raise their annual incomes from US\$142 to \$578 per hectare (de la Cruz et al, 1992). Despite this, half of the cooperating farmers were not satisfied with the growth rate and size of the tilapia fish at harvest: *'they thought they would be able to improve the size of the fish by themselves, after the project was over'*. They subsequently made improvements and modifications to the type of fish, to the sizes and locations of ponds and trenches in the fields, and to the techniques for pest management that avoided fish mortality.

Impact of Participation on Research Systems

It is not just farmers who benefit when research is participatory. Researchers benefit too. They learn more about technologies, as farmers are able to test them in a wide variety of conditions. They have the satisfaction of knowing that technologies they produce really are what farmers want. They also develop better lines of communication. Once researchers appreciate that there are multiple sources of innovation, then they greatly increase the opportunity of helping to improve farmers' livelihoods (Biggs, 1989; Bebbington, 1991). In this sense, change can come from joint learning that challenges perceptions, thoughts, and actions of both the researchers and farmer participants.

Research conducted at the Pakhribas Agricultural Centre in the hills of eastern Nepal showed that lentils can be successfully grown after rice or relayed under rice in the irrigated lowland (*khet*) in mid-altitude areas (Chand and Gurung, 1991). Packages of lentil seeds with instructions were distributed among farmers in seven districts. From his experiments, one farmer discovered not only that lentils did poorly on paddy land but was able to provide feedback to researchers on new environments for lentil cultivation (Box 6.4).

A little bit of structured learning can result in wholesale changes in the way research institutions focus their research. Scientists of the Tamil Nadu Agricultural University recently discovered that farmers prefer red rice varieties over white (Manoharan et al, 1993; TNAU/IIED, 1993). Years of research have resulted in the release of about 100 varieties from research stations, of which only 2 were red. Questionnaire surveys had regularly 'confirmed' that farmers preferred white rice. Yet when scientists began using participatory methods, especially matrix scoring, to understand local preferences for rice, they discovered that white rice was recognized to be higher yielding, but disliked for taste, fineness and lack of nutritive value. Villagers said that *'their physique had come down due to consumption of white rice'* (Manoharan et al, 1993).

Farmers therefore still grew red rice, even though it is poor yielding.

Box 6.4 Farmers experimenting in the hills of Nepal and providing new information for researchers

A farmer who received 500 g of lentil seed in a package from Pakhribas Agricultural Centre research station planted one-third of the seed on *khet* land and on paddy bunds in July. He thought it would grow well on the paddy bund, as do other legumes such as soybean and black gram. Unfortunately, the farmer discovered that lentils cannot be grown during the summer; his crop was heavily infested with summer weeds and his plants did not grow well in heavy summer rain. The farmer then intercropped one-third of the seed with potato during January in a high-altitude maize system. The crop did not grow well again, this time because of the cold and, at a later stage, damage by pre-monsoon rain.

The farmer continued his experimentation and planted the remaining seed during the first week of September, after harvesting potato in a potato-maize cropping pattern. The growth of the lentil was good and the crop utilized residual moisture for its development. The farmer thus was able to harvest lentil successfully during February. In this way, the farmer not only discovered the proper planting time for lentil, he also provided feedback to the researchers that lentil can be grown successfully at high altitudes where a potato-maize system is practised and land is kept fallow during the winter season.

Farmers growing lentil also learned to mix lentil biomass with kitchen waste to feed to cattle and buffaloes, the milk yields of which increased by 20%.

Source: Chand and Gurung, 1991

They said they needed a single red variety with bold red grain, high grain and straw yields, with resistance to pests and diseases. Research efforts on red rice improvement have now intensified to meet these needs. The director of research, Dr S Chelliah recently described the success in this way: *'This is one example of the success of the participatory rural appraisal (PRA) approach and I am confident that this would lead to the identification of many new research priorities which will be location-specific and field-oriented reflecting farmers' needs and preferences'*.

Such improved communication between scientists and farmers led directly to improved returns from sheep and goats in Brazil (Baker et al, 1988). With the use of Regular Research Field Hearings (RRFHs), an approach that emphasized close and regular contact with farmers' groups, mutual trust and understanding grew. With this better dialogue, farmers learned more about the uses and necessary adaptations of the technology, which comprised drenching, vaccinating against diseases, umbilical cord cutting and treatment with iodine, castrating males not needed for reproduction and regular visits by a veterinarian. Scientists also learned more about the farmers' conditions. Where these RRFHs were used, the daily weight gain of the animals was 24 per cent greater than in groups who received the technical package without the dialogue. Farmers were also more satisfied with the performance of the animals and were willing

to pay some 36 per cent more for the animals.

In recent years, there have been many similar mechanisms developed in national agricultural research and extension systems that have systematically increased connectivity and collective learning (Box 6.5). However, these changes have rarely been spread through large institutions. In their analysis of national agricultural research systems, Merrill-Sands and Collion (1992) concluded that *'it is fair to assert that although farming systems and farmer participatory methods have in many cases led to more client-responsive research scientists, they have in few cases resulted in more client-responsive research organizations.'*

From Directive to Participatory Extension

A similar approach to involving local people is needed in extension systems, where the challenge is just as great as in research institutions. Extension has long been grounded in the 'diffusion' model of agricultural development, in which technologies are passed from research scientists via extensionists to farmers (Rogers, 1962). Farmers who choose not to adopt are often labelled by extensionists as 'laggards' with attitudinal barriers (Russell et al, 1989; Chambers and Ghildayal, 1985). In the late 1980s, there were some 540,000 extension personnel worldwide (Swanson et al, 1990). But most of these work in systems that ignore local groups and institutions. The tendency has been to deal with individual farmers or households, who are selected on the basis of likelihood of adopting new technologies. They are, in turn, expected to encourage further adoption in their community through a demonstration effect.

This approach is exemplified by a type of extension that came to be known as the training and visit (T and V) system. It was first implemented in Turkey in 1967 and later widely adopted by governments on the recommendation of the World Bank (Benor et al, 1983; Roberts, 1989). It was designed to be a management system for energizing extension staff, turning desk-bound, poorly motivated field staff into effective extension agents. Extension agents receive regular training to enhance their technical skills, which they then hope will pass on to all farmers through regular communication with the smaller number of selected contact farmers. Between 1977-92, the World Bank disbursed US\$3000 million through 512 projects for extension systems along the lines of the T and V model (World Bank, 1994). Although a substantial sum, this represents just 5 per cent of the World Bank's lending to the agricultural sector during this period.

But as the contact farmers are usually selected on the basis of literacy, wealth, readiness to change and 'progressiveness', this often sets them apart from the rest of the community. The secondary transfer of the technical messages, from contact farmers to community, has been much less successful than predicted and adoption rates are commonly very low among non-contact farmers. Without a doubt, T and V is now widely considered as ineffective (Box 6.6) (Axinn, 1988; Howell, 1988; Russell et al, 1989; Moris, 1990; Röling, 1991; Antholt, 1992, 1994; Hussain et al, 1994).

What is not clear is whether all these problems were due to the T and V system itself or to the way it was institutionalized (Antholt, 1992, 1994). T and V was usually associated with large increases in staff, yet extension

Box 6.5 Selection of successful innovations in national agricultural research and extension systems

A selection of innovations include:

- working groups, research teams and joint interdisciplinary treks based in Lumle and Pakhribas Agricultural Centres, Nepal;
- farmer field schools in Indonesia, Philippines and Honduras;
- catchment approach to participatory planning and implementation of soil and water conservation, Ministry of Agriculture, Kenya;
- Adaptive Research Planning Teams and village research groups, Ministry of Agriculture, Zambia;
- farmer groups for technology research and extension in Ministry of Agriculture, Botswana;
- innovator workshops in Bangladesh and India, in which farmers come to workshops attended by researchers to talk about their innovations;
- linking with farmer and community groups for Landcare, Australia;
- policy analysis network of universities in Nepal, coordinated by Winrock International;
- National Azolla Action Programme, Philippines;
- participatory planning and research design, Pakistan Agricultural Research Council;
- teams of female bean experts working with plant breeders in Rwanda;
- participatory research teams, Tamil Nadu Agricultural University, India;
- farmers working in groups and feeding information directly to local radio programmes in Peru;
- group farming in Kerala, India;
- farmer groups for technology adaptation and extension, Narendra Deva University of Agriculture and Technology.

Sources: Chand and Gurung, 1991; Mathema and Galt, 1989; Kiara et al, 1990; MALDM, Kenya, passim; Pretty et al, 1994; Sikana, 1993; Drinkwater, 1992; Heinrich et al, 1991; Abedin and Haque, 1989; Campbell, 1994b; San Valentin, 1991; Guijt and Pretty, 1992; TNAU/IIED, 1993; Shereif, 1991; Maurya, 1989; Sperling et al, 1993; AED, 1991

departments have rarely had the resources to keep them in the field working with farmers. In Tamil Nadu, for example, the number of village extension officers increased from 1730 to 4000 with the adoption of T and V, but the resources available for demonstrations in 1991 amounted to about only US\$1 per year per extension worker.

More importantly, though, T and V has tended deeply to institutionalize extension's top-down hierarchy, so preventing extension systems from being learning organizations. Bureaucrats liked the system, because it could be used to hold staff accountable. But higher level staff and research scientists have severely inhibited the upward flow of information, despite early intentions to do so. As Charles Antholt (1991) put it: *'Time-bound, centrally-determined, highly-concentrated work programmes can sometimes, but not always make sense under homogenous conditions. But the realities of most agricultural systems... are rather different. Given the seasonality of workloads, the heterogeneity of agroecological systems, the complex choices facing farm families...*

Box 6.6 The impact of training and visit extension in a range of contexts

- In Somalia, only one non-contact farmer adopted a high-input package for each contact farmer, a ratio much lower than the 10:1 expected; this was despite the fact that maize and sorghum yields were 40–45% greater on contact farmer fields.
- In Kerala, India, non-contact farmers have been found to have very little contact with contact farmers, preferring to consult a wide range of alternative information sources, such as newspapers and the mass media, and fellow farmers.
- In Andhra Pradesh, T and V was found to have had no effect on agricultural productivity.
- In West Bengal, Bihar, Maharashtra, and Tamil Nadu, all of which have had T and V for at least ten years, no causal connection was found between incremental investment in T and V and incremental changes in agricultural production.
- In Nepal, ten years of T and V in the Terai was found to have had no impact on wheat yields.
- In Bangladesh, T and V was not successful in achieving any positive changes in the orientation of extension towards local people, despite this being a major objective when introduced.
- In Indonesia, T and V made no impact on non-rice dryland crops.
- In Pakistan, T and V had no impact in Punjab province, focusing too little on increasing the relevancy of technology for farmers.

Sources: Antholt, 1992, using various World Bank evaluations; Axinn, 1988; Mullen, 1989; Chapman, 1988

extension services must be much more flexible, more timely, and less centralized.

Important lessons have been learned from the problems associated with T and V, and there is clearly a need to address the systemic issues facing extension (Zijp, 1993; Antholt, 1994). Extension will need to build on traditional communication systems and involve farmers themselves in the process of extension. Incentive systems will have to be developed to reward staff for being in the field and working closely with farmers. There must be a *'well-defined link between the well-being of field officers and the extension system, based on the clients' view of the value of extension's and field workers' performance'* (Antholt, 1992). Achieving such a vision will need a complete overhaul of the notion of extension. It may be that the time has come to abandon the term extension altogether, as it implies passing something from someone who knows to someone who does not. Participation, if it is to become part of extension, must clearly be interactive and empowering. Any pretence to participation will result in little change. Allowing farmers just to come to meetings, or letting a few representatives sit on committees, will be insufficient.

There have been some recent innovations in introducing elements of farmer participation and group approaches into extension, and these have already had a significant impact. Differences in impact between individual

and group approaches have been well documented in both Nepal and Kenya (Sen, 1993; Eckbom, 1992; SWCB, 1994). In Western Nepal, Sen compared the rate of adoption of new technologies when extension worked with individuals or with groups. With groups, there was better communication between farmers and extensionists, and so more adoption. When the individual approach was resumed after the experiment, adoption rates fell rapidly in succeeding years.

In Kenya, the Ministry of Agriculture is increasingly adopting a community-oriented approach to soil and water conservation (see Case 12, Chapter 7). This is steadily replacing the former individual approach of the T and V system. One particularly important study compared the impact of the catchment approach with the individual T and V in two neighbouring communities in Trans Nziwa. For a wide range of indicators, farmers' livelihoods were more improved where the community approach was implemented (Table 6.4). Such impacts have been confirmed by other ministry self-evaluation and monitoring studies (SWCB, 1994; Pretty et al, 1994; MALDM, passim). Where extension staff interact closely with communities in developing joint action plans and local people freely elect members to a local catchment committee, then the impact on agricultural growth is immediate and sustained. Strong local groups mobilize the interest of the wider community and sustain action well beyond the period of direct contact with external agents (see Chapter 5).

TOWARDS LEARNING ORGANIZATIONS

A systematic challenge for agricultural research, extension and planning institutions, whether government or non-government, is to institutionalize approaches and structures that encourage learning.

Narayan's study of the importance of participation in water projects indicated that whether people participated or not was influenced as much by factors in external institutions as local needs or interests (Narayan, 1993). Those that succeed were characterized by a prior orientation or value towards local people, responsiveness during implementation and giving up to or sharing decision making control with local communities. In particular, if the agencies actively used local knowledge, made participation a goal, and then monitored and rewarded it, they were more likely to succeed.

There is much we can learn from the private and corporate sector (see, for example, Thompson and Trisoglio, 1994; Easterby-Smith, 1992; Peters, 1987; Peters and Waterman, 1982; Argyris and Schön, 1978). It is increasingly recognized that organizations that succeed in a changing and increasingly complex world are also those that have the ability to learn from their experiences, and adapt quickly. The central difference between the private and public sectors is that if a private company fails to learn from its clients (those who pay for the products or services) then it will close down. Institutions unable to learn do not recognize incrementally changing circumstances until a crisis suddenly manifests itself. But, at the moment, if an agricultural research organization fails to provide

Table 6.4 Comparison between the impact of the catchment approach and the individual farmer approach in neighbouring catchments at Geta Farm, Cherangani Division, Trans Nzoia, Kenya

	<i>Catchment approach</i>	<i>Individual farmer approach</i>
Annual value of crop production, 1990 (KSh)	14,260	13,470
Variable costs, 1990 (KSh)	3910	3450
Gross margin, 1990 (KSh)	8100	7860
Gross margin per person-day (KSh)	13	8.3
Annual increase in productivity	12%	8%
Net present value (4% discount rate) in KSh	114 million	54 million
Benefit/cost ratio	1.75	1.27
Increase in land value: 1986-91	62%	29%
Increase in land value: Annual	10.1%	5.3%
Change in leasehold prices, 1986-91	+ 8%	-10%
Increase in average livestock holding	45%	15%
Milk consumption ratio	1.6	1

Source: Eckbom, 1992

technologies that farmers desire, it will not close down.

There are three areas in which agricultural institutions can improve their ability to learn. They can promote experimentation; promote connectivity and group work based on roles rather than disciplines; and develop monitoring and self-evaluation systems to improve learning and awareness.

Promote Experimentation and Diversity

An experimental approach often involves the taking of risks, and so tends to fly in the face of the instincts of senior staff and the procedures of most organizations. Most try to select people who will fit in with their particular cultures. But too much homogeneity makes it more difficult for new ideas to emerge. It is well established that creativity and innovativeness tend to be generated where diversity of experience is encouraged, particularly at lower levels (Nonaka, 1988; Easterby-Smith, 1992; Williams and Antholt, 1992).

A good sign is that agricultural research and development has become increasingly diverse in recent years, with a growing number of disciplines engaged. Robert Rhoades (1989) characterizes four overlapping periods of steadily shifting emphases. These stages are as follows.

- **Production stage** (roughly 1950-75), in which the pioneering disciplines were breeding and genetics, and farmers were seen as recipients of technology.
- **Economic stage** (roughly 1975-85), in which Farming Systems Research was pioneered by economists and agronomists, and farmers were seen as sources of information for technology design.

- **Ecological stage** (roughly 1985-95), in which anthropology, agroecology and geography are pioneers, and farmers contribute their indigenous knowledge, and are seen both as victims and causes of unsustainable development.
- **Institutional stage** (roughly 1995 onwards), in which the pioneering disciplines will be management specialists, psychologists, organizational sociologists, political scientists, training specialists and educators; in which farmers will be full collaborators in research and extension; and in which alliances will be developed between different institutions.

Even though each wave of enthusiasm for a new approach has grown out of antecedents, there has been a tendency for those who pioneer and embrace each new direction to play down the accomplishments of earlier approaches, and so 'the 'old' always argue that the 'new' is not so new ('we were doing it all along') while the 'new' fiercely defends what it perceives to be the wave of the future' (Rhoades, 1989). Precisely how the new disciplines and skills would work together is often unclear, but as Rhoades put it; 'this should not be a cause for alarm, given that early in every new stage no one was able to appreciate the vast bodies of methods and theories available in disciplines still marginal to the agricultural research and development establishment'.

But increasing diversity may not alone be sufficient, as changes in attitudes will be essential for any long-term change. The problem for senior officials with creativeness and innovation is that they must recognize that many new initiatives are bound to fail. It is therefore crucial that people do not get punished for taking risks that might fail. Easterby-Smith quotes the chief executive of a large corporation, who said that staff have 'the freedom to do things and fail. We accept that... But at the same time we expect any mistakes to have originality. We can afford any mistake - once'.

In the long term, innovative behaviour will only persist if it is rewarded. The challenge is for institutions to have rewards, whether financial or promotional, so that those who do not take risks are not rewarded. Similarly, those who make mistakes should not be disadvantaged. Such incentives are needed in research and extension institutions if scientists are to be encouraged to adopt alternative methods of working with farmers.

Promote Connectivity and Group Work

Learning organizations need collective analysis and good connections between their various parts. By working in groups, staff can approach a situation from different perspectives, carefully monitor one another's work and carry out a variety of tasks simultaneously. Groups can be powerful and productive when they function well, and their outputs are likely to be greater than the sum of their individual members.

Although groups generally produce fewer ideas than individuals working separately, they usually generate better ideas as each is discussed and thought through more deeply. Groups are more likely to identify errors of judgement before action is taken. Discussion stimulates more careful thinking and leads to consideration of a wider range of ideas. Rather

surprisingly, groups take riskier decisions than the individuals comprising them would have done if acting independently. Individuals are more adventurous as they can take courage from their fellow group members.

But several people brought together to work on a single research or development activity do not necessarily make a productive team. Charles Handy (1985) has suggested that before a group of people can function well as a team, they must pass through a series of stages: 1. forming; 2. storming; 3. norming; and 4. performing. First, various individuals come together, sometimes as strangers, sometimes as colleagues, to create a new group for some stated purpose. In this early *forming* stage, they are still a collection of individuals, each with their own agenda and expertise, and little or no shared experience. As these individuals become more familiar with one another, the group will enter a *storming* phase. Now personal values and principles are challenged, roles and responsibilities are taken on and/or rejected, and the group's objectives and mode of operating will start to be defined more clearly. If there is too much conflict and discord within the group, it will collapse. But if some common ground can be found, the group will gain greater cohesion and a sense of purpose.

As the group members begin to understand their roles in relation to one another and establish a shared vision or goal, they will develop a clearly discernable identity and group-specific norms of behaviour. At the *norming* stage, the group has settled down. People know each other better, they have accepted the rules and probably developed little subgroups and friendship pairs. Once these norms have been established, the group will be ready for action and will enter into the *performing* phase. It is in this phase that they will work most effectively as a *team*. This team has a life of its own; its power to support learning will be quite considerable. The confidence level of the team members will have reached the point where they are willing to take significant risks and try out new ideas on their own. It is also the stage when learning will be greatest.

Recent research by Meredith Belbin has led to a greater understanding of the mix of roles needed to make groups work (Box 6.7). It is assumed that nobody is perfect, as each of us has at least one allowable weakness. But a team can be almost perfect, as it frees individuals to concentrate on their strengths. The best teams have a wide mix of roles and functions represented, while teams consisting wholly of one type, however brilliant the individuals, can be disastrously ineffective. For example, a team with several *shapers* could stay locked in conflict, whereas too many *fixers* will produce a team good at gathering information and making contacts but poor at reflecting and implementing.

Two factors make it hard for institutions to produce effective teams based on a full mix of roles and functions. The first is the tendency to select individuals that match the image of the organization. This results in too many people of the same type. For a team leader or manager, it may be necessary to select people they may not like as individuals, but who will be key team members. The second is that all too often individuals are selected according to qualifications, their apparent eligibility for the position, rather than their suitability in terms of their potential team contribution.

Box 6.7 The nine roles required for a 'perfect' team

The Coordinator: The team's natural chairperson; confident, talks easily, listens well; promotes decision making; able to elicit contributions from all team members; need not be a brilliant intellect.
Allowable weakness: somewhat manipulative.

The Spark: The team's vital spark and chief source of ideas; creative, unorthodox, imaginative.
Allowable weakness: lacks practicality, a bit of a handful, up in the clouds.

The Implementer: The team's workhorse; turns ideas into practical actions and gets on with them logically and loyally; disciplined, reliable, conservative.
Allowable weakness: can only adapt if told why, lacks imagination.

The Fixer: The team's extrovert; amiable, good at making and using contacts; an explorer of opportunities.
Allowable weakness: undisciplined, short attention span.

The Shaper: Usually the self-elected leader; dynamic, positive, outgoing, argumentative, a pressurizer; seeks ways round obstacles.
Allowable weakness: not always likeable, tendency to bully, provokes opposition.

The Monitor Evaluator: The team's rock, strategic, sober, analytical, introvert; capable of deep analysis of huge quantities of data; rarely wrong.
Allowable weakness: an unexciting plod, lacks imagination.

The Teamworker: A counsellor and conciliator; social, perceptive, accommodating, aware of undercurrents and others' problems; promotes harmony; most valuable at times of crisis.
Allowable weakness: indecisive.

The Completer Finisher: The team's worrier and stickler for detail, deadlines and schedules; has relentless follow-through; chief catcher of errors and omissions.
Allowable weakness: reluctant to let go, worries about small things.

The Specialist: The team's chief source of rare knowledge and skill; a single-minded loner; self-starting, dedicated and makes the occasional dazzling breakthrough.
Allowable weakness: contributes on a narrow front.

Source: adapted from Meredith Belbin, 1992

The challenge for organizations involved in developing a more sustainable agriculture is to incorporate these principles of group work in the mechanics of participation and institutional collaboration. To do this, there needs to be good connectivity between different components of institutions, so that learning can be shared and distributed. Such connectivity and the development of institutional memory is enhanced through mechanisms for monitoring and self-evaluations.

Monitoring and Self-Evaluations to Improve Learning

Most institutions have mechanisms for identifying departures from normal operating procedures. This is what Argyris and Schön (1978) call single loop learning. But most institutions are very resistant to double-loop learning, as this involves the questioning of, and possible changes in, the wider values and procedures under which they operate. For organizations to become learning organizations, they must ensure that people become aware of their own processes of learning from both mistakes and successes.

Institutions can, therefore, improve learning by encouraging systems that develop a better awareness of information. What they need is to be assured of the quality of external information. The best way to do this is to be in close touch with external environments, such as farms, villages and communities, that generate this information. Professionals must spend time out of the office and in the field. They should also be aware of the fact that we all tend to focus on good rather than bad news.

Good external information must be supported by good internal handling of information. What happens to the information? Who has access to it? Who accepts or rejects it? Many institutions get locked into an unproductive cycle of information manipulation that has been characterized by Chris Argyris in the following way: senior managers are fed with the positive that they want; this is used to confirm the views they already hold; there is therefore little open testing of ideas; and so people become cynical and defensive, and become less willing to provide accurate information (in Easterby-Smith, 1992).

Breaking this cycle can only be done with a genuine commitment to participative decision making, combined with participatory analysis of performance. Most development institutions rely on conventional evaluations to monitor performance. As the subjects of the evaluation are not involved in the process, they feel defensive and hide any errors. Instead of honestly reflecting on the past, they tend to be forced on to the defensive. They then feel little or no ownership in the final recommendations and corrective measures. And so there is little or no learning.

Alternatives to this common scenario are the increasingly important fields of self-evaluation and participatory monitoring. These approaches are designed to improve learning, and have been effective in the Philippines, India, Sri Lanka and Thailand (Lauraya et al, 1991; SDC, 1992; Uphoff, 1992b; Sommer, 1993). Norman Uphoff (1992b) describes what happens when such mechanisms were put in place in the context of irrigation management: *'Government personnel started working more conscientiously and effectively once they came to know the real conditions at the village level through a systematic monitoring and evaluation system. Moreover, there was a dramatic change in local people's collective and individual behaviour once they knew with some precision, and in a comparative way over time and across jurisdictions, how well they were meeting basic needs'*.

But such feedback through regular self-monitoring has been easier in NGOs than in national agricultural systems. Recent studies of some 30 on-farm research and FSR projects in a wide range of countries have found that

learning was generally weak (Merrill-Sands et al, 1991; Byrne, 1989; Tripp, 1991). Despite *'a decade of rhetoric about feedback'*, few agricultural institutions have managed to become learning organizations (Merrill-Sands et al, 1991).

One successful application has been in a project in southern India involving partnerships between a range of institutions (Box 6.8; and see Case 10, Chapter 7). A self-evaluation process was designed as an inter-institutional learning process, so that each group of institutions and individuals could reflect on both their own domains of responsibility and the organization of the project, and then develop options for individual and collective change. External evaluations of complex development programmes commonly create stress and uneasiness among those being evaluated. Instead of following this common route, the process led to new commitments and policies to help future practice and consolidate existing partnerships.

Box 6.8 The self-evaluation process in the Participative Integrated Development of Watersheds (PIDOW) project, Karnataka, India

For close to a decade, four sets of partners have worked together in the PIDOW project: the NGO Myrada, the Drylands Development Board of the Karnataka government, the village level sanghams and the donor, Swiss Development Cooperation. The project works in semi-arid Gulbarga District on the rehabilitation of micro-watersheds, focussing on community development approaches to soil and water conservation, afforestation, dryland agriculture and credit support. The main issues for analysis during the self-evaluation were financial viability, community participation, technical appropriateness, institutional collaboration, equity, sustainability and replication. The self-evaluation involved field-based analyses using participatory methods, plus a range of workshops with villagers and policy makers.

The impacts of the self-evaluation process were as follows:

- the process released many critical and self-critical feelings among all the partners;
- it gave an opportunity to reconfirm past achievements;
- it came up with the proposed emergence of Apex-Sanghams for farmers to air policy concerns;
- it was a forum for exploring conflicts over technical issues. Boulder bunds, for example, had been imposed rigidly by government staff, but farmers said their trapezoidal design was better. They said it could be raised if needed, it required less land and material, and was just as stable if well constructed. This traditional design was recognized by the government at the policy workshop: *'the indigenous practices when found useful may be incorporated into micro-watershed planning in conjunction with recommended government practices'*;
- it led to commitment from government to revise the legal framework regarding management and access to resources on the upper catchment public lands in favour of local communities.

Source: Sommer, 1993

A New Institutional Context

The implications of all this are fundamental for most agricultural and rural organizations. The new learning organizations or clumsy institutions (Shapiro, 1988) should be more decentralized, with an open multi-disciplinarity, flexible teams and heterogeneous outputs responding to demand-pull from farmers. They should be able to operate in turbulence (Roche, 1992). Personal promotion and institutional survival should depend more on external achievement. These new institutions will have to have realistic and rapid feedback flows, so as to make adaptive responses to change. This learning environment should focus on problem solving, and so be interactive and field based. Time will have to be built in for professionals to reflect on what has happened and how they might do things differently next time. This means that the multiple realities and complexities will be better understood through multiple linkages and alliances, with regular dialogue and participation between all actors (Table 6.5).

TOWARDS A NEW PROFESSIONALISM FOR AGRICULTURE

Learning and Teaching

The central concept of sustainable agriculture is that it must enshrine new ways of learning about the world. But 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 organizational structures (Ison, 1990; Argyris, 1991; Russell and Ison, 1991; Bawden, 1992, 1994; Pretty and Chambers, 1993a). 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). Where teaching does not include a focus on self-development and enhancing the ability to learn, then *'teaching threatens sustainable agriculture'* (Ison, 1990).

But teaching itself can impede learning. Professionals who are to work for a more sustainable agriculture 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)

Because of the widespread failure of the formal educational sector to provide the necessary learning environments for the development of new professionals, it has been other institutions which have led the way. These have chiefly been NGOs from both the North and the South. Enlightened individuals in government organizations, NARSs and CG institutes, and

Table 6.5 Comparison between old and new institutional settings

	<i>From the old institutional setting</i>	<i>To the new institutional setting</i>
Mode of decision making	Centralized and standardized	Decentralized, flexible and participatory
Mode of planning and delivery of technologies or services	Single design, fixed packages, supply-push	Evolving design, wide choice, demand-pull
Response to external change	Collect more data before acting	Act immediately and monitor consequences
Mode of field learning	Field learning by 'rural development tourism' and questionnaire surveys; error concealed or ignored	Learning by dialogue and systems of participatory learning; errors not punished
Mode of internal learning	Single-loop learning at best; misleading feedback from peripheries gives falsely favourable impressions of impact	Double-loop learning with time for reflection on experience; use of participatory monitoring and self-evaluations
Importance of creativity	Suppressed if a threat to existing structures and procedures	Experimentation encouraged and original mistakes not punished
Connectivity, linkages and alliances	Institutions work in isolation; individuals in institutions work alone	Institutions linked formally and informally to each other; individuals linked in task forces and informal groups

farmers have also played their part. The investment is not in knowledge, in the formal sense, but in attitudes, behavioural changes and facilitation skills. Training is centred on learning by doing and bringing scientists, extensionists and farmers together to negotiate and learn from each other on personal level. This is quite different to the way normal universities and colleges work.

What learning organizations should seek is to ensure the generation of timely, relevant, and agreed information and knowledge that will support the quest towards a sustainable agriculture. This will occur when we can find ways of developing both new institutional arrangements and alliances to encourage wider involvement, and a new professionalism with greater emphasis on the process of learning (and unlearning) itself.

From the Old to the New Professionalism

A move from a teaching to a learning style has profound implications for agricultural development institutions. The focus is less on *what* we learn, and more on *how* we learn and *with whom*. This implies new roles for

development professionals, leading to a whole new professionalism with new concepts, values, methods and behaviour (Table 6.6). Typically, normal professionals are single disciplinary, work largely in agencies remote from people, are insensitive to diversity of context, and are concerned with themselves generating and transferring technologies. Their beliefs about people's conditions and priorities often differ from people's own views. The new professionals, by contrast, are either multidisciplinary or work in close connection with other disciplines, are not intimidated by the complexities of close dialogue with rural and urban people, and are continually aware of the context of interaction and development.

The problem with characterizing an old and a new professionalism in this way is the risk of depicting complex relationships as simple polarizations, in this case the bad and the good, whereas true sensibility lies in the way opposites are synthesised. A distinction is needed here between the strengths of normal science as bodies of knowledge, principles and methods, and the weaknesses of the beliefs, behaviour and attitudes which often go with it. It is mainly the beliefs and values which present problems, and which the new professionalism seeks to change (Pretty and Chambers, 1993a,b).

However, it is also important to note that the old is really the modern and before the modern there were practices more akin to the new. Extensionists in the USA in the last century and early part of this were clear about the way they worked with farmers. One definition of extension education was given as *'working with people, not for them: of helping people become self-reliant, not dependent on others; of making people become the central actors in the drama, not the stage hands or spectators'* (A H Mauser in Campbell, 1994b).

It is clearly time to let go of some of the old paradigm of positivism for science and embrace the new alternatives. This will not be easy. Many existing agricultural professionals will resist. But as the science writer, Arthur Clarke (1973), put it *'When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong'*. It is only when some of these new professional norms and practices are in place that widespread change in the livelihoods of farmers and their natural environments is likely to be achieved.

When challenged about the work of the Latin American Consortium for Agroecology and Development (CLADES), Miguel Altieri (1992) recently said: *'I don't believe in objective true, universal, neutral science. We use agroecology within a development paradigm that must have a certain direction in terms of social change. Our approach has been marginalised from academia and we have always been called the radicals or the dreamers. It is interesting that academia is now knocking on our doors. I don't argue with anybody any more about whether the set rotation works for seven years; I'll take you there and you can argue with the farmers because the proof is theirs'*.

The prospects of a sustainable agriculture that is built on this new professionalism may be too much for many existing scientists. Thomas Kuhn (1962) indicated that new paradigms inevitably mean some

Table 6.6 Changing professionalism from the old to the new

	From the old professionalism	To the new professionalism
Assumptions about reality	Assumption of singular, tangible reality	Assumption of multiple realities that are socially constructed
Scientific method	Scientific method is reductionist and positivist; complex world split into independent variables and cause-effect relationships; researchers' perceptions are central	Scientific method holistic and post-positivist; local categories and perceptions are central; subject-object and method-data distinctions are blurred
Strategy and context of inquiry	Investigators know what they want; pre-specified research plan or design. Information is extracted from respondents or derived from controlled experiments; context is independent and controlled	Investigators do not know where research will lead; it is an open-ended learning process. Understanding and focus emerges through inter-action; context of inquiry is fundamental
Who sets priorities?	Professionals set priorities	Local people and professionals
Relationship between all actors in the process	Professionals control and motivate clients from a distance; they tend not to trust people (farmers, rural people etc) who are simply the object of inquiry	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 research
Mode of working	Single disciplinary – working alone	Multi-disciplinary – working in groups
Technology or services	Rejected technology or service assumed to be fault of local people or local conditions	Rejected technology or service is a failed technology
Career development	Careers are inwards and upwards – as practitioners get better, they become promoted and take on more administration	Careers include outward and downward movement; professionals stay in touch with action at all levels

Source: Pretty and Chambers, 1993a,b

destruction of the old and so it should not be surprising that many who oppose sustainable agriculture will fear the loss of career prospects. Rod MacRae and colleagues (1989) put it this way when considering the professional barriers to the development of a sustainable agriculture: *'For those who are well recognised in their field there is fear of irrelevancy. Since many scientists have produced research over the years that is irrelevant to sustainable approaches at best, and destructive at worst, they would have to reject the value of an entire lifetime of work; an especially difficult task because many scientists, particularly during their younger years, have allowed their self-esteem to become tied up entirely in their research work... Naturally, they are resistant to approaches, such as sustainable agriculture, that challenge the orthodoxy that has helped them achieve their present position'*.

The use of participatory methods must be combined with action to create both appropriate institutional contexts for them to flourish and appropriate learning environments for individuals to develop their own problem-solving capacities. Where all three combine, namely new systems of participatory learning and action for partnerships, dialogue and analysis; new learning environments for professionals and local people to develop capacities; and new institutional settings, including improved connections both within and between institutions; then widespread and persistent change is more likely (Pretty and Chambers, 1993a; Roche, 1992). It is only with all three in place that a sustainable and productive agriculture can be developed.

SUMMARY

For many reasons, existing agricultural institutions, whether universities, research organizations or extension agencies, find it difficult to learn from farmers and rural people. This is because they are characterized by restrictive bureaucracy and centralized hierarchical authority; their professionals are specialists and so see only a narrow view of the world; and they have few systemic processes for getting feedback on performance. The widespread reliance on questionnaire surveys, supplemented by short rural visits, gives a distorted picture of rural reality. The tendency is for rural complexity to be simplified.

There is increasing recognition that 'participation' between agricultural professionals and rural people is essential for sustained agricultural change. But the term participation is interpreted in many different ways, most of which are characterized by no giving up of control to local people. They may be passive participants, listened to or even consulted, but rarely do they fully interact with the opportunity to take control. Interactive participation can be ensured through the use of alternative systems of inquiry. These are defined methodologies and systemic learning processes; they seek multiple perspectives and diversity; they use group processes of learning and they are context specific. The experts' role is best thought of as a facilitator of local people's analysis and the whole process should lead to local institution building or strengthening, so increasing the capacity of people to take action on their own. Many methods can be

used and their rigour is ensured through the use of criteria for trustworthiness.

Research organizations have a poor record when it comes to participation with farmers. If we are to be serious about the development of a sustainable agriculture, it is critical that local knowledge and skills in experimentation are brought to bear on the processes of research. The problem with agricultural science is that it has poorly understood the nature of indigenous knowledge and farmers' capacity to experiment. When given the opportunity, farmers have been innovative at adapting technologies to their own conditions, often having a significant impact on research and extension institutions in the process.

The wider challenge is for agricultural organizations to become learning organizations. To do this, they will have to promote experimentation; promote connectivity and group work based on roles rather than disciplines; and develop monitoring and self-evaluation systems to improve learning and awareness. The central concept of sustainable agriculture is that it must enshrine new ways of learning about the world. But learning should not be confused with teaching. A move from a teaching to a learning style has profound implications for agricultural development institutions. The focus is less on *what* we learn, and more on *how* we learn and *with whom*. This implies new roles for development professionals, leading to a whole new professionalism with new concepts, values, methods and behaviour.

It is clearly time to let go of some of the old paradigm of positivism for science and embrace the new alternatives. This will not be easy, as many professionals will resist. But it is only when some of these new professional norms and practices are in place that widespread change in the livelihoods of farmers and their natural environments is likely to be achieved.