very different kinds of institutions, the first a grassroots NGO and the second a national agricultural research unit. As these contributions show, both NGOs and government agencies are capable of becoming strategic, flexible, people-centred institutions, provided there is a commitment to change and the wherewithal to do it.

The future role of extension is the subject of papers by Niels Röling and Parmesh Shah. Röling argues that the new challenges of a farmer-first approach to agricultural development requires a radical reorientation of extension systems and philosophy. If extension services are to be transformed from supply-led, technology-driven agencies to organizations that are demand-led, client-driven and performance-based, then a new profession of extension is required. Shah's paper (Part III) presents one of a growing number of cases of village-based extension systems found in various parts of the world. Village extension volunteers in Gujarat, India, offer services, such as soil and water conservation planning, as part of extension services run by and paid for by local people to meet their own needs.

Andrew Campbell provides a very different case of demand-led research and extension support: the Landcare programme in Australia. Today, Landcare represents what is arguably the largest and most effective locally-driven resource management programme in the world. With new professional challenges for agricultural research, extension and development workers, the need for fundamental changes in curricula and teaching styles in educational institutions become essential ingredients for success. In the final paper of Part III, Richard Bawden offers the case of Hawkesbury Agricultural College (the University of Western Sydney) as an example of one institution that has managed to shift from a conservative, top-down, *teaching* institution to a flexible *learning* organization committed to a people-centred, systems approach to agricultural science.

Towards a learning paradigm: new professionalism and institutions for a sustainable agriculture

JULES N. PRETTY and ROBERT CHAMBERS

The context of change

Recent years have seen the growing strength of a new world view in agriculture. The transfer of technology approach for agricultural research and extension has long served industrial and green revolution agriculture, but has increasingly been recognized to be inappropriate for many of the conditions of complex, diverse and risk-prone agriculture. In the transfer-of-technology paradigm, research decisions are made by scientists and technology is developed on research stations, and then handed to extension to

pass on to farmers. But the dominant positivist framework has missed local complexity; determinist causality has failed to account for the adaptive performances of farmers; technologies successful in one context have been applied irrespective of context, with widespread failure; and professionals and institutions have engaged in self-deception as a defence against having to learn the lessons of failure.

A new and complementary paradigm for agricultural research, development and extension is emerging both from a recognition of the failures of such approaches and from advances in other domains. A wide range of disciplines and fields of investigation are now providing insights for an emerging learning paradigm. The components of this new paradigm imply the need for new learning approaches, participatory methods, institutional settings and professionalism itself.

New learning approaches and environments

The central concept of the new paradigm is that it enshrines new ways of learning about the world. Learning and teaching, though, are not the same thing. Learning does not necessarily result from teaching. Teaching is the normal mode in curricula; it underpins the transfer of technology model of research; and it is central to many organizational structures (Ison, 1990; Bawden, Part III). Universities and other agricultural 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). But teaching can impede learning. Professionals who are to work with local complexity, diversity and uncertainty need to engage in sensitive learning about the particular conditions of rapid change. Where teaching does not include a focus on self-development and enhancing the ability to learn, 'teaching threatens sustainable agriculture' (Ison, 1990).

There is little experience of institutional reform that has put learning approaches at the core. A move from a teaching to a learning style has profound implications. The focus is then less on what we learn, and more on how we learn. Institutions will need to provide creative learning environments, conditions in which learning can take place through experience, through open and equal interactions and through personal exploration and experimentation. The pedagogic goals become self-strengthening for people and groups through self-learning and self-teaching. Russell and Ison (1991) have indicated that a central component of new research and development will be that 'the role and action of the researcher is very much a part of the interactions being studied'.

New participatory approaches and methods

In recent years, there has been a blossoming of participatory approaches in government and non-government research, extension and planning institutions (Cornwall *et al.*, Part II). This great diversity is a sign of strength. It implies that each variation is to some extent dependent on contexts and

Table 2: Changing professionalism

	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' categories and perceptions are central	Scientific method holistic and constructivist; 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 interaction; context of inquiry is fundamental
Who sets priorities?	Professionals set priorities	Local people and professionals set priorities together
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.
Mode of working	Single disciplinary – working alone	Multidisciplinary – working in groups
Technology or services	Rejected technology or service assumed to be fault of local people or local conditions. Careers are inwards and upwards – as practitioners get better, they become promoted and take on more administration	Rejected technology or service is a failed technology or service. Careers include outward and downward movement – professionals stay in touch with action at all levels

from and with farmers, and so serve diverse and complex conditions and farming systems. The new roles for outsider professionals include convenor for groups; catalyst and consultant to stimulate, support and advise; facilitator of farmers' own analysis; searcher and supplier for materials and practices for farmers to try; and tour operator to enable farmers to learn from one another (Chambers, 1992a; 1993). These new roles require a new professionalism with new concepts, values, methods and behaviour (Table 2).

Although to characterize an old and a new professionalism is to risk a polarized caricature between the bad and the good, the contrasts stand out. Typically, old professionals are single-disciplinary, work largely or only on research stations, are insensitive to diversity of context and are concerned with generating and transferring technologies. The new professionals, by contrast, are either multidisciplinary or work closely with other disciplines, are not intimidated by the complexities of close dialogue with farmers and rural people, and are continually aware of the context of inquiry and development.

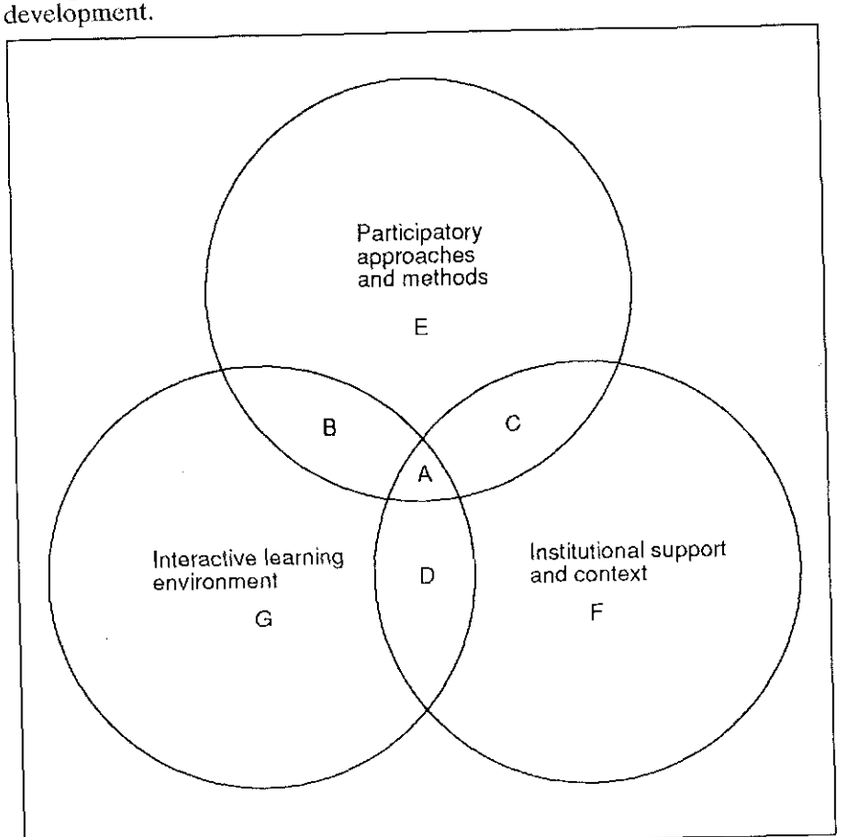

Figure 1: *Conceptual framework for* Beyond Farmer First

A vision for sustainable agriculture

This vision for the future, in which the new professionalism becomes the norm in new institutional structures and partnerships, has been achieved in certain places. There are, for example, an increasing number of environmental and economic successes in complex, diverse and risk-prone areas, where agricultural and economic regeneration has occurred. Local groups, supported by new professionals working in enabling institutions, have increased yields, reduced environmental impacts, built capacities and resilience and reduced dependencies. For this vision, evidence suggests there are three essential areas to tackle. These are new methodologies for participatory analysis and sharing; new learning environments for professionals and rural people to develop capacities; and new institutional environments, including improved linkages within and between institutions. These three areas for action are shown in Figure 1 as intersecting circles.

The following assumptions underlie this conceptual framework:

- Participatory approaches and methods support local innovation and adaptation, accommodate and augment diversity and complexity, enhance local capabilities, and so are more likely to generate sustainable processes and practices;
- An interactive learning environment encourages participatory attitudes, excites interest and commitment, and so contributes to jointly negotiated courses of action;
- Institutional support encourages the spread between and within institutions of participatory methods, and so gives innovators the freedom to act and share. This includes where a whole organization shifts towards participatory methods and management, and where there are informal and formal linkages between different organisations.

In this perspective, sectors G, F and E represent starting points and preconditions, but no initiative is likely to spread well unless it receives support by moving into D, C or B, and then into A.

Participatory methods, as in E, are likely to be abandoned unless there is institutional support or a learning environment. This has been a recurrent experience with field training workshops in PRA. Those who have taken part may be convinced, and wish to introduce participatory methods into their organizations, but find they cannot do this alone. Partly they may lack confidence or clout, but also their colleagues may be sceptical or hostile.

A creative and participatory learning environment on its own, without institutional support or participatory field methods, as in G, is typically vulnerable and short-lived. Such environments tend to rely on one person or a small group, and so disappear when the person or group moves or is moved out. Where there is institutional support for participatory modes, as in F, it is liable to remain only rhetoric and intent unless expressed through a participatory learning environment and/or the use of participatory field methods. Examples are known where a director has been convinced of the value of participatory methods but staff, wedded to top-down methods of investigation, have resisted reform; and where, in consequence, nothing much has changed.

Box 1: A success from Kenya: The Soil and Water Conservation Branch

In 1974, the National Soil Conservation Programme was established in the Ministry of Agriculture. During the first ten years, emphasis was placed on the construction of mechanical protection works, mainly various forms of terracing. The extension services targeted those individual farmers who were willing and able to accept technical assistance. During the 1980s, it became increasingly apparent that this individual approach to extension was not supporting sufficient soil and water conservation measures. Erosion was outstripping conservation, despite the financial incentives and subsidies.

As a result, in 1987 the Ministry adopted the catchment approach. This concentrates resources and efforts within a specified area for a limited period of time. A team with extension officers from different ministries works together for a week in a catchment area using Participatory Rural Appraisal methods for the catchment planning. They work with local people to analyse local ecological and social conditions, produce inventories of local knowledge and practices and develop an action plan. This is discussed at an open meeting, or *baraza*, where farmers are able to comment and express their needs. A catchment committee of local people is elected, and this local organization co-ordinates soil and water conservation within the catchment area.

This group approach to extension planning has increased the credibility of extension staff as they are seen to be listening and learning from local people. It does not make use of direct subsidies. Instead, it has mobilized communities around a productive interest. It has changed attitudes in both local and outside people. The approach has resulted in significant environmental and economic regeneration, with sustained increases in agricultural yields, resource conservation and strength of local groups.

Sources: MALDM, 1988–93; Pretty et al., *1994*

In sector A, support within institutions exists at the top, and authority is more decentralized. Linkages are encouraged with other institutions, whether NGO, government or local organizations. The learning environment focuses on problem-solving, and is interactive and field-based. Responsibility is more personal than procedural, relying more on discretion and judgment and less on rules and manuals. Behaviour and attitudes are democratic, stressing listening and facilitation, not didactic teaching. Local groups and organizations are supported, encouraged to conduct their own experiments and extension and to make demands on the system. Examples of these conditions, or conditions close to them, can now be found in many countries and contexts (e.g. Box 1; Farrington and Bebbington, Part III).

The role of governments and state institutions

There is growing acceptance that participatory approaches can contribute to the development of technologies by and for resource-poor farmers, and to community management of natural resources. But government organizations are limited in their ability to conduct systems-based participatory agricultural research and development. This is accounted for by several well-known factors.

At the macroeconomic level, tight limits are set by debt burdens, structural adjustment, low revenue and budget deficits. At the institutional level, inflexible management generates misleadingly favourable feedback based on centrally determined criteria. Government field agencies, with the deadlines of financial years, often concentrate on physical construction to meet targets to the neglect of community and farmer participation. In consequence, attempts to scale up successes frequently founder. At the individual level, agricultural researchers are deterred from working with farmers by reward systems based on scientific papers derived from on-station research, and by sheer lack of physical and financial resources, such as transport and travel allowances.

Many problems, as well as strengths, were brought to light by ISNAR's study of nine NARSs that had been conducting on-farm client-oriented research for at least five years. The study found that the hardest part of on-farm research to institutionalize was getting feedback from farmers to affect research priorities (Merrill-Sands *et al.*, 1991). As Merrill-Sands and Collion (1992) have stated: 'This finding is particularly disturbing given that we were looking at relatively mature FSR efforts that had had time to train researchers in FSR methods'.

Extension also thoroughly embodies the teaching, positivist paradigm. Extension means extending knowledge from a centre of learning to those presumed to be in need of that knowledge. Researchers have the prestigious role of being the source of new technologies, whilst farmers are passive recipients. The erroneous assumptions underpinning much extension and transfer-of-technology are shown in Box 2.

Box 2: Erroneous assumptions in conventional agricultural research and extension

- Real knowledge is the sole domain of the researcher;
- The farmer is a passive and malleable recipient of information;
- The initiative for disseminating information rests exclusively with the communicator;
- Increased production is the main criterion for farming improvement;
- Farmers' information needs are technical research results rather than in the area of management of their livelihood systems.

Sources: Chambers et al., *1989; Ison, 1990; Moris; 1990; Röling, Part III*

In group-based approaches, extension becomes facilitation, through using and developing farmers' knowledge, teaching observational skills and using adult education methods to develop joint decision making skills (Röling, Part III). Russell and Ison (1991) have suggested that: 'It is time to abandon the term extension altogether because of what it has come to mean in practice and the network of faulty assumptions which are at its core'.

Government Successes

Despite these constraints, there are a growing number of successful innovations in national systems. A selection includes:

- Working groups, interdisciplinary research teams and joint treks in Nepal (Chand and Gurung, 1991; Mathema and Galt, 1989);
- Catchment approach to soil and water conservation, Ministry of Agriculture, Kenya (Kiara *et al.*, 1990; Pretty *et al.*, 1994; MALDM, 1988–93);
- Adaptive Research Planning Teams and village research groups, Ministry of Agriculture, Zambia (Sikana, Part III; Drinkwater, Part II);
- Farmer groups for technology research and extension in the Ministry of Agriculture, Botswana (Heinrich *et al.*, 1991; Norman *et al.*, 1989);
- Innovator workshops in Bangladesh (Abedin and Haque, 1989);
- Farmer and community groups for Landcare, Australia (Campbell, 1994; Part III);
- Policy analysis network of universities in Nepal, coordinated by Winrock International (Gill, 1993);
- Participatory research teams, Tamil Nadu Agricultural University, India (TNAU/IIED, 1992);
- Farmer groups for technology adaptation and extension, Narendra Deva University of Agriculture and Technology, India (Maurya, 1989).

These cases were successes because progress was made in several areas. There were incentives for change, and a recognition that past approaches had failed. There were enabling management structures, with support from senior staff giving the space to innovators who, in turn, were often charismatic individuals able to promote and achieve change. Smaller, autonomous groups within the larger bureaucracies innovated, and then became a model for the rest. Participatory methods were used not just for information gathering, but to establish new dialogues, change behaviour and empower local people.

Many successes reflect the growing experience of farmer-to-farmer extension and peer-training. 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 (Jintrawet *et al.*, 1985). Such farmer-

to-farmer extension has resulted in the spread of contour hedgerows in the Philippines (Fujisaka, 1989a and b); new rice rotations in NE Thailand (Jintrawet *et al.*, 1985); management innovations for irrigation systems in Nepal (Pradan and Yoder, 1989); agroforestry in Kenya (Huby, 1990); velvet beans for green manuring in Honduras (Bunch, 1990); and watershed protection measures in India and Kenya (Mascarenhas *et al.*, 1991; Shah, Part II; MALDM, 1988–93).

Replicability and new problems

An important question is to what extent these successes are replicable. The most pressing problems arise from the approaches themselves. Feedback and learning from farmers' experiences are essential for improvement of technologies and for sustained dialogue between scientists and farmers, but these have proved difficult to sustain on a large scale. In Botswana, feedback has been effective, but on a small scale, from farmer groups in one region (Heinrich *et al.*, 1991). In Nepal, field staff could not devote sufficient time to supervision or collection of feedback, because of the large number of on-farm activities (Chand and Gurung, 1991). New reward systems are needed for agricultural scientists to reduce emphasis on controlled on-station experimentation and the publication of conventional scientific papers.

Successful local groups can also be seen as a threat to state institutions, or political patronage and hijacking can occur when successes are seen as vehicles for achieving other aims. In Australia, there are now more than 1000 local groups, comprising at least a quarter of all farmers in the country. With a growing influence over agricultural policy and funding, there is a very real danger of a backlash from central authorities (Campbell, 1994; Part III).

The national policy environment has a major bearing. For wider impact, attention has also to be paid to factors which impede the spread of locally-led successes, such as macro-economic policies (subsidies for inputs; food pricing policies; food-for-work schemes); regulatory policies (lack of land title for local people); financial constraints; and the desire by politicians to maintain political control of actions at all levels.

Given these problems, and the scale of the challenges and opportunity, it is evident that governments cannot and should not try to go it alone. There is then a compelling case for partnerships and alliances with NGOs, local groups and international organizations.

Non-governmental organizations

The scale, scope and influence of NGOs concerned with development has grown enormously in recent years (Korten, 1990; Edwards and Hulme, 1992; Fowler, 1992; Farrington *et al.*, 1993; Farrington and Bebbington, Part III). In the South, there are perhaps some 10–20,000 development NGOs, and in the OECD countries a further 4,000. Their activities are now very diverse. In some of the poorest areas and countries, they perform

many of the service roles elsewhere carried out by government. Activities include not only relief, welfare, community development and agricultural research and extension, but also advocacy and lobbying, development education, legal reform, training, alliance building and national and international networking. These varied functions and roles mean they are critical actors in their own right, as well as potential partners for government and international institutions.

A number of strengths of NGOs contribute to their relative success. They have:

- The flexibility to choose the subject area and sources of information;
- The freedom to develop their own incentives for professionals;
- The capacity to struggle to get things right, and so more ability at the local level to question, change and learn;
- The strength to support community-level initiatives, and help to organize federations and caucuses;
- The ability to work on longer time horizons, as they are less affected by the time and target-bound 'project' culture.

Like state organizations, NGOs have undertaken a wide range of agricultural activities. In some countries or parts of countries, the coverage by farmers' groups and NGOs in extension, training and input supply is more extensive than that provided by the public sector.

Scaling up the impact of NGOs

NGOs which operate on a very large scale are the exception. Most NGOs are quite small, though quite often conspicuous. They can appear to be doing a lot, but the observer is easily misled. Coverage by NGOs as a whole is usually patchy and small compared with that of government field organisations. Three types of strategy have been identified by Edwards and Hulme (1992) for widening the impact of NGOs:

- *Additive*: NGOs increase their size and expand operations;
- *Multiplicative*: NGOs achieve impact through deliberate influence, networking, policy and legal reform, or training;
- *Diffusive*: NGOs achieve impact through informal and spontaneous spread of ideas, approaches and methods.

The additive strategy is widespread as donors' interest and support has fostered organizational expansion. But it has dangers. Some of the comparative advantage of NGOs is liable to be lost when they expand. Close relationships with farmers, the capacity to experiment and the ability to be flexible to local contexts may all be weakened. Korten's (1990) description of the growth of the International Planned Parenthood Federation as an evolution to 'an expensive and lethargic international bureaucracy' may be an extreme case, but the dangers of size are real.

The multiplicative strategy can take many forms. Intermediary NGOs have provided stimulus, resources and technical assistance for the formation and functioning of community-based organisations. NGOs in these

cases can act as intermediaries, channelling financial and technical resources from other agencies to community-based organizations, instead of using those resources themselves (Mitlin and Satterthwaite, 1992).

The diffusive strategy entails developing and spreading ideas, approaches and methods which others pick up, and which have a capacity to spread on their own. Examples include various forms of self-help savings and credit, such as that of the Grameen Bank, the very ideas of which may encourage others to try similar approaches, and the approaches and methods of Participatory Rural Appraisal (Mascarenhas *et al.*, 1991; Chambers, 1992d).

NGO – government partnerships

Some NGOs choose to work alone, as when, in their opinion, there is little of relevance in the public sector programmes for their clientele. Increasingly though, there is a case for collaborative partnerships between NGOs and the public sector. The size of human capital and resources locked up in government institutions usually represents a huge underutilized potential. As Roche (1991) has argued: 'NGOs need to identify how best they might support but not substitute for what exists'. There is also a case for working with, not necessarily for, governments in long-term partnership. Since the pace of reform is usually slow and subject to reverses, the chances of achieving an impact on government policy and practice are enhanced when NGOs are prepared to work closely in a constructive dialogue.

Many types of relationships have developed between NGOs and governments in agriculture. These include:

- Support for marginalized regional administrations;
- Training of government and NGO staff and farmers in participatory methods;
- Development of alliances during training courses, leading to increased job satisfaction on the part of government staff;
- Research dissemination: it is uncommon for NGOs to generate technology which government disseminates, but quite common for NGOs and NARSs to conduct research jointly (Farrington and Bebbington, Part III). In this mode the NGOs generally operate in a more obviously, and often on-farm, 'adaptive' mode than the NARSs.
- Consortia of government, NGO and farmers' organisations for joint planning and coordination.

These new state–society relations have significant implications (Curtis, 1991). There are benefits from synergism, from greater efficiency of resource use and from NGOs and farmer organizations becoming more accountable. There are also costs and dangers. The state's capabilities may be weakened in two ways: through NGOs substituting for government activities; and through a brain drain to NGOs, as increasingly NGOs are able to attract skilled people away from the public sector, even though this may enrich NGOs with professionals who understand government bureaucracies.

This raises questions about the dividing line between what the state can and should provide, and what can and should be provided by organizations outside government; of how to negotiate appropriate deals between government and NGOs; and of the allocation of resources to achieve an optimal balance between incentives, personal rewards and the costs faced by different parties.

International agricultural research and the CGIAR

The CGIAR Institutions

The international research centres of the CGIAR have a professional influence out of all proportion to their size and budgets. In 1988, the Centres' expenditure of US$250 million was some 6 per cent of the global expenditure on agricultural research (Ravnborg, 1992). Nevertheless, agricultural scientists worldwide see the Centres as embodying and setting the standards of professional excellence. Through their training of national scientists, international networking of research programmes, publications, and prestige, the Centres spread and sustain the dominant concepts, values, methods and behaviour of agricultural science. Still basking in the afterglow of the green revolution, they still in the mid-1990s predominantly accept and propagate the transfer-of-technology paradigm.

Recently, the CGIAR system has responded to the increasing priority attached to the management of natural resources and sustainability in agriculture. The shortcomings of commodity-based research have been increasingly recognized and much discussion has focused on an ecoregional approach to research. In a 1993 report (TAC, 1993), a second green revolution is seen to be needed to double food supplies in the next 25–40 years. The new approach seeks to achieve this by better and more equal collaboration with NARSs, and by co-operation between Centres.

But this revolution can only be achieved through decentralization, farmer participation and through scientists coming closer to farmers. This is well represented by some professionals in some institutions (Fujisaka, Part III). Yet there are still three major challenges which are basic for a revolution in sustainable agriculture.

The first challenge is the development and dissemination of methods for analysis conducted by farmers themselves. The assumption has been that farming systems research has to be done by professionals. Yet recent experiences with participatory methods indicate that farmers have a far greater ability than agricultural or other professionals have supposed to conduct their own appraisal, analysis, experimentation, monitoring and evaluation.

The second is approaches and methods for changing the values of scientists. A striking finding of recent experience with participatory methods is how powerfully inhibiting is the normally dominant behaviour of professionals with farmers – lecturing, criticising, advising, interrupting, 'holding the stick' and 'wagging the finger'. The astonishing time it has taken to realize the analytical capabilities of farmers can be attributed to this almost

universal tendency of outsiders. The need, then, is for experiential training approaches to enable scientists to make the changes.

The third challenge relates to the view that traditional production systems provide limited opportunities for intensification since they use only small amounts of external resources (TAC, 1988). A very small proportion of the system's total budget is spent on technologies that focus on regenerative agriculture. This imbalance undervalues low-external input farming, and overlooks the striking potential for intensification through resource-conserving technologies and enterprises to diversify farming systems (Pretty, 1994b; Cheatle and Njoroge, 1993; Reijntjes *et al.*, 1992; Altieri, 1987).

Opportunities for alliances with NARSs, NGOs and farmers' groups

To support the development and dissemination of participatory approaches and methods within and outside the CG system, there is a need to form new alliances and to strengthen those that already exist. Groups of professionals in some Centres have already been conducting participatory research in partnership with other organizations. These include or have included:

- Post-harvest potato technology research with Peruvian farmers, from CIP (Rhoades and Booth, 1982);
- Bean research with Bolivian, Colombian and Rwandan farmers and NGOs, from CIAT (Ashby *et al.*, 1989; Bebbington and Farrington, 1992; Sperling, 1989);
- Aquaculture systems research and development with Malawian and Filipino farmers, from ICLARM (Lightfoot and Noble, 1992);
- Upland conservation research and development in the Philippines and elsewhere, from IRRI (Fujisaka, Part III);
- Pigeonpea research with women farmers in Andhra Pradesh (Pimbert, 1991) and pearl millet research in Rajasthan (Eva Weltzien Rattunde, pers. comm.), from ICRISAT;
- Soil and water conservation research with Indian government agencies, NGOs and farmers, from ICRISAT (Kerr and Sanghi, 1992);
- Countrywide network for potato research in Philippines, UPWARD at CIP (UPWARD, 1990);
- Continent-wide network for farmer participatory research for alley farming and agroforestry, Alley Farming Network for Tropical Africa (AFNETA), supported by IITA, ILCA and ICRAF (AFNETA, 1993; Atta-Krah, Part III).

These programmes are, however, not yet the norm. Those individuals who have succeeded in developing and using participatory approaches have tended to be isolated and marginalized within their institutions. At least until recently, they have been more recognized and respected in the outside world than by their colleagues. The central question remains whether the CGIAR system as a whole, and the IARCs individually, will embrace participatory approaches and methods, as mainstream professional activities, or whether these will remain on the fringe.

Local institutions

Types of local institution

Local groups and other institutions have been relatively neglected in agricultural research, extension and development. This is another symptom of agricultural development that focuses on technology rather than on the organisational and institutional setting. Yet all the positive experiences in Sector A of the conceptual model (Figure 1) have built upon existing institutions or helped to develop new ones. Local institutions can have many positive effects. Although local institutions are fundamental for a sustainable agriculture, they function in a wide range of ways (Box 3). Five types of local group are directly relevant to the new agenda for agricultural research and development:

- *Community development groups*, such as for hill resource management in India (Poffenberger, 1990) and agricultural development in Nepal (Rahman, 1984);
- *Farmer experimental and village research groups*, such as in Zambia (Sikana; Drinkwater, Part II), Botswana (Heinrich *et al.*, 1991), Ecuador and Colombia (Ashby, *et al*, 1989; Bebbington, 1991a and b);
- *Farmer-to-farmer extension groups*, such as for soil regeneration in Honduras (Bunch, 1990) and for irrigation management in Nepal (Pradan and Yoder, 1989);
- *Natural resource management groups*, such as for local forests, for irrigation tank management in India (CWR, 1990–91; Mosse, 1992), for soil and water conservation in Kenya (MALDM, 1988–92), for irrigation in the Philippines (Bagadion and Korten, 1991), and for land rehabilitation in Australia (Campbell, Part III);

Box 3: Functions of local institutions

- Organize labour resources for production;
- 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;
- Improve access of rural population to information;
- Improve flow of information to government and NGOs;
- Improve social cohesion;
- Provide a framework for co-operative action;
- Help organize people to use their own knowledge and research to advocate their own rights;
- Mediate access to resources for a select group of people.

Sources: Uphoff, 1992a, b; Cernea, 1991a, b; Curtis, 1991; Norton, 1992

- *Credit management groups*, such as in MYRADA groups in India (Fernandez and Mascarenhas, 1993), Grameen Bank groups in Bangladesh and Small Farmer Development Programme groups in Nepal (Conroy and Litvinoff, 1989; Rahman, 1984).

Strategies for supporting local institutions

Local groups do have some shortcomings. Some community level institutions establish and legitimize unequal access to natural resources, as with water allocation in Tamil Nadu during times of scarcity (Mosse, 1992), and in the common field system in medieval Britain (Pretty, 1990). Also, if only one institution is present in the community, with powers to refuse membership, then, as with farmers' clubs in Malawi, the poor are liable to be excluded (Kydd, 1989). External interventions can also create problems. They 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 also seek to take over local successes or gain reflected glory from them.

Problems also arise during the evolution of groups. Groups are sometimes more effective in their early years. As they grow in size, confidence and prominence, their power and position can bring them into new conflicts. The original leaders may not build up secondary leadership, creating an internal vacuum. A diversity of local institutions can also lead to factionalism and conflict unless attention is paid to articulation between groups and federation to higher level bodies.

These problems have been largely overcome by external organizations using the following strategies:

- Where there has been little spontaneous local organization, external agents can play a positive role in change, often by concentrating first on rural context rather than content. They may mobilize resources and act as a broker between interest groups, as in a Tamil Nadu case (Mosse, 1992); or they may create demand for local institutions by beginning with awareness and articulation of local needs and interests, as in Ecuador and Bolivia, where land tenure and marketing were addressed before research activities (Bebbington, 1991; Part III).
- Responsible leadership is crucial. It is encouraged where groups select their own members and make their own rules, as with MYRADA credit groups (Fernandez, 1992), and in Sri Lanka irrigation groups (Uphoff, Part III). Good leaders need adequate rewards to guard against unofficial or corrupt practices.
- Training, where it is involved, is to help people gain new problem-solving skills. This is more useful than technical training. Local people can then take on the roles of researcher and extensionist, and by so doing increase effectiveness by farmer-to-farmer training and extension.
- Perhaps the most important strategy is to find ways of helping local institutions to come together and federate, with small groups at the base represented by wider and stronger institutions at higher levels (Bebbington, Part III).

Educational and learning organizations

Universities and their agricultural faculties are often the most conservative of agricultural organizations. They remain in the conceptual strait-jacket of positivism and modernization, arising partly out of the functional demarcation of research and teaching, and the focus on teaching rather than learning (Pearson and Ison, 1990). Most have developed structures that reflect the proliferation of disciplines which have emerged over the past thirty years. The problem is that an innovative field is usually accommodated by adding on a new department (Gibbon, 1992). Such new ideas have hardly ever stimulated radical rethinking or restructuring. This is because the structure of agricultural universities and faculties creates biases hugely in favour of the teaching paradigm (Box 4).

The most fundamental need is to enable universities to evolve into communities of participatory learners. Academics must become involved in learning, learning about learning, facilitating the development of learners and exploring new ways of understanding their own and others' realities. Radical change is required. The education system does not need patching and repairing; it needs transformation.

The strategic implications for learning are threefold (Ison, 1990). The first is greater learning autonomy for students. The aim is to enhance, not stifle, their responsibility, leadership and creativity. This requires the development of flexible, learner-centred curricula. The second is more focus on applying concepts to real problem situations. This requires working to reach agreement in identifying the existence and nature of the problem,

Box 4: The biased structures of agricultural universities and faculties

- They are frequently organized along authoritarian rather than participatory management lines;
- Management positions are often held on the basis of seniority rather than management skills;
- Creative and eccentric innovation is rarely tolerated;
- Institutional rewards, particularly senior authorship of papers, promotes individual and isolated research – making many institutions lonely places;
- Organizations become introspective and resistant to new ideas, processes and changing environmental circumstances;
- Staff development, if it exists, is frequently in the form of refresher training, where content (new faces) is the primary input, rather than a balance between content and the development of new management or learning skills;
- Explicit or implicit status divisions become set in stone, e.g. researcher versus extensionist, natural versus social scientist.

Source: Ison, 1990

with the participation of all concerned, including the student learner. And the last is devolving more responsibility and power to students. The aim is to enable them to learn how to understand realities better. This requires assessment procedures which encourage them to pursue independent inquiry, rather than just pass examinations. As a result, it is necessary to:

> Think about things in a quite different way – for what we *do* in the world reflects what we *know* about it, and what we *know* depends on how we go about *knowing*, or in other words when thinking about change we should start by thinking about thinking (Bawden and Macadam, 1988, quoted in Ison, 1990).

The change suggested here is very rare in universities, an exception being the former Hawkesbury Agricultural College in Australia (Bawden, Part III). It is more common in small colleges and in training institutions linked less to the mass production of graduates, and more to the development of capable professionals (Lynton and Pareek, 1990; Lynton, 1960); and in some adult education institutions (Rogers, 1985). An unresolved question is how these agricultural education institutions can be reformed.

One example of how educational institutions can take on a new role for sustainable agriculture comes from Honduras. Since 1988, scientists at a small agricultural college in El Zamorano have been working to build the capacity of small farmers to control pests without pesticides (Bentley, Part II; Bentley and Melara, 1991). This is done through short courses with farmers. Farmers' knowledge is already profound, but there are aspects of pest control they do not know about. For example, they can describe social wasps, but do not know that solitary parasitic wasps exist; they know that pesticides are toxic, but equate smell with toxic strength and so have no means of perceiving chronic toxicity. The successful new learning is based on the collaboration between farmers and scientists, and now small-scale farmers help to set scientists' formal research agendas. Such collaboration results in the development of better technologies than either University staff or farmers alone could invent. As Bentley and Melara (1991) put it: 'we depend on farmers to help tell us what to study and to work with us carrying out the experiments in their fields, fine-tuning the technologies to their conditions'.

Institutional and policy implications for the new professionalism

Some of the practical implications for support and spread for the new agricultural professionalism are well known and have been described elsewhere (Merrill-Sands *et al.*, 1991; Chambers, *et al.*, 1989). The personal and institutional changes envisaged must be supported by the adoption of new incentives, structures and linkages. Some of these can be taken on by individual institutions; others will require more co-ordinated action at policy level:

- *Shifting resources*: scientists, extensionists, teachers and trainers need the physical and financial means to travel and stay in villages often

enough and long enough for good participatory interactions. Support is needed for field training experiences, and opportunities to share ideas and innovations, within regions, countries and globally.
- *More recognition and new rewards*: far from being marginal in institutions, those who work as new professionals in a participatory mode deserve recognition as pioneers. This is occurring with the rise in international, donor and government interest in participatory approaches, but requires backing also from theory, books, prestigious journals, academic and international prizes and awards and sustained funding by governments, foundations and donor agencies.
- *Changing personal behaviour and attitudes*: personal behaviour and attitudes remain the great blind spot of agricultural research and extension. The quality and sensitivity of personal interactions are critical. In training for participatory methods, it has been found that listening, learning and low-key facilitation are more important than the methods. Methodologically, a major frontier for institutional change is how first to enable individuals to change, for personal change will often have to precede as well as accompany changes in the cultures of organizations.
- *Supportive leadership*: consistent and strong support from the upper levels of organizations can provide space and security for innovation, even when a whole organization does not change. Familiarisation of senior managers and administrators with the new professionalism has to be one part of a strategy for spread.
- *Creating alliances, support and sharing*: even with strong leadership, whole institutions will rarely change at once. In PRA, sharing experience through inviting participants in field training workshops from a range of organizations has proved effective. Friendships develop, and mutual support can take place afterwards. The crucial time is often shortly after returning from a training to the parent organization. Professionals then often need support in order effectively to share their experience with colleagues.
- *Training, trainers and dissemination*: demand for training in new participatory methods far exceeds the supply of good trainers. The strategic use of trainers and training opportunities therefore matters. Key factors include selecting participants for field workshops who are likely to be able to spread the participatory approaches and methods, and themselves become trainers later; inviting at least two from the same organization so that they can provide mutual support on their return; ensuring that sharing and critical self-awareness are built into participatory approaches from the start; and support and dissemination through producing and sending materials to targeted individuals. These materials can include slide packs, reports on applications of methods and on innovations; local networking; and notes on 'how-to-do-it' for methods of learning, rather than manuals and cookbooks which are liable to inhibit self-learning.
- *Policy and practice:* the history of agricultural policy shows a common pattern. Technical prescriptions are derived from controlled and

uniform settings, and applied widely with little regard for diverse local needs and conditions. Differences in receiving environments and livelihoods then often make the technologies unworkable and unacceptable. Policies actively encourage dependency on external inputs, even when they are financially costly, environmentally damaging and economically inefficient. When technologies are rejected, policies shift to seeking success through the manipulation of social, economic and ecological environments and through enforcement. For sustainable agriculture to succeed, these mistakes must not be repeated. Instead, policy and practice need a new, enabling orientation. With this, conditions would be created for sustainable development based more on locally available resources and local skills and knowledge. Agricultural policies must focus in a more practical manner on enabling people and professionals to make the most of available social and biological resources.

Conclusions

The new agricultural professionalism places responsibility on the individual as well as on institutions. Each person can contribute to or constrain its spread. Each person can, through critical self-awareness and embracing error, learn and improve, so that the new professionalism grows and gets better.

The intention to adopt new values and practices are prerequisites for change, and cannot be assumed. But even when they exist, both institutions and individuals face difficulties. In institutions, standardization and speed stand out as recurrent dangers, pursued in the interests of wider and more rapid application. As Sumberg (1991) has observed:

> It would appear absolutely essential to avoid the temptation of a rapid institutionalization of farmer-participatory research. It was this . . . that eventually limited the overall impact of farming systems research.

It would be ironic if approaches developed to deal with diversity and complexity became institutionalized in such a way that whatever positive contribution they might have been able to make is effectively marginalized.

For individuals, too, there are problems, especially for those trapped in conventional organizations. In outlining the new professionalism, we do not wish to discourage those for whom, in their current institutional context, there may seem so little room for manoeuvre that it is out of reach. There are many paths, and many small steps that can be taken towards it. Nor should the new professionalism be seen as an alternative, completely to replace the old. The old and the new have mutual strengths. For the new to succeed, both drive and restraint must be exercized so that its spread can be sustained and self-improving. Learning how to evolve and spread the new professionalism must itself be a slow and sensitive learning process.