Jules N Pretty

1 FUNDAMENTAL CHALLENGES FOR SUSTAINABLE AGRICULTURE[1]

Despite remarkable increases in food production in the second half of this century, profound challenges still face farmers and those engaged in agricultural development. Modern farming, characterized by increased use of such external inputs and technologies as fertilizers, pesticides, seeds and machinery, has also brought environmental and social costs. Some argue vigorously that such modern agriculture is the only path for agricultural development (World Bank 1993; Borlaug 1992; TAC 1988).

Many others, though, take a different view, drawing on evidence that a revolution in sustainable agriculture has begun. Where agriculture incorporates natural processes such as nitrogen fixation and pest-predator relationships into productive processes; reduces the use of off-farm inputs by substituting labour and management; makes greater productive use of the biological and genetic potential of plants and animals; and improves the match between cropping patterns and the productive potential and physical limitations of the land, it can successfully revitalize local economies and environments (Pretty 1994; UNDP 1992; NRC 1989).

In the complex, remote and 'resource-poor' parts of the world, farmers adopting regenerative and resource-conserving technologies have been able to double or treble crop yields, even though they have used little or no external inputs (Chambers et al. 1989; Bunch 1991; Pretty 1994; Reijntjes et al. 1992; Shah 1992; UNDP 1992). In the high-input, generally irrigated lands, farmers adopting regenerative technologies have maintained yields whilst substantially reducing inputs (Bagadion and Korten 1991; GoI 1992; Winarto 1992). In the very high input agriculture of many industrialized countries, these technologies have maintained profitability, usually with some yield reduction, whilst significantly reducing inputs (NRC 1989; Hanson et al. 1990; Vereijken 1990; Dobbs et al. 1991; Bax and Fisher 1993; Jordan et al. 1993; Pretty and Howes 1993).

Despite these successes, relatively few farmers have adopted new sustainable agricultural practices. One reason for this is that sustainable agriculture presents a deeper and more fundamental challenge than many researchers, extensionists and policy makers have yet supposed. These challenges relate to the very nature of the way we conceptualize sustainability and how it might be achieved.

2 THE PREVALENCE OF POSITIVISM AS SCIENTIFIC METHOD

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

It is this positivist approach that has led to the generation of technologies for farmers that have been applied widely and irrespective of context. Where it has been possible to control farmers, either directly or through economic incentives or markets,

agricultural systems have been transformed. But where neither the technologies have fitted local systems nor farmers been controlled, then agricultural modernization has passed rural people by. Some 1.5 billion people now rely on agricultural systems in which cereal yields have remained of the order of 0.5-1 tonne per hectare over at least the past 50 years.

Many positivists are inevitably frustrated and confused when faced with the notion of sustainability. In as much as they believe an independent reality exists, then so must it be possible precisely to define sustainability in value-free terms. There are now something of the order of 70 such definitions, the author of each regarding it as the best. To show that something is sustainable, positivists also need indicators against which to measure performance. These help to show how close a system is to being sustainable. If it is far away, then activities ought to be changed so as to come closer to the ultimate goal.

But no scientific method will ever be able to ask all the right questions about how we should manage resources for sustainable development, let alone find the answers. The results are always open to interpretation. All actors, and particularly those stakeholders with a direct social or economic involvement and interest, have a uniquely different perspective on what is a problem and what constitutes improvement in an agricultural system. As Wynne has put it: 'the conventional view is that scientific knowledge and method enthusiastically embrace uncertainties and exhaustively pursue them. This is seriously misleading' (Wynne 1992). The trouble with normal science is that it gives credibility to opinion only when it is defined in scientific language, which may be inadequate for describing the complex and changing experiences of farmers and other actors in rural development. As a result, it has alienated many of them.

3 ALTERNATIVES TO THE POSITIVIST PARADIGM

The positivist paradigm is so pervasive that, by definition, those inside it cannot see that alternatives exist. Indeed, the absolutist position of positivism excludes other possibilities. Yet the important point about positivism is that it is just one of many ways of describing the world (Kuhn 1962; Feyerabend 1975; Habermas 1987; Giddens 1987; Rorty 1989; Uphoff 1992).

A new set of paradigms is now emerging from advances in a wide range of disciplines and fields of investigation, such as from developments in mathematics, non-linear science and chaos theory (Gleick 1987; Gould 1989); from quantum physics; from post-positivism (Phillips 1990); from critical theory (Jackson 1991; Popkewitz 1990); from constructivist inquiry (Lincoln and Guba 1985; Denzin 1989; Guba 1990; Röling and Jiggins 1993); from soft-systems and contextual science (Checkland 1981 1989; Russell and Ison 1991; Bawden 1992); from the philosophy of symbiosis (Kurokawa 1991); from post-modernism (Harvey 1989); and from stakeholder analysis (Burgoyne forthcoming). There are many others not listed here.

Although these are all alternatives to positivism, they are not necessarily commensurable with each other (Guba 1990; Jackson 1991). Post-positivism, for example, is often taken to be a modified version of positivism, in which reality is believed to exist, but which is impossible truly to be perceived by us. Objectivity remains an ideal, and triangulation of data, investigators, theories and methods is the means to ensure that interpretations of the world are not distorted. By contrast, critical theory suggests that the world can only be seen through a 'value window', and the choice of value empowers some people and disenfranchises others. The task of inquiry is to transform people, so raising them to a 'true' level of consciousness. Like positivism and post-positivism, its ontology (the nature of reality) is realist, though the epistemology (the nature of the relationship between the knower and known) is subjectivist.

A further contrast is with constructivism, in which reality is believed to exist only in the context of a mental construct. As knowledge is a human construction, no unequivocal explanations are therefore ever possible. There will always be large numbers of theories that can explain a given body of facts, and choosing one theory cannot be value-free. Investigation is value-bound, in which the interaction between inquirer and investigated shapes the outputs or findings.

The advances in alternative paradigms have important implications for how we go about finding out about the world, generating information and so taking action. All hold that 'the truth is ultimately a mirage that cannot be attained because the worlds we know are made by us' (Eisner 1990). Although some would argue that these paradigms are as different

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from each other as from positivism, there is no need to select one position or basic set of beliefs above another. All suggest that we need to reform the way we think about methodologies for finding out about the world. This should not be surprising, as 'the language of reductionism and positivism does not entertain the very complex and dynamic phenomena associated with the quest for sustainable practices' (Bawden 1991).

4 UNDERLYING PRINCIPLES OF ALTERNATIVE PARADIGMS

Five principles set out the crucial differences between these emerging paradigms and positivist science:

1 The first is that any attempt precisely to define sustainability is flawed. It represents neither a fixed set of practices or technologies, nor a model to describe or impose on the world. The question of defining what we are trying to achieve is part of the problem, as each individual has different objectives. For us to prescribe a concretely defined set of technologies, practices or policies would be to close down on future options, so undermining the notion of sustainability itself. Sustainable agriculture is, therefore, not so much a specific farming strategy as it is a systems-oriented approach to understanding complex ecological, social and environmental interactions in rural areas.

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

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

4 The fourth is that the key feature now becomes the capacity of actors continually to learn about these changing conditions, so that they can act quickly to transform existing activities. Action in the quest for sustainable agriculture does not demand certainty before intervening in the environment. It should make uncertainties explicit and encourage rather than obstruct wider public debates about pursuing new paths for agricultural development. The findings of any investigation no longer can be conceived of as a report on what really exists, but are the result of the process that created them. The world is open to multiple interpretations, and so it is impossible to say which one is true.

5 The fifth is that systems of learning and inquiry are needed to seek the multiple perspectives of the various stakeholders, encourage involvement and action, and resolve conflicts for the common and future good. The view that there is only one epistemology (that is, the scientific one) is rejected. Participation and collaboration become essential components of any system of inquiry, as any change cannot be effected without the full involvement of all stakeholders and the adequate representation of their views and perspectives. As Sriskandarajah *et al.* (1991) put it: 'ways of researching need to be developed that combine 'finding out' about complex and dynamic situations with 'taking action' to improve them, in such a way that the actors and beneficiaries of the 'action research' are intimately involved as participants in the whole process'.

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

But non-positivists do not say that science does not work. They point out that what positivist science wants is ways of predicting and controlling nature, and so a good scientific theory simply gives better control and prediction. A more honest way of thinking about science is as a human tool, not as

a discipline that is in touch with some absolute reality. This simply means that 'no longer can it be claimed there are any absolutely authoritative foundations upon which scientific knowledge is based... The fact is that many of our beliefs are warranted by rather weighty bodies of evidence and argument, and so we are justified in holding them; but they are not absolutely unchallengeable' (Phillips 1990).

Conflict does not have to flow from people accepting different meanings. The greatest threat of conflict or violence comes from someone who claims their view is true, and so tries to suppress other views. Thus, we must resist the notion of certainty, which is the source of dogmatism and ideology. The paradox is that scientists will readily admit they are constantly having to change their own ideas about reality in the course of their work.

We can only get a human idea of what is in the world, and so science itself can only be a human picture of the world. How we see the world depends on what matters to us. As different people have different values, this raises critical issues for the methodologies we use for finding out about the world. What should become central is the people themselves, rather than the 'tools' or 'instruments'. How do their values affect the way we go about learning about the world? Why do they need the information? Why do they think it is important? How will they judge whether it is useful or good?

These questions are not addressed unless investigators have a framework to help organize methods into a system of inquiry. Using a formal survey with a preset questionnaire has long been the standard choice for those wishing to gather agricultural information. The questionnaire[2] is given to trained enumerators who interview a sample group selected from a larger population. As each informant is asked the same set of questions, it is assumed that the interviewer does not influence the process. In recent years, there has been a rapid expansion in alternative systems of inquiry. These have drawn on many long-established traditions that have put participation, action research and adult education at the forefront of attempts to liberate and emancipate disempowered people (see Chambers

1992a; RRA Notes, *passim*; Pretty *et al.* 1994). Many have developed as alternatives to questionnaire surveys. Where the new systems of inquiry differ is in the emphasis on the interactive participation of all actors.

5 MULTIPLE USES OF 'PARTICIPATION'
There is a long history of 'participation' in development, and a wide range of development agencies, both national and international, have attempted to involve people in some aspect of planning and implementation. 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). This has created many paradoxes. The term 'participation' has been used to justify the extension of state control 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).

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. This paternalism then undermines sustainability goals and produces results which do not persist once the project ceases. As little effort is made to build local skills, interests and capacity, local people have no stake in maintaining structures or practices once the flow of incentives stops.

Drawing on the range of ways that development organizations interpret and use the term participation, there are at least seven different types of participation (Table 1). This typology suggests that the term 'participation' should not be accepted without appropriate qualification. If development is to be sustainable, then nothing less than functional participation will suffice. All the evidence points towards long-term economic and environmental revitalization coming about when people's ideas and

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

Table 1:	A typology of participation: how people participate in development programmes and projects	
	Typology	Components 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 of the research 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 the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5	Functional Participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6	Interactive Participation	People participate in joint analysis, which leads to action plans and the formation of new local 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. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

knowledge are valued, and power is given to them to make decisions independently of external agencies. It should always be qualified by reference to the type of participation, as most types will threaten rather than support the goals of sustainable development. Therefore great care must be taken when using the term participation.

6 PRINCIPLES OF THE SYSTEMS OF PARTICIPATORY INQUIRY

To the wider body of development programmes, projects and initiatives, these systems of inquiry represent a significant departure from standard practice. Some of the changes underway are remarkable. In many government and non-government

institutions, extractive research is being superseded by investigation and analysis by local people themselves. Methods are being used not just for local people to inform outsiders, but also for people's own analysis of their own conditions (Chambers 1992a, 1992b; Pretty and Chambers 1993; RRA Notes, *passim*).

The interactive involvement of people in many differing institutional contexts has promoted innovation and ownership, and there are many variations in the way that systems of inquiry have been put together. However, there are important common principles. 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, 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 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 inquiry process** - all involve the recognition that the complexity of the world will only be revealed through group inquiry. This implies three possible mixes of investigators, namely those from different disciplines, from different sectors, and from outsiders 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 carry out their own study and so achieve something. These facilitating experts may be stakeholders themselves.

● **Leading to sustained action** - the inquiry process leads to debate about change, including confronting of the constructions of others people, and this debate changes the perceptions of the actors and their readiness to contemplate action. This leads to more sophisticated and informed constructions of the world. The debate and/or analysis both defines changes which would bring about improvement and seeks to motivate people to take action to implement the defined changes. Action is agreed, and implementable changes will therefore represent an accommodation between the different conflicting views. This action includes local institution building or strengthening, so increasing the capacity of people to initiate action on their own.

7 CRITERIA FOR JUDGING INFORMATION

It is common for users who have presented findings drawn from alternative systems of inquiry 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 commonly assumed, therefore, to be missing from such inquiry.

This means that it is the investigators using participatory methods who are called upon to prove the value of their approach, not the conventional investigator. Users of participatory methods attempt to answer four questions 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? Can we apply these findings to other contexts or with other groups of people? Would the findings be repeated if the inquiry were replicated with the same (or similar) subjects in the same or similar context? 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? Conventional research uses four criteria to provide answers to these questions. These are internal validity, external validity, reliability and objectivity.

These criteria, though, are dependent for their meaning on the underlying assumptions of the positivist research paradigm (Lincoln and Guba

1985; Kirk and Miller 1986; Cook and Campbell 1979). External validity, for example, is the extent to which we infer that presumed causal relationships apply to other contexts, i.e. they can be generalized across different types of persons, settings and times. Objectivity is the extent to which multiple observers can agree on a phenomenon, and is established by using a methodology that seeks to ensure that process and findings are not influenced by the investigators themselves. Yet in the alternative paradigm, such generalizations and detachments between observer and observed are logically impossible.

These criteria cannot be used to judge the quality of findings arising out of the use of alternative systems of inquiry. What is needed are entirely alternative criteria to establish trustworthiness, or what some call 'goodness'.

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 confirmability. But these 'had their foundation in concerns indigenous to the 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 can be identified (Table 2). 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

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Table 2: Components of inquiry process enhancing trustworthiness

Components of Inquiry Process Enhancing Trustworthiness

1   Prolonged and/or intense engagement of the various actors;

2   Persistent and parallel observation;

3   Triangulation of sources, methods and investigators;

4   Analysis and expression of difference;

5   Negative case analysis;

6   Peer checking;

7   Participant checking;

8   Reports with working hypotheses, contextual descriptions and visualizations;

9   Parallel investigations and team communications;

10   Reflexive journals;

11   Inquiry audit;

12   Impact on stakeholders' capacity to know and act.

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 the positivist paradigm. 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 'data no longer speak for themselves'.

8 A FRAMEWORK FOR JUDGING TRUSTWORTHINESS

8.1 Prolonged and/or intense engagement between the various sectors
This is primarily to build trust and rapport, to learn the particulars of the context, and to keep the investigator(s) open to multiple influences. Trust takes a long time to build, but can be destroyed overnight. It is built by demonstrating to participants that their confidences will not be used against them; and by confirming that participants will have an input into, and so influence, the inquiry process.

8.2 Persistent and parallel observation
This is for understanding both a phenomenon and its context. Observation increases the depth of understanding and the breadth of perspectives and realities encountered.

8.3 Triangulation by multiple sources, methods and investigators
This is to cross-check information and increase the range of different peoples' realities encountered. Multiple sources implies multiple copies of one type of source (e.g. interviews with farmers from one social group); or different sources of the same infor-

mation (e.g. interviews with men, women and children about the same topic). Multiple methods implies comparing the results derived from a range of methods; once a proposition has been confirmed by one or more methods, the uncertainty of its interpretation is greatly reduced. Multiple investigators implies having teams with a diversity of personal, professional and disciplinary backgrounds, increasing the range of perspectives and biases imposed on the inquiry.

8.4 Analysis and expression of difference
This is to ensure that a wide range of different actors are involved in the analysis, and that their perspectives and realities are accurately represented. These perspectives will not necessarily be resolved to suggest a single consensus.

8.5 Negative case analysis
This is the process of sequential revision of hypotheses as insight grows, with the objective of revision until one hypothesis accounts for all known cases without exception. Negative case analysis is to qualitative research what statistical analysis is to quantitative. Qualitative inquiry uses error to revise the hypothesis, whilst quantitative inquiry uses error variance to test the hypothesis, and so accept or reject it. In practice, accounting for all known exceptions is rarely achieved.

8.6 Peer checking
Peer or colleague checking involves periodical meetings with peers not directly involved in the inquiry process. The objective is for peers to explore aspects of the inquiry that might still be implicit in the minds of the team members or lone investigator. This helps to keep the investigators honest, by exposing them to searching questions so as to probe biases and explore meanings.

8.7 Participant checking
This is to test the data, interpretations and conclusions with people with whom the original information was constructed. If the reconstructions by the inquirers are recognized by these groups of participants as adequate representations of their own (and multiple) realities, then the credibility of the findings is established. These participant checks occur both during the course of interactive analysis and inquiry, and formally in presentation meetings towards the end of the inquiry. Without participant checks, investigators can make no claims that they are representing participants' views. Participants have the

opportunity to investigate discrepancies and challenge findings, to volunteer additional information, and to hear a summary of what the investigators have learned and constructed.

8.8 Reports with working hypotheses, contextual descriptions and visualizations

Whilst the conventional investigator expects to make relatively precise statements about external validity, expressed, say, in the form of statistical confidence limits, the participatory inquiry team sets out working hypotheses with detailed descriptions of the context in which they were formulated. These 'thick' descriptions include visualizations as well as direct quotations capturing peoples' personal perspectives and experiences.

8.9 Parallel investigations and team communications

These are essential for dependability as they demonstrate replication. 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. For parallel investigations to succeed, there must be good communication between team members. This requires regular formal meetings and established group norms of behaviour.

8.10 Reflexive journals

These are diaries individuals keep on a daily basis to record a variety of information about themselves. As all individuals involved in the process are recognized as being central to the process, their feelings and decisions should also be recorded. These may not be revealed to others, but they are essential in helping, at a later stage, to remember the immediate reasons for methodological decisions and interpretations.

8.11 Inquiry audit

The inquiry 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 a figment of their imaginations. The inquiry audit is conducted to establish the fairness of the representations by examining the process of inquiry and the end product. The inquiry audit then can attest that the end products are supported by the data and are internally coherent. The inquiry audit can be conducted in a workshop context or by an external, and so disinterested, person.

8.12 Impact on stakeholders' capacity to know and act

It is important to be able to demonstrate that the investigation or study has had an impact. The participants should have a heightened sense of their own constructed realities, as well as an increased awareness and appreciation of those of other people. There should be enhanced sophistication of the stakeholders, as well as an increased understanding of the range of possible avenues of action. Not only should the inquiry lead to action, but the report itself should also prompt action on the part of readers who have not been directly involved.

9 TOWARDS A NEW PROFESSIONALISM

The elements of these alternative systems of inquiry, the principles, methods and trustworthiness criteria, will not be sufficient to provoke widespread change in institutions and individuals. The methods themselves are not neutral of historical, social and political context. They may be used to lead to genuine local capacity building and organization. They may also be used to transform local perspectives into forms more acceptable to outsiders.

These systems of inquiry are centred on approaches that are alternatives to positivism. They are more likely to generate information agreed by various interest groups, which is less likely to be proven wrong in the long run. For these reasons, it is better for decision-makers, as the needs and values are explicit: 'inquiry that purports to be value-free is probably the most insidious form of inquiry available because its inherent but unexamined values influence policy without ever being scrutinized themselves' (Beardsley 1980). However, there will never be any final, correct answers. There is no absolute trustworthiness. There is only trustworthiness at a given time in a given context. Furthermore, because all the actors can be said to trust a particular body of information at a particular time, this does not mean they will always do so. As external conditions change, so their values and criteria for judging will also change. The information may then come to be judged as untrustworthy, with various people no longer having confidence in it.

It will be important to ensure the construction and generation of timely, relevant, and agreed information and knowledge that will support the quest to-

wards 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.

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

Professionals who are to work for a 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). 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. The pedagogic goals become self-strengthening for people and groups through self-learning and self-teaching, and 'the role and action of the researcher is very much a part of the interactions being studied' (Russell and Ison 1991). Systems of participatory inquiry, therefore, imply new roles for development professionals, and these all require a new professionalism with new concepts, values, methods and behaviour (Pretty and Chambers 1993).

It is clearly time to let go of the old paradigm of positivism for science, and embrace the new alternatives. But for the pioneers, this will be extraordinarily difficult. As Richard Bawden (1991) has put it 'this is profoundly difficult... I am quite aware that I risk fierce controversies, international name-calling, and dissolutions of old friendships'. 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.

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Agrarian Questions
The politics of farming anno 1995

International congress to be held in Wageningen, the Netherlands

May 22-24, 1995

Worldwide, a wide variety of interrelated agricultural systems, from low output to highly productive farming is running against the borders of the exploitation of human labour, natural resources and the environment. Technological and market regulation have failed to resolve these problems. The political economy paradigm needs refinement and the advanced integration of the farming sector calls for a broad perspective.

The organising committee of the Agrarian Questions congress calls for papers that clarify current agrarian struggles and the social processes generating them, and how one might act upon them.

The subthemes of the congress are:
1) The social and technical regulation of agricultural production;
2) Power and the agricultural labour process;
3) Agrarian transformation and environmental degradation;
4) Patterns of consumption and agrarian development.

Deadlines:
Pre-registration as soon as possible; Abstracts before June 30, 1994; Registration before December 31, 1994; Full papers January 31, 1995.

For information:
Wageningen Agricultural University
Congress Office, Costerweg 50
6701 BH Wageningen
The Netherlands
Fax: +31 8370 84884; Email: Meulenbroek@RCL.WAU.NL