

A view of science, agricultural science and farming systems research in these postmodern times

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ABSTRACT

Truth and reality are quite individual in society today. Dissent and scepticism are mainstream, and the truth is often more-or-less whatever your conscience wants it to be. This may be a challenge to scientists who adhere to the positivist view that “the truth is out there”. The contemporary, relativistic nature of truth is linked to a reduction of the value placed on knowledge in society. *Knowledge is being replaced by Interpretation*. This study explores some perspectives on truth, knowledge and interpretation, and some relationships between soft systems and traditional scientific research. We comment on one soft systems tool, participation that has been particularly useful in our systems research projects offering practical and philosophical advantages in a range of situations. However, participative methods demand new roles for scientists and producers, and there is not always a happy mix between participative and scientific approaches.

Key words

Research, science, systems, participation, postmodernism, ontology.

INTRODUCTION

Science has been the backbone of R D and E for a long time, and in many cases there has been successful translation of scientific innovation to farm technology. But recently, so-called “soft systems” have become popular. Participation is an increasingly popular component of “soft” research methods, which are seen by some as a means of avoiding some of the problems associated with of the traditional transfer of technology model (3).

This study relates some of the philosophy of participatory research to the philosophy of science. The differences are examined for synergies and antagonisms.

This study draws on our collective thoughts and experiences in working together on farming systems projects. Our experience in R D and E comes from a wide range of environments and methods that include traditional agronomic research, computer modelling, agro-climatic research, adult learning, participatory action research and transfer of technology extension. What we have in common is a desire to progress the practical application and theoretical understanding of science and participation.

REVIEW and DISCUSSION

Agricultural science is an applied science, founded in the traditions of science. But what are the traditions of science? To almost everyone alive in the Western world, it seems that science has been around since Adam was a boy, but science is kind of *new*, originating in Europe in the 17th century (Figure 1). And while it appears to be a fundamental and unchanging component of society, the practices and philosophical basis of science and its relations to society are changing *very fast*. Figure 1 contrasts the long history and slow changes in civilisation (through the ages and per a basic human activity; bread-making) with the recent, rapid development of science and scientific theories.

Key dates and results in science, viewed from 2000 AD

Modern science began in the Italian Renaissance (15th and 16th centuries), but it was the early 17th century before science adopted scepticism and experimental methods, which gave vigour to scientific endeavour. Transport, health, communication, food production, and housing have all radically improved with scientific advances (eg. life expectancy in Europe has quadrupled since the 17th century (11, p 9)). Science was, and still is, concerned with enlightenment (see glossary) and technological advance via logic, positivism and experimentation. For 300 years this has created tension between science, religion, society and nature because of shifting power, authority, perceptions of relevance, *etc.*

Until recently, science has remained relatively free of sceptical public criticism, probably due to its amazing utility, social limitations to dissent, and (perhaps) political favouritism.

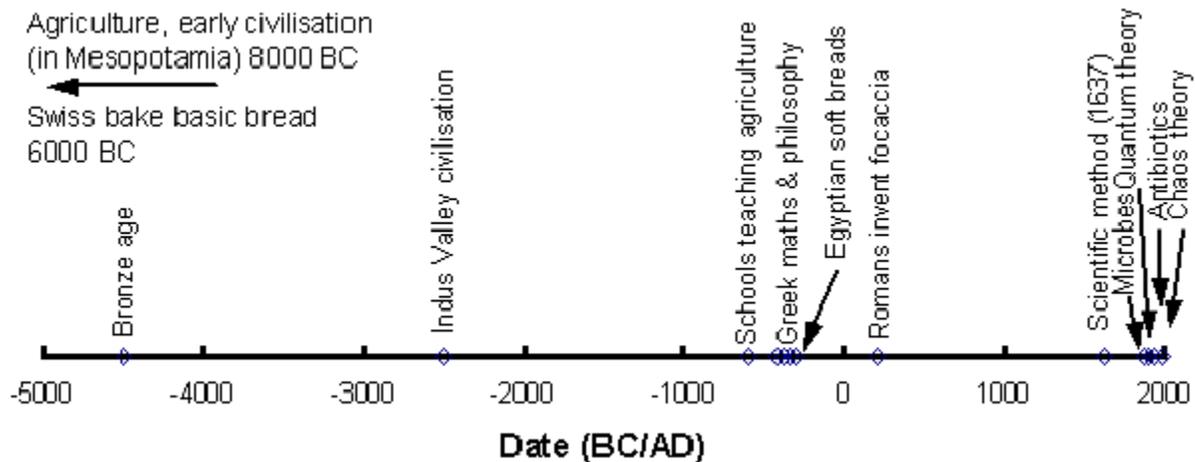


Figure 1. A timeline of the development of agriculture, science and bread-making.

By the late 19th century, the modern scientific revolution grew to represent the technological, sceptical (“left brain”) aspects of society, separate from the romantic/artistic “right brain”. Within this “partial universe”, modernism grew to be consistent with beliefs that anything and everything was possible (given time and effort). Advocates of the Enlightenment believed that science would bring understanding of self and world, and progress morality, justice and human happiness (4). But experience in science and modernity have underlined the realities of human existence, and little of the optimism of (and for) the Enlightenment remains (4). Friedrich Neitschke (1844-1900) had begun the pessimism that questioned Enlightenment long before modernism was the cultural norm. For him, it was clear that there is little richness, diversity and vitality in Enlightenment and the philosophies of modernism in general. So began post-modernism. The following section presents the postmodernists’ case that there has been a leap forward, or perhaps downward, from modernism, and that the changes at first seem bad, but are good.

Postmodernism and the end of Enlightenment

Post-modernism rejects and supersedes modernism (4, p 11-38). In general terms, modernism was about objectivity, industrialisation, progress, function, knowledge, consensus, symbolism, truth, rules and technology, while post-modernism is about expression, constructivism, interpretation, dissent, community, language, equality and aesthetics. Sometimes the differences between modernism and postmodernism are clear, such as in architecture, where modernism was represented by high tech, high-rise apartment buildings (as solutions to inner-urban slums). Many of these are now uninhabited or have been demolished. Post-modernists generally regard modernist buildings crude, ugly and naive.

There is plenty of evidence that modernism and science have begun to decline (4, 11, 2). Today, philosophy, art, music, architecture and much of religion are substantially postmodern. But most of science isn’t postmodernism at all. So where does this leave science? According to Jean-Francois Lyotard, one of the chief characteristics of the postmodern era is that science is out of step; it has lost its

credibility (7, p 37). A singular, but powerful example of this is the US government recently disbanding its scientific advisory panel (11, p 11).

Postmodernism as the successful conclusion of Modernism?

An alternate view that rejects the existence of postmodernism and views contemporary society as a new wave of modernism has been put forward by Habermas (5). In this paradigm, Enlightenment and science are valid, valuable pursuits. Scepticism concerning science and social and political life could be considered a natural by-product of sceptical inquiry into nature.

Habermas (5) believes that there are three separate “worlds” viewed by society; science, law/morals/ethics, and art. The dissociation between science and society is seen as a natural and positive development rather than a sign of decline or irrelevance. He argues that if society is confident that these part-worlds are productive, self-critical and self-reliant, the de-coupling from society doesn't matter.

Different and changing views of reality, truth and knowledge

In science, singular and universal truths are approached and approximated via logic and experimentation. Modernism allows for different perspectives on the same truth, such as the particle-wave duality of photons, or the influence of perspective on different peoples' experiences. (Picasso's cubist paintings are a literal expression of multiple perspectives). In applied science, the reality or unreality of universal truths is not such a big deal. For example, in agronomy it is often hard enough to observe consistent effects and obtain some knowledge (due to the vagaries of weather, soils *etc.*) without trying to uncover some hidden “law of nature”. In postmodernism, reality is treated differently again: the *interpretation* of experiments by people is equated to individual, valid truths. Singular truth could only ever be a “notion”, and multiple perspectives an “oversimplification”. So truths co-exist and add richness to human experience. The relevance of the difference between knowledge and interpretation, and singular and multiple truths, in relation to farming systems projects and participative research are discussed below.

Another important difference between modernism, science and postmodernism concerns the role of power in expressions or descriptions of reality. Michel Foucault (1926-1984) has critically examined institutional and linguistic expressions of power, and found that science has favoured particular countries, races and classes, creating under-classes of under-informed people. This is achieved at least partly by presenting *particular* views of the truth as *the* truth and particular people and institutions as *the* holders or adjudicators of *the only* truth. Power relationships are important in participatory R D and E, and their role is discussed in more detail below.

Finally, it is necessary to introduce Jacques Derrida (1930-), who espouses one of the more radical views of post-modernity. He attacks logocentrism (centring debate around logic). His view is that logic and logical structures are over-emphasised and can be untruthful. The concept is a bit difficult, at least for those who wonder how you can decide anything without logic. But the consequences of his theory are simple. Is logic ever misused or twisted? Of course. Do stories sound logical when we hear them, then turn out false? All the time. Do we need logic to be happy? I don't think so. Are logical things more valuable than illogical things? If taken seriously, these ideas kind of rock the whole philosophical boat.

While philosophers get very serious about these issues, there are others who have more light-hearted (or at least pragmatic) views. Douglas Adams (1), in the “Hitchhiker's Guide to the Galaxy” had a “go” at logical Enlightenment - What would you *do* after finding out the meaning of everything? The meaning of everything (42 or otherwise) presumably *means* nothing in practice. Likewise, C.S. Lewis in “The Silverchair” simply invites us to consider whether “the made up things are a good deal better than the real ones” (6). Perhaps ignorance is bliss. *That* idea has been around for a long time.

Agricultural science

In the terms of modernism and postmodernism as presented above, we suspect that the people and structures of most agricultural industries are comfortably modernist; the faith of producers, agro-politicians and scientists lies with positivism, utility, majority, strength, stability, science and technology. But agricultural science and industries have obviously been affected by some of the cool and groovy attractions of post-modernism. Marketing often seems to be up-to-date and philosophically post-modern, perhaps because it is at the interface between agricultural production and society. Real developments in postmodern production systems seem to be less common, but there are some recent trends in areas such as environmentalism and animal ethics that are consistent with postmodernism. These hint that social beliefs or philosophical stances or deep ecological principles might guide some of agriculture in the future (although they can also be shallow marketing ploys aimed simply at earning more income). Organic farming and *dharma*-based vegetarianism (8) are examples where the principles guiding agricultural production and consumption are probably more moral and ethical rather than scientific or economic.

Farming systems research in the new millennium

Due to the applied and social nature of farming systems, there has always been a need for holistic methods and emphasis on the role of farmers in farming systems research. The “soft systems” approaches involve a fundamental belief that people and their behaviour are central to agricultural development (3), which is a contrast to the “hard systems” methods that provide objective, technical solutions.

The soft approaches allow multiple constructs of truth (constructivism), which have become noticeable in agricultural D and E (but not R) in some parts of Australia in recent years. Re-prioritising towards soft systems appears to be slowly overturning the dominant role of traditional agricultural science in some farming systems research, perhaps because the “soft systems” are effectively addressing two areas of belief by institutions, funding organisations and researchers;

- The utility of research should be increased, and
- Research must do more to meet the needs of the end-users

Participative research is a key component of the rise in soft systems analysis. Participative methods have a distinctly postmodern fundamental philosophy. They also aim to provide utility and accountability to clients. The next section presents the more appealing features and characteristics of participation.

What is participative research?

Participative research is an R D and E process that emphasises adult learning, learning cycles, co-operation, individual needs and group interactions. The following qualities are found in participatory action research;

- Having all participants plan and enact the research program (farmers + researchers)
- Having “action” as a key to learning (not just theory or logic) (action usually being physical involvement in exploration, demonstration or experimentation)
- Servicing the needs of individuals, and respecting existing knowledge and abilities
- Encourage stakeholders to disclose/reflect on their assumptions to improve decision making
- Avoiding impositions of knowledge or values by any of the participants
- Building a social environment for positive learning and research
- Building skills for ongoing self-directed individual and group learning

Some ideas about how participation works

This section outlines some of the means by which participation seems to produce results. However, this is not meant to imply that traditional research does not produce results, or that those results are somehow deficient, or that participation is somehow the opposite of traditional research.

Conventional research produces lots of data and information. However, information without context or meaning often doesn't do any good (12). Extra information may not lead to knowledge or wisdom.

Participatory research aims to increase information, increase learning, increase understanding, *increase knowledge and increase wisdom*. Hopefully, it puts individual and group **meaning** into observations, data and information.

How? Participatory research increases the opportunities for research to be relevant, a positive experience for all participants, and for the implications to be well understood. The **sharing** of knowledge between participants and **cooperative** learning are key processes in participation. These not only lead to increased knowledge; they *maintain a context that is more relevant* than in traditional R D and E.

Participation seems to break down false perceptions and stereotypes that can inhibit communication, and are sometimes hard to avoid. A typical example of unhelpful stereotyping is that scientists are academics and talkers, and farmers are practitioners and listeners. Stereotypes concerning gender, education and disability are common. The groundedness and personal nature of good participation helps reduce (but not eliminate) the subconscious desire to make or accept unhelpful stereotypes.

We have found that the different educations and institutions that tend to define scientists (10) can sometimes damage communication and participation. It is logical and not surprising that people are distrustful of scientists (or public servants); they often form socially exclusive groups that are easily regarded as elitist (10). For a high level of participation there must be power-sharing in the dialogue between scientists and agricultural producers (9), and this requires scientists and producers to be aware of "emotional baggage" concerning education, achievements, institutions, *etc.* that needs to be dealt with.

When participation is functioning well, there is substantial control of the research and learning processes by producers (9). Besides the obvious positive feelings this could bring, it may also be effective at dispelling the social mistrust of the scientists and institutions that usually control the agenda. How? Participation allows producers some powerful opportunities to challenge or expose or eliminate the exclusivity of researchers' positions; to "take the reigns", "see how it all works" and to "have a go" at it themselves.

In general, participation is sometimes a more socially equitable and harmonious behavioural environment in which to access both farmers' and scientists' knowledge. Of course, to do this in practice is a real challenge, at least partly because the participants are used to the "old" arrangements and stereotypes.

Do the principles of science and participation mix? Like oil and water, or gin and vermouth?

Despite most of the authors being engaged on the same multi-method farming systems project, we have a considerable diversity of opinion about the definitions and values of science and participation, and how compatible they are. In practice, though, we have observed that each and both can be very valuable.

It is quite noticeable that participation can be difficult for scientists who relish scepticism and action. Being sceptical comes naturally for them. However, the scientifically acceptable notion of "proving your facts" regularly proves unhelpful in a participative context. Participative processes usually imply that producers' views are acceptable or valid in spite of no scientific evidence (or even evidence to the contrary). This progresses communication. It is difficult re-establish communication if it is compromised by scepticism. Therefore, it is often valuable in participative dialogue to ignore individual or personal desires to advance via the scientific method; progress depends instead on the evolution of opinion via more inclusive processes. The *beliefs* of participants are a valuable commodity. A compromise between the goals of the group participative process and individual scientific process can also be very valuable.

The authors have been involved in many group discussions where there has been a marked improvement in the learning process after researchers have moved from a position of accepting or rejecting opinions, to a position of participating with producers to find reliable theories in complex situations.

CONCLUSIONS

Science has literally changed the world, and now science is changing to meet the challenges of the new world. Science is supposedly objective, positive, ethically detached and amoral. In practice (in agronomy at least) it is none of these things. But is science keeping pace with society's need for more holistic and plural research? We don't know. In agriculture, traditional science has aided materialism and industrial progress, and much of agriculture is still enthusiastic about science. But some of the limitations of traditional science are now apparent, and the goals of R D and E are shifting a little.

Participatory research seems well adapted to the postmodern environment. It certainly supports individual and group learning and interpretation, and may be capable of supporting the multifactorial goals of farming systems R D and E. Participative methods have a great fit with the multiple-truth principle of postmodernism.

Although there are some philosophical differences between science and the desires of a post-modern society, the differences may be minor *in practice*. There may also be opportunities for agricultural science and participatory research to co-mingle some more to overcome some of their respective weaknesses in "soft" and "hard" approaches. This demands new roles for scientists and producers in participative farming systems research projects.

GLOSSARY

Constructivism – In agricultural extension, it refers to acquiring knowledge through individual experiences and cognition, translating that into personal perspectives and truths.

Dharma – one of the four goals of Hindu and Buddhist faiths (the others are pleasure, profit and release or enlightenment). It includes descriptive laws and commentaries on universal ethics. eg. respecting all life.

Enlightenment – truth, justice and happiness as obtained through knowledge and reason (so named by Habermas).

Enlightenment project – the quest for enlightenment (esp. associated with science since 17th century).

Modernism – the cultural movement that reached a peak in Western society in the early and mid 20th century. It is characterised by positivism, logic, science and technology. Think of modern art, transport, etc.

Post-modernism – contemporary cultural themes, philosophy and experiences. Variously regarded as simply a rejection of modernism or, alternately, a new movement with new philosophies.

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