When Adoption Theory Fails

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Summary. Where issues are complex, ill-defined and challenge human value systems, learning based approaches are more likely to lead to a shared understanding of problem issues and action to improve them, than technology transfer based teaching or telling. Lack of shared understanding between stakeholders of what the problem is, rather than lack of awareness of scientists' solutions, is a prerequisite cause of inaction on complex issues such as ley farming, natural resource management and business viability. In central Queensland we are working with small stakeholder groups to map their perceptions of *ideal* farming practice. We then use these constructs to ask questions of *current* practice. Divergence within and between stakeholder groups yields issues for action and learning. Strategic rather than operational issues have emerged to date. These include the impact of technology on the *stability* of farming systems; structures to keep the farm in the family; marketing and producing *chemical-free* food; integrating cattle with cropping; and market risk management.

BACKGROUND

Agricultural research and extension programs are too often based on assumed problems or the worldviews of the problem solvers rather than their problem clients. This results in *serving systems* (programs) not being relevant to the needs of the *served systems* (clients needs). In other words, we are too often up the right tree but in the wrong forest! However, where adoption is poor, the response is usually *Well, let's re-package it and try again!* This suggests we are trapped in a *single loop learning* cycle and not learning from our failings. Single loop learning refers to corrective action taken within the norms of an existing system. In contrast, the ideal of *double loop learning,* means changing the norms of the system itself (2).

Conservation cropping was originally extended by DPI as a strategy to manage soil erosion. This suggests that the problem was soil erosion. However, numerous surveys showed the primary stakeholder, the landholder, did not see soil erosion as an issue (8). While landholders were mostly aware of solutions scientists were proposing (4), why would they be interested in solutions to problems they don't own in the first place? In this example, the real problem was one of gaining shared understanding between all stakeholders that soil erosion was a problem. The strategy to match this problem could have been learning based processes to demonstrate and monitor the severity of soil erosion (Fig. 1). Only then would solutions such as conservation cropping have become relevant for the purpose of erosion control.

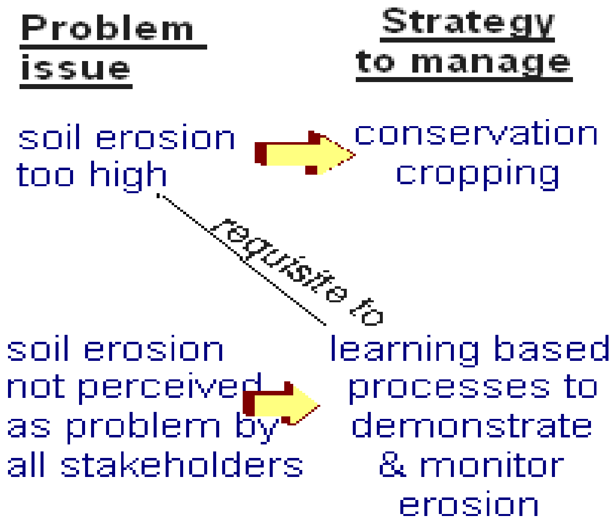

Figure 1. Related problem issues can lead to markedly different strategies.

Where issues are complex, poorly defined and challenge human value systems, learning based approaches are more likely to engender ownership and shared understanding of issues for improvement and action, than technology transfer methods. Technology transfer refers to a process whereby extension agents *transfer* information generated by science to farmers via mass media or field day approaches. The model assumes that perceived *innovation* will *diffuse* throughout the wider community. Extension science has largely based its theories of adoption around this model. Its attraction is efficiency. While an approach may be efficient, it may be ineffective. Evidence of poor effectiveness with technology transfer includes the slow uptake of stubble retention and ley systems, excessive soil erosion, declining soil fertility, unviable farm businesses, etc (9). While technology transfer can create awareness of these issues, awareness does not easily translate to understanding or action, nor transcend community barriers, for example, between *grazier* and *farmer* groups.

Technology transfer remains an efficient and effective model where net benefit is obvious, the audience *technologically empowered,* the message simple and the idea fitting within client *comfort zones*. Examples include the extension of new crop varieties, machinery and chemical products. However, in the context of sustainable farming in the 1990s, these issues can be considered the occasional *special case.* This has led extension science to employ approaches more orientated towards *learning* than *teaching* or *telling*. As the proverb says *Don't give the people fish, teach them how to fish!*

One learning based approach is ac*tion research* which offers a powerful model for coping with situations where humans and technical issues interface, norms are under challenge and ownership of the problem is crucial. Action research aims to *understand* a situation of concern by simultaneously taking *action* to improve it. As Kurt Lewin stated, it is only possible to understand a social system by trying to change it (6). The building blocks of action research are a collaborative process between researchers and actors; a process of critical inquiry; a focus on social practice; and a deliberate process of reflective learning (1).

This paper reports on the use of action sciences and soft systems to both understand and improve those poorly defined sustainable farming systems issues in central Queensland.

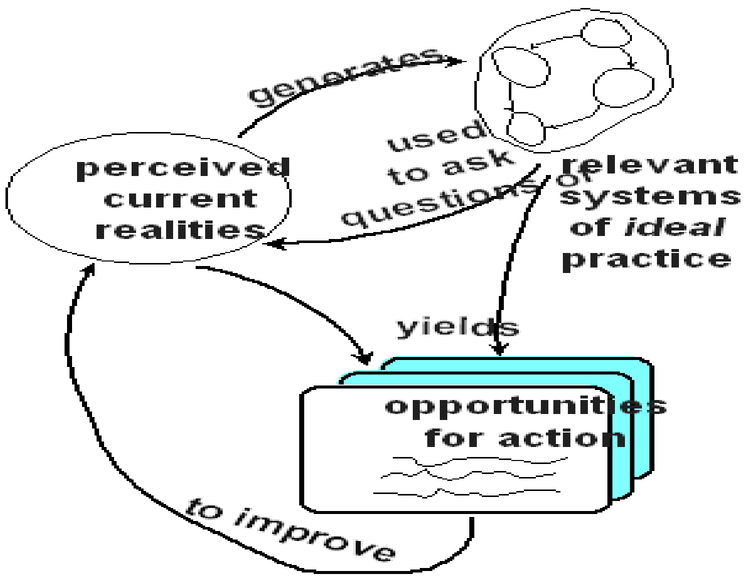

Figure 2. The core process showing a classical Soft Systems Methodology learning cycle.

0PROCESS

Since August 1994, my co-researchers and I have been working with small stakeholder groups comprising producers, agribusiness and DPI, whom we considered to have influence over mixed farming and livestock practices in central Queensland. At our initial meeting we mapped perceptions of *ideal* management practice. At a follow-up meeting we used these ideal constructs to ask questions of *current realities* (Fig. 2). This yielded potential issues for action, the feasibility of which were assessed. At a third meeting, issues of *generic* importance across the region were negotiated and action programs developed.

We used focus group interviewing and a scenario question to help define ideal practice. Oral data was summarised and returned to participants. We made sense of the data using two approaches. The first was *thematic analysis* which involved capturing themes or patterns emerging from the data (7). The second was Soft Systems Methodology (SSM). We used it to structure data, attribute meaning and *value add* (5). This involved converting activities in the data into *logical* systems. A generic example is given in Fig. 3. The *bubbles* contain activities which are linked by arrows to show dependencies.

The aims were to: learn our way towards problem issues; define what stakeholders took *farming systems* to be; test the robustness of the process to cope with the divergent perspectives of multiple stakeholders; stimulate learning; and improve situations of concern. The process is detailed in (3).

1OUTCOMES

Stakeholders saw production as the heart of ideal practice (Fig. 3). If this failed, the whole system failed. However, *enabling* activities such as economic, natural resource, capital and labour, political and marketing management, could also cause the system to fail. These activities were pursued within the context of a rural lifestyle, suggesting most decisions were not based solely on economic rationalism. The whole could be taken as a *rural business* or a system to manage *rural real estate.*

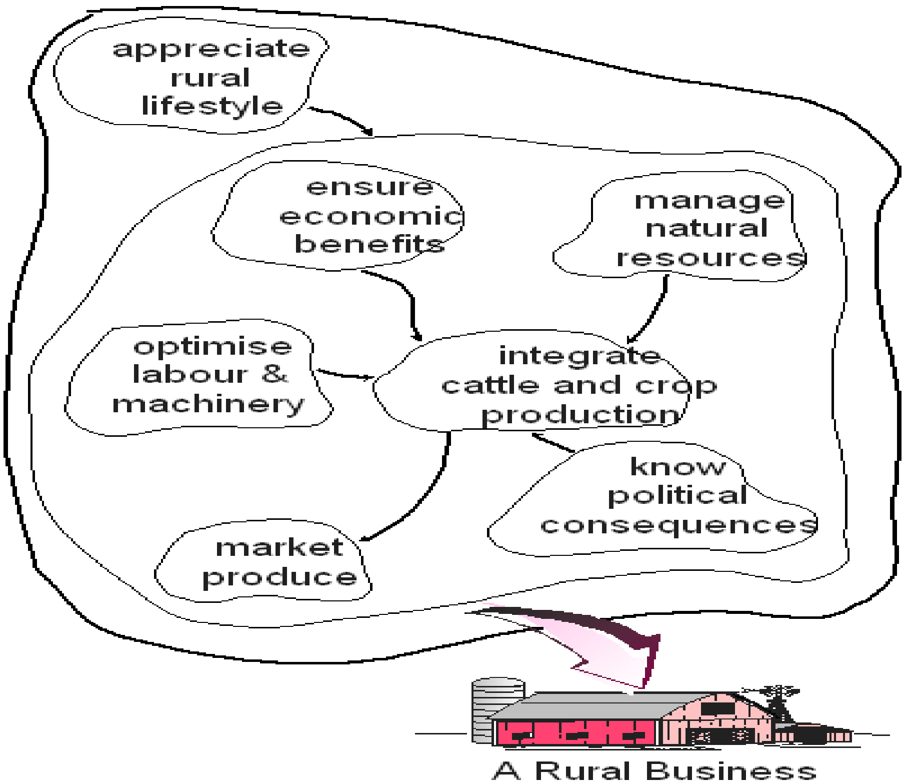

Figure 3. Generic construct showing ideal practice activities.

Until we understand the impact of technology on all of the parts, and not just production, we will not understand why the business manager takes on certain innovations and not others. Of greater need is to understand the relationships between the parts. That is, what is the effect of meddling with one of these parts on the other parts and the whole? For example, production technology can reduce stability in a system when managers are trying to do the reverse, to buffer a highly unstable external environment.

Issues emerging from the research mostly impact at the strategic rather than operational level of management. Inappropriate strategic decisions such as buying more land, investing in technology, or diversifying into new industries, pose a greater risk to farm viability than operational fine-tuning, for example, whether to use 40 or 50 kg/ha of nitrogen, which variety to plant, how much herbicide to use, etc. However, research and extension has largely served at the operational level of decision making.

Examples of issues common across groups included:

- evaluation of the impact of technology on the stability of farming systems
- research and education on the principles of rural business viability
- business structures to help keep the farm in the family
- the feasibility of producing and marketing *chemical-free* beef and grain, including organic
- better integration of cattle and ley systems with cropping, including legumes for clay soils
- professional approaches to market risk management
- optimal levels of land, machinery and infrastructure capitalisation to labour.

2CONCLUSION

Learning based approaches offer a more effective way of understanding and improving complex issues of concern involving humans, than technology transfer based adoption theory. They can subsume the traditional roles of research and extension and be just as appropriate to agribusiness as government. However, the cost of improving effectiveness is a heavy investment in human resources and skills.

The feasibility of technology ought be evaluated from the worldview of the customer and not just the scientist. In the case of a rural business manager, this means considering the economic, lifestyle, marketing, capitalisation, labour and political risks of research and extension, in addition to the production and natural resource implications.

Finally, we need to spend much more energy co-learning our way towards relevant problem issues at the expense of generating solutions, to ensure that emerging solutions will be relevant and effective.

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