Participative Ecodesign: A New Paradigm for Professional Practice

How to cite:

© 1993 The Author

Version: Version of Record

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data policy on reuse of materials please consult the policies page.
Vector Module

Our problems with 

Tb in possums make this an essential element. However, it will be sufficiently generalised to support other vector problems, much the arboviruses. It will contain fields for vector density (including absence) and disease status. Disease control managers will be able to record the dates and types of vector control operations. The results of operations will be displayed via linked surveillance module records.

Special Modules

It is recognised that there will be requirements outside the generic modules described above. For example, with tuberculosis, a module to record lesion sites, pathology and microbiology is planned. Other conditions may also require special modules to be 'added on'.

COMPUTER SYSTEMS

The NLD will operate on the MAF national network. This is a network of personal computers with supporting servers and other devices. The software system 'Oracle' will be used to develop the database, the so-called 'back-end'. The '4 GL Windows' product 'Power Builder' will be used to develop the front end. The system 'Oracle' will be used to develop the input and output systems, the so-called 'front-end'.

In addition, analytical tools, for example SPSS, may also be necessary to provide for requirements of regional and national disease control managers. The configuration of databases, servers and work stations has yet to be defined. One certain challenge will be to achieve satisfactory speeds with such demanding software and systems in a network environment. However, there is no doubt that the efficiency and costs of computing systems will continue to improve dramatically, and we are therefore optimistic that any technology problems will be resolved.

CONCLUSIONS

The livestock industries require information for trade and better management in a tough world market. The information technology challenge is to keep up with the ever changing information requirements, as producers face an array of opportunities and threats. Our aim with the NLD is to provide a sound basis to meet challenges needs in a timely and adequate manner.

REFERENCES

3. McKenzie J, Massey University, Palmerston North (pers. comm.)

PARTICIPATIVE ECODESIGN: A NEW PARADIGM FOR PROFESSIONAL PRACTICE

KL JISON

Department of Crop Sciences University of Sydney NSW 2006

"... every perception involves an aetiology and a prognosis" (Hanson 1969)

INTRODUCTION

In the preparation of this text I am reminded of the words of my colleague David Russell (1986): "In the real world the difference between your real world and this must always be so. The common ground which is the basis of our ability to communicate with one another comes through the common processes of perceiving and conceptualising. The processes may be the same but the end products are never the same. What we share is communication of the worlds we experience, we do not share a common experiential world." With these words in mind I invite you to critically reflect on your own professional practice and to consider the key experiences which have shaped your "view of the world". I hope to share some experiences which have helped shape my view of the world, and which might assist in your own critical reflection. I do so because late twentieth century science and the professional practices which derive from it, are under challenge by new discourses: "knowledge", "communication", "research", "development" and "learning".

Because professional practice and the interpretation of individual experience is shaped by theories held "about the world", there is a need to consider these alternative discourses, and the implications for future education and practice.

KEY EXPERIENCES

I wonder how often in your professional practice you have found that clients have not done what you think is good for the animal, or by implication, for themselves? How well have they carried out your "expert" advice?

My first experience of this occurred whilst still an undergraduate when my father, a grazier, was the recipient of my advice about pasture improvement.

1. Based on the work of French philosopher/historian Michel Foucault, Weeden (1997) explains discourses as: "...ways of constituting knowledge, together with the social practices, forms of subjectivity and power relations which inhere in such knowledge and the relations between them. They constitute the body, unconscious mind and emotional life of the subjects which they seek to govern."
One of the ranch developments was on an area of predominately Miombo woodland, the habitat of the tsetse fly. Traditional grazing involved hardmen, day grazing and night containment in a boma; this was accompanied by regular dipping. Part of the ranch was bounded by a perennial river and this factor, combined with project objectives of increasing beef output, had lead to 150 ha of woodland adjacent to the river being cleared for the eventual sowing of irrigated, improved, tropical pastures. When I visited the ranch, the timber had been cleared for about a year; considerable regrowth was already evident. The pasture had not been sown but the seed of legume and grass, imported from Australia, were in storage in a tin roofed shack on the ranch. It had been there for almost a year suggesting to me that the grass seed would no longer be viable. What I did find in place was a large self propelling irrigator, the pump, a New Holland hay baler and rake and a fertiliser spreader. The fertiliser spreader was for liquid manure - a type common in Europe or possibly on Australian dairy farms. I agreed it was unlikely to be of any use in the project. What had happened? All machinery procurement for FAO related projects was via headquarters in Rome. Need I say more? But the staff in FAO headquarters could not be held responsible for the decision by project staff that fodder conservation using this type of equipment was to be part of the “development strategy”.

The machinery, lined up in the open - there was no machinery shed - was shown to me with pride and anticipation of what it might deliver. All this at a time when Tanzania had a chronic balance of payments problem such that petrol could only be purchased every other day, and the pilots of their international airline could only land at foreign airports if the landing fees had been prepaid. In other words, there was no way beyond the life of the project that spare parts could be obtained for this sophisticated equipment.

Also, in my circles, the current wisdom was, and still is, that forage conservation in the tropics, particularly in the proposed form, is uneconomic.
One of the ranch developments was on an area of predominantly Miombo woodland, the habitat of the tsetse fly. Traditional grazing involved herdsman, day grazing and night containment in a bombo; this was accompanied by regular dipping. Part of the ranch was bounded by a perennial river and this factor, combined with project objectives of increasing beef output, had lead to 150 ha of woodland adjacent to the river being cleared for the eventual sowing of irrigated, improved, tropical pasture.

When I visited the ranch, the timber had been cleared for about a year; considerable regrowth was already evident. The pasture had not been sown but the seed of legume and grass, imported from Australia, were in storage in a tin roofed shack on the ranch. It had been there for almost a year suggesting to me that the grass seed would no longer be viable. What I did find in place was a large self propelling irrigator, the pump, a New Holland hay baler and rake and a fertiliser spreader. The fertiliser spreader was for liquid manure - a type common in Europe or possibly on Australian dairy farms. All agreed it was unlikely to be of any use in the project. What had happened? All machinery procurement for FAO related projects was via headquarters in Rome. Need I say more? But the staff in FAO headquarters could not be held responsible for the decision by project that fodder conservation using this type of equipment was to be part of the "development strategy".

The machinery, lined up in the open - there was no machinery shed - was shown to me with pride and anticipation of what it might deliver. All this at a time when Tanzania had a chronic balance of payments problem such that petrol could only be purchased every other day, and the pilots of their international airline could only land at foreign airports if the landing fees had been prepaid. In other words there was no way beyond the life of the project that spare parts could be obtained for this sophisticated equipment.

Also, in my circles, the current wisdom was, and still is, that fodder conservation in the tropics, particularly in the proposed form, was uneconomic.

On the return journey, we encountered elephant nearby. I inquired as to how they (the project team) proposed to keep these animals away from the sown and conserved pasture. Fencing was proposed, but they were clearly concerned and still thinking about this issue!

I must confess to not being innocent in all this. As a visiting "pasture expert" from Australia, I was quickly consulted as to sowing strategy for the seed in the shed. I had been in Tanzania all of 10 days. The short rains were about to start. Should they sow then or wait until the main rains. I was asked. Data available to me were limited, but average rainfall figures seemed to suggest it might be possible to sow in the short rains. But what was the quality of the seed and was there a high hard seed percentage to spread the risk of failure in the legume? These were unknowns. It was suggested we needed these data to make a final decision. My understanding is that they proceeded to sow their precious seed in the short rains which were, I later learned, notoriously unreliable. To this day I do not know if a successful pasture was ever established, but I would not wager money on it.

How do I now interpret the many dimensions of these very formative experiences, and why are they relevant to this paper? My own reaction to this role of being the visiting "expert" were I think telling. I felt enormous pressure to "deliver the goods" or to provide the "facts" which might "solve" their dilemma. I did not then, as I would now, think of this as a "process issue" within a "systems problem". More of this later.

This experience, and my awareness that so much done in the name of "development" has failed, has lead me, over twelve years of professional practice as an educator and researcher, to be concerned with the process of problem formulation.

Let me attempt to explain what I mean by this in the context of the Tanzanian story. To do this I need to ask you to think of how the project I described came into existence. Who might have been involved in naming the problem as
One of the ranch developments was on an area of predominantly Mombo woodland characterized by the threshold tradition of grazing involved in the herdsman, day grazing and night camping. This was followed by another who accompanied by regular digging. Part of the ranch was still to grow rice and this factor, combined with project objectives of increased levels of output, urged on to lead to many 150 ha of woodland adjacent to the river being cleared for the emerging of irrigated, improved, tropical pasture.

When I visited the ranch, the timber had been cleared for about a year, and the new growing was already evident. The pasture had not been sown but the seed of legumes and grass, imported from Australia, were in storage in a tin roofed shack off the ranch. It had been there for almost a year suggesting to me that the grass seed would no longer be viable. What I did find in place was a large self-propelled irrigator, the pump, a New Holland hay baler and rake and a fertilizer spreader. The farmland was part of a number of Australian dairy farms. All agreed it was unlikely to be of any use in the project. What had happened? All machinery procurement for FAO related projects was via headquarters in Rome. Need I say more? But the staff in FAO headquarters could not be held responsible for the decision by project staff that the fodder conservation using this type of equipment was to be part of the "development strategy".

The machinery, lined up in the open - space was marked "used" — was shown to me with pride and anticipation of what it would deliver. All this at a time when Tanzania had a chronic balance of payment problem that petrol could only be purchased every other day, and the pilots of our international airline could only land at foreign airports if the landing fee was paid in cash. In other words there was no way beyond the life of the project that spare parts could be obtained for this sophisticated equipment.

Also, in my circles, the current wisdom was, and still is, that foreign investment in the tropics, particularly in the proposed form, was uneconomic.

On the return journey, we encountered elephant nearby. I inquired about how they (the project team) proposed to keep those elephants out of the planted and conserved pasture. Fencing was proposed, but there were considerable concerns about it and still thinking about this issue!

I must confess to not being innocent in all this. Having come back from Australia, I was quickly consulted as to sawing strategy for the second round. I had been in Tanzania all of 10 days. The short rains were always likely to start. Should they spray or wait until the main rains? Available to me were limited, but average rainfall figures seemed to suggest it might be possible by now in the short rains. But what was the quality of the seed and was there a hard seed percentage to spread the risk of failure in the legume? These were unknown. I suggested we tested seed data to make a final decision. Understanding the task, they proceeded to sow their precious seed in the short rains, which they did. I learned, notably unprepared. To this day I do not know if the successful pasture was ever established, but I would not wager money on it.

How do I now interpret the many dimensions of these very formative experiences, and why are they relevant to this paper? Reaction to this role of being the visiting "expert" were I think helping me understand enormous pressure to "deliver the goods" or to provide the "facts" which might "solve" the dilemma. I did not then, as I would now, think of this as "process" or "systems" problem. More of this later.

This experience, and my awareness that so much done in the name of "development" had failed, has lead me, over twelve years of professional practice, to an education, and research, to be concerned with the process of problem formulation.

Let me attempt to explain what I mean by this context of the Tanzanian story. To do this I need to ask you to think of how the project I described came into existence. Who might have been involved in naming the problem as low or unreliable beef supply for par est Salaam? How might FAO have been involved? Who might have represented them? Possibly a technical expert who saw the problem and a particular problem? Who may have proposed potential solutions based on their own experience.

These questions, based on similar experiences to mine, in particular in the perspectives of many development workers during the late 80's. This has lead to the emergence of qualitative methodologies, such as rapid rural appraisal, which attempt to value the perspectives of many of the people involved in a complex problem, when they are represented both in the "problem" and the "Farmer First movement" (Chambers and Thrupp 1989) which focuses on participation and local knowledge.

More importantly, however, I believe this story allows us to see that "problems" do not exist "out there" in "nature". Problems come into being, or are delineated, through the involvement of people, the way they use language to describe the world and the strategies and social processes through which agreements are formed about what constitutes a problem.

This for me was an important understanding, as it has led me to raise questions via the following diagram:

(1) What do we mean when we speak of knowledge?
(2) What do we mean by research and development?
(3) What is meant when we speak of learning?
(4) What do we mean when we speak of communication?

Asking these questions has put me in touch with the idea it only describe as a "global questioning", or a major paradigm shift which is evident in all disciplines. In preparing this paper, it is interesting to see emerging in the literature a questioning of the prevailing veterinary science discipline in particular but more so with experiences beyond the context and country of their initial training and the continent of their creation. The creation experience is a singular human act.

Can you imagine what the first project planning meeting might have been like which brought all of the "actors" in the Tanzanian ranch project together?

By this stage the project would have also had a history which would have shaped peoples' perceptions and which was likely to have had different language skills, and indeed languages. On this basis those present might choose not to speak. Others might speak, and not being understood. Perceived and actual power differences between people in the project would further determine the nature of their interaction. It would be difficult for an individual even to make sense of the range of emotional states which may not have been successfully interpreted from their body language and delivery of what they had to say. Slightly different interpretations of what a person said would be made by each member of the group.

We might also speak of each person bringing different "knowledge" to the group—knowledge informed by different cultural contexts. It might be said that some have local knowledge and others have practical knowledge.

What do we mean when we talk of knowledge? How does it differ from the other two different forms of knowledge and practical knowledge.

What do we mean when we talk of knowledge? How does it differ from the other two different forms of knowledge and practical knowledge.

What do we mean when we talk of knowledge? How does it differ from the other two different forms of knowledge and practical knowledge.

What do we mean when we talk of knowledge? How does it differ from the other two different forms of knowledge and practical knowledge.

What do we mean when we talk of knowledge? How does it differ from the other two different forms of knowledge and practical knowledge.
biological basis of human communication.

When Hansen says "Perception has an aetiology and a prognosis", it is likely that you will grasp the metaphor more readily than me, as "aetiology and "prognosis" are usually outside my language domain (jargon?). Perception has a causal pathway and a forecasting element, or as I would prefer to put it, we see the world through perceptual filters which are our theories of the world. As Hansen states: "Both vision and knowledge are indispensable elements in seeing."

This has a biological basis (Maturana and Varela 1987). As organisms, our nervous system is structurally closed to the external environment; biologically, it is not possible to inform another organism, or for information or knowledge to be transferred from one organism to another. Knowledge is socially constructed by people, and bounded by the context of their worlds; in this sense knowledge is a relational phenomenon, rather than an object (Maturana 1988). This return to our biology in understanding how we "know", brings into question many of the metaphors which shape how we currently think about communication and teaching.

**HUMAN COMMUNICATION**

There has been widespread criticism of the linear transfer of technology (TOT) model of agricultural R&D in which scientists are seen to create knowledge which is then taken up by advisers or extensionists, and passed onto farmers (Russell et al 1989; Ison and Ampt 1992; Jiggins 1993).

With respect to the client-consultant relationship, Morris (1979, p656) observes: "...we have in the past rather neglected his (farmer's) views, or at least have planned a course of action and then tackled on an 'extension' effort to convince the livestock owner that we are working in his best interest."

A pivotal conceptual framework embodied in the TOT paradigm is the diffusion and adoption of innovations model of technology transfer. With its associated language (eg. barriers to adoption, early adopters, laggards - see Ison 1993), it shapes how extension and advisory work is thought and talked about, especially amongst administrators from a research background. For instance, Radostitis and Blood (1985, p6) define what they considered a willing farmer: a leader, successful, stable, knowledgeable, risk averse, who operates within the limits of resources (land, cash, etc). This is almost equivalent to the "innovator" in the diffusion of innovation model. It also reflects the tendency of professionals to orientate to clients who are most like them (Anderson 1984).

The diffusion model was developed in a particular context, and as so often seems to happen, educators, researchers and administrators have sought to employ it in contexts in which its assumptions no longer hold. This has been known for a long time (Crouch and Payne 1983; Latour 1987), yet still it shapes peoples' perceptions of extension. The TOT model has been shown to be based on a network of faulty assumptions, and powerful and embedded metaphors. They are linked to misconceptions about what actually occurs in the process of human communication (Russell 1992; Russell and Ison 1992; Ison 1993). The dominant metaphors are those of "information transfer", "information revolution", "channels of communication", and "teaching" (Ison 1990), most of which arise from seeing communication in the same way as two computers might transfer data. These pervasive metaphors based on the electronic model of communication of course ignore "meaning making" which is a singularly human ability with a biological basis.

As humans, we have no way of referring to ourselves, or to anything else, outside of language. Since language, or what we more commonly refer to as communication, creates what we call "reality", developing a shared meaning (a notion created by the observer) will involve participation in the task at hand of all those who will be affected by the outcome.

Based on his neurobiological research, Maturana (1988) has defined human social systems as "systems of co-ordinations of actions in language, or networks of conversations". He thus argues that a change in a human social system can only take place in the network of conversations that its members
biological basis of human communication.

When Fashian says "Perception has an etiology and a prognosis", it is a metaphor more than a statement. "Etiology and prognosis" are words from my own language domain (of science) and not a forecasting element, or as I would call it, "to put it in" the world through perceptual filters. This is almost equivalent to the "innocent observer" in the diffusion of innovation model. It also reflects the tendency of professionals to see what clients are most like them (Anderson 1987). This has a biological basis (see also Vay 1987).

As organism, our nervous system is structurally closed to the external environment; biologically, it is not possible to inform another organism, or for information to be transferred from one organism to another. Knowledge is socially constructed by people, and bounded by the context of their worlds; in this sense knowledge is relational, rather than an object (Maturana 1988). This further suggests that biology in understanding how we know, brings into play many of the metaphors and images which shape the way we think about communication and teaching.

HUMAN COMMUNICATION

There has been widespread criticism of the serial transfer (TOT) model of agricultural extension. Farmers in which scientists are seen to create knowledge which is then taken up by advisers or extensionists, and then passed onto farmers (Russell et al. 1989; Ishon and Atan 1992; Jiggins 1993).

With respect to the client-consultant relationship Morris (1979) and Alemwey (1996) believe that people have the natural language, and at least there is knowledge-taught extension effort to create a consultation owner that we are working in his best interest.

A pivotal conceptual framework in this paradigm is the diffusion and adoption of innovations model of technology transfer (see Maturana 1988). Modern linguistics, in its sociocultural context (e.g., the national culture) has addressed the interactions of language or networks of conversations. It is argued that change can only take place in the network of conversations that it members generate. Using these ideas as a basis I would argue that we provide an interpretation of the communication and social process as recently described by my colleague, I do so because I see this process as fundamental to our Maturana's (1988) term, an act of "language". My colleague indicated to me that the last thing he did in the process was to physiological and morphological data, as described what would I call an exploration of context - historical and contemporary - in a process that is not unlike a performance. Of course, the client(s) and animal(s) are key participants in this conversation; as others are remarkably adept at "knowing" an animal's body language and vocalisation. The veterinarian's sensory data is filtered through his/her theories of the world. Only towards the end of the performance was the animal physically inspected, and thus entered in a different form of language (heart rates and sounds, swelling, pains, postures, biochemistry etc.).

In recent research in the rangelands of western NSW, we have been very concerned with this idea of context. To date there has been a limited understanding of the relationships between Australian pastoralists and their environment and context. In the sense we use it, an individual's 'context' includes many "environments": their history of farming, the deeds and experiences of their people; their world of anticipated goals; as well as the environment of beliefs, values and mythology.

The same argument is now being made funded in medical and veterinary circles, where it is increasing to recognize the developing a shared meaning (i.e., the observer) will involve participation in the task at hand of all those who will be affected by the outcome.

A pivotal conceptual framework in this paradigm is the diffusion and adoption of innovations model of technology transfer (see Maturana 1988). Modern linguistics, in its sociocultural context (e.g., the national culture) has addressed the interactions of language or networks of conversations. It is argued that change can only take place in the network of conversations that it members generate. Using these ideas as a basis I would argue that we provide an interpretation of the communication and social process as recently described by my colleague, I do so because I see this process as fundamental to our Maturana's (1988) term, an act of "language". My colleague indicated to me that the last thing he did in this process was to physiological and morphological data, as described what would I call an exploration of context - historical and contemporary - in a process that is not unlike a performance. Of course, the client(s) and animal(s) are key participants in this conversation; as others are remarkably adept at "knowing" an animal's body language and vocalisation. The veterinarian's sensory data is filtered through his/her theories of the world. Only towards the end of the performance was the animal physically inspected, and thus entered in a different form of language (heart rates and sounds, swelling, pains, postures, biochemistry etc.).

In recent research in the rangelands of western NSW, we have been very concerned with this idea of context. To date there has been a limited understanding of the relationships between Australian pastoralists and their environment and context. In the sense we use it, an individual's 'context' includes many "environments": their history of farming, the deeds and experiences of their people; their world of anticipated goals; as well as the environment of beliefs, values and mythology.

The same argument is now being made funded in medical and veterinary circles, where it is increasing to recognize the developing a shared meaning (i.e., the observer) will involve participation in the task at hand of all those who will be affected by the outcome.

A pivotal conceptual framework in this paradigm is the diffusion and adoption of innovations model of technology transfer (see Maturana 1988). Modern linguistics, in its sociocultural context (e.g., the national culture) has addressed the interactions of language or networks of conversations. It is argued that change can only take place in the network of conversations that it members generate. Using these ideas as a basis I would argue that we provide an interpretation of the communication and social process as recently described by my colleague, I do so because I see this process as fundamental to our Maturana's (1988) term, an act of "language". My colleague indicated to me that the last thing he did in this process was to physiological and morphological data, as described what would I call an exploration of context - historical and contemporary - in a process that is not unlike a performance. Of course, the client(s) and animal(s) are key participants in this conversation; as others are remarkably adept at "knowing" an animal's body language and vocalisation. The veterinarian's sensory data is filtered through his/her theories of the world. Only towards the end of the performance was the animal physically inspected, and thus entered in a different form of language (heart rates and sounds, swelling, pains, postures, biochemistry etc.).

In recent research in the rangelands of western NSW, we have been very concerned with this idea of context. To date there has been a limited understanding of the relationships between Australian pastoralists and their environment and context. In the sense we use it, an individual's 'context' includes many "environments": their history of farming, the deeds and experiences of their people; their world of anticipated goals; as well as the environment of beliefs, values and mythology.

The same argument is now being made funded in medical and veterinary circles, where it is increasing to recognize the developing a shared meaning (i.e., the observer) will involve participation in the task at hand of all those who will be affected by the outcome.

A pivotal conceptual framework in this paradigm is the diffusion and adoption of innovations model of technology transfer (see Maturana 1988). Modern linguistics, in its sociocultural context (e.g., the national culture) has addressed the interactions of language or networks of conversations. It is argued that change can only take place in the network of conversations that it members generate. Using these ideas as a basis I would argue that we provide an interpretation of the communication and social process as recently described by my colleague, I do so because I see this process as fundamental to our Maturana's (1988) term, an act of "language". My colleague indicated to me that the last thing he did in this process was to physiological and morphological data, as described what would I call an exploration of context - historical and contemporary - in a process that is not unlike a performance. Of course, the client(s) and animal(s) are key participants in this conversation; as others are remarkably adept at "knowing" an animal's body language and vocalisation. The veterinarian's sensory data is filtered through his/her theories of the world. Only towards the end of the performance was the animal physically inspected, and thus entered in a different form of language (heart rates and sounds, swelling, pains, postures, biochemistry etc.).

In recent research in the rangelands of western NSW, we have been very concerned with this idea of context. To date there has been a limited understanding of the relationships between Australian pastoralists and their environment and context. In the sense we use it, an individual's 'context' includes many "environments": their history of farming, the deeds and experiences of their people; their world of anticipated goals; as well as the environment of beliefs, values and mythology.

The same argument is now being made funded in medical and veterinary circles, where it is increasing to recognize the developing a shared meaning (i.e., the observer) will involve participation in the task at hand of all those who will be affected by the outcome.

A pivotal conceptual framework in this paradigm is the diffusion and adoption of innovations model of technology transfer (see Maturana 1988). Modern linguistics, in its sociocultural context (e.g., the national culture) has addressed the interactions of language or networks of conversations. It is argued that change can only take place in the network of conversations that it members generate. Using these ideas as a basis I would argue that we provide an interpretation of the communication and social process as recently described by my colleague, I do so because I see this process as fundamental to our Maturana's (1988) term, an act of "language". My colleague indicated to me that the last thing he did in this process was to physiological and morphological data, as described what would I call an exploration of context - historical and contemporary - in a process that is not unlike a performance. Of course, the client(s) and animal(s) are key participants in this conversation; as others are remarkably adept at "knowing" an animal's body language and vocalisation. The veterinarian's sensory data is filtered through his/her theories of the world. Only towards the end of the performance was the animal physically inspected, and thus entered in a different form of language (heart rates and sounds, swelling, pains, postures, biochemistry etc.).

In recent research in the rangelands of western NSW, we have been very concerned with this idea of context. To date there has been a limited understanding of the relationships between Australian pastoralists and their environment and context. In the sense we use it, an individual's 'context' includes many "environments": their history of farming, the deeds and experiences of their people; their world of anticipated goals; as well as the environment of beliefs, values and mythology.

The same argument is now being made funded in medical and veterinary circles, where it is increasing to recognize the developing a shared meaning (i.e., the observer) will involve participation in the task at hand of all those who will be affected by the outcome.
traditionally been conceived as the function of agricultural and veterinary research and development. The consultant-client relationship relies on traditional discourses about what constitutes knowledge, and how it can be transferred to farmers. Thus, for many it is only a question of better packaging the facts or developing more effective "delivery" systems to get the "right" information to clients or students. These new discourses on knowledge necessitate a re-examination of what we commonly call or see as R&D, as well as teaching practice.

Research conducted in the NSW rangelands by the Community Approach to Rangelands Research (CAR) team exemplifies an attempt to respond to these new discourses (Russell and Ison 1992; Webber et al 1992ab). In our initial dialogue with pastoralists about developing new approaches to R&D, distinctions were made between:

- research on things, such as plants, soil etc;
- research on people and
- research with people.

Pastoralists found these distinctions meaningful. They were intrigued by our interest in researching with people, particularly as their previous experience of research and researchers was mainly one of researchers taking and seemingly giving nothing back in return.

**RELEVANCE TO VETERINARY PRACTICE**

It is likely that the concepts I have explored above will resonate with members of the epidemiology chapter as you are concerned with the "ecology of diseases" or relationships between factors and diseases, rather than wanting to concentrate on symptoms of diseases.

My understanding is that veterinarians have traditionally been "clinical disease" orientated, but that there is increasing recognition that management and environment and other factors (sub-clinical and endemic diseases) can necessitate a broader or systems perspective. There is a broadening of the notion of disease in veterinary discourse to: "include not only clinical and sub-clinical disease but also management inefficiency, all three of which can result in sub-optimal performance." (Radostits and Blood 1985,p4). Shallo (1992) speaking of consulting argues that: "The aim is to change the perception of farmers in our district towards veterinarians, from providers of only an 'ambulance service' to that of whole-farm consultants." Some non-traditional approaches have gone further, to consider links between farmers personal characteristics in relation to, for example, farm performance and mastitis (Tarabla and Dodd 1990). Epidemiologists have long seen disease in terms of the ecosystem, and as an imbalance in the ecosystem. This perspective considers "disease" in its environmental context (I include, here social factors) and as increasingly being concerned with relational properties in the system.

In practice it would appear that veterinary knowledge is valued over local or farmer knowledge, although Kevin Bell (1988 p29), who has a vet-farm management consultancy in WA, seems to come close to appreciating local knowledge, when he observes: "Be humble enough to accept the fact that most good ideas come from farmers...", and, "Facilitate information transfer: farmers learn best from other farmers (even better than from you)." In the context of the TOT model outlined above, these are mixed messages when later, Bell (p31) states that the priority for consultants is to "transfer knowledge". Blood and Brightling (1988, p viii) also refer to "the knowledge explosion" which in my terms would be more accurately described as a data explosion, as only when meaning, by humans, is given to data is information produced. These conceptions are cause for concern given the increasing belief that decision support systems cannot participate in decision making" (ibid p92; see Ison 1993).

It could be argued that R&D, because of its reliance on "professional expertise" is a "values imposing system". Conventionally, despite all recent evidence to the contrary (see Latour, 1987; Appleyard 1992), scientific understanding is seen as objectively determined and value free. These understandings thus have the "power of truths" and accusations are then made against...
traditional view has been conceived as the function of agricultural and veterinary research and development. The consulant-client relationship relies on a priori information, discourses about what constitutes knowledge, and the "right" information to clients or students. These new discourses on knowledge, accessibility and practical relevance, are a challenging examination of what we commonly call or define as R&D, as well as teaching practice.

Research conducted in the NSW rangelands by the Community Approach to Rangelands Research and Extension (CARE) team exemplifies an attempt to respond to these new discourses (Russell and Isom 1992; Wehner et al. 1992). In our initial dialogue with pastoralists about developments in relation to R&D, distinctions were made between: research on things, such as plants, soil etc.; research on people and animals; and research on social systems.

Pastoralists found these distinctions meaningful. They were particularly intrigued by our interest in "research on people," and the possibility of research in particular as their experience of research and researchers was mainly one of researchers taking and seeming to give nothing back in return.

RELEVANCE TO VETERINARY PRACTICE

It is likely that the concepts I have attempted to resonate with members of the epidemiology chapter as you are concerned with "clinical disease" or the "clinical disease" relationships between factors and diseases, rather than wanting to concentrate on symptoms of diseases.

My understanding is that veterinarians have traditionally been "clinical disease" orientated, but that there is increasing recognition that there are "non-clinical" or "environmental and other factors (sub-clinical and endemic diseases) can cause disease, the symptoms of which are more difficult to identify and describe. There is a broadening of the view of disease in veterinary research to include not only clinical and sub-clinical diseases but also management inefficiency, all three of which can result in sub-optimal performance (Radoistis and Blood 1985, p.4). Shallow (1992) in his paper on the "role of advice" in veterinary medicine, argues that the role of the veterinarian is to "provide farmers with a service to improve their management of their livestock." Various factors, such as management, nutrition, and health, can all contribute to the "right" advice for individual farmers. In this paper, I will discuss the implications of the "right" advice for farmers in developing more effective "evidence-based systems" to get the "right" information to clients or students. These new discourses on knowledge, accessibility and practical relevance, are a challenging examination of what we commonly call or define as R&D, as well as teaching practice.

Despite the growing body of worldwide experience to the contrary, there persists the view that one person or nation can change or develop the other - to be responsible for them. It seems to close in on the old cliches which imply "we know what is right" or that "we need to change their behaviour" and that we can effect these changes by telling them to "do it" or by giving them "advice." In the context of these cliches, the message is still that if we can "deliver" the message more effectively these cliches and metaphors have a much more effect of setting ourselves, the experts and public, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

It could be argued that R&D, because of its roots in the human social system, is a "value-laden system." Conventionally, despite all recent evidence to the contrary (see Latour, 1987; Appleby 1992) scientific understanding is seen as objective and value-free. These understandings underpin the "power of truths" and the "knowledge" of others, and the validity of our own. In practice, it would appear that veterinary knowledge is valued more by local or humans who have "hands-on" experience of the disease. However, we need to develop a critical understanding of the role of advice in the veterinary profession, and how it can be used to influence the decision-making of farmers. This is a complex and challenging task, and one that requires careful consideration.

Drawing on this conceptual framework, our CARE group has been working over the last two years to assist a small group of pastoralists with the implementation of a new system that takes into account the social and cultural context of the farm. This research has been a part of a larger project that is aimed at improving the health and productivity of the rangelands.

PARTICIPATORY RESEARCH

Despite the growing body of worldwide experience to the contrary, there persists the view that people or nations can change or develop the other - to be responsible for them. It seems to close in on the old cliches which imply "we know what is right" or that "we need to change their behaviour" and that we can effect these changes by telling them to "do it" or by giving them "advice." In the context of these cliches, the message is still that if we can "deliver" the message more effectively these cliches and metaphors have a much more effect of setting ourselves, the experts and public, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

It could be argued that R&D, because of its roots in the human social system, is a "value-laden system." Conventionally, despite all recent evidence to the contrary (see Latour, 1987; Appleby 1992) scientific understanding is seen as objective and value-free. These understandings underpin the "power of truths" and the "knowledge" of others, and the validity of our own. In practice, it would appear that veterinary knowledge is valued more by local or humans who have "hands-on" experience of the disease. However, we need to develop a critical understanding of the role of advice in the veterinary profession, and how it can be used to influence the decision-making of farmers. This is a complex and challenging task, and one that requires careful consideration.

Drawing on this conceptual framework, our CARE group has been working over the last two years to assist a small group of pastoralists with the implementation of a new system that takes into account the social and cultural context of the farm. This research has been a part of a larger project that is aimed at improving the health and productivity of the rangelands.

* Projects have the potential for more mutually satisfying outcomes when an invitation is extended to participate, and the outcomes are based on conversations which acknowledge each person's experience and knowledge; the question is: what is the role of "advice" and how it can be used to influence the decision-making of farmers? It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

* It is important to understand that experience and knowledge is related to context, and that it is necessary to attempt to appreciate particular contexts; the expertise and the client, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

* Matters individuals are keen to take actions on behalf of others or concur with "experts" or institutional priorities; the expertise and the client, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

* Pursuit of these matters in open, collaborative and critically informed ways, can lead to locally meaningful and adaptive changes; the expertise and the client, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

* Knowledge is both individually and socially constructed and because of this, processes are necessary to create learning networks; the expertise and the client, up as if all we were were marionettes requiring skillful manipulation. It is easy to forget that there are short-cuts and that local constraints and cultural contexts can be by-passed. It is important to clarify the terms of the discussion, to question what the"right" advice is and how it is relevant or meaningful to the experience of the client. The participation of the client in the process of decision-making is a key issue, as is the development of a system that can "participate in decision making." (Bidell, 1992; von Rosen 1993).

* Pastoralist families and communities already do "research" and "advice" (share experience and knowledge) - they place importance on
waiting to be asked);

* diversity of experience, knowledge, research and "extension" action is an asset of equal importance to the diversity of the biophysical environment.

These two last possibilities provide a framework for what I am calling eodesign.

Design can be characterised as an involvement in a project that has many players and that translates human culture, technology and aspiration into form (Coyne and Snodgrass 1991). My focus on design is in response to Hooker's (1991) observation that: "The direct consequence of the profound changes in the character and role of organised knowledge is that the future must now be regarded as increasingly a human artefact - an art-in-fact. The future can no longer be regarded as a natural object, a fact already there or objectively determined by present trends. Rather it must be chosen. Artefacts are the realisation of human value judgements in facts, in the concrete design of our world. Artefacts are experiments, experiments first with what is possible, and then what is preferable. They are designs, chosen from among possible designs, because of the values they realise in the designs." He proposes a process of futures design based on "backcasting" rather than extrapolation or projection from the present. (See Ison 1993).

Ecodesign is specifically concerned with bringing ecological principals and values (see Russell 1991; Walters and Holling 1990) to bear on the design process. Future professional roles are thus likely to involve responding to and extending invitations for problem or opportunity formulation as members of co-researching teams, joint identification and evaluation of alternatives, designing and facilitating group processes, and co-managing and evaluation of plans and programs.

Appropriate values for design must be articulated and developed. What are some of these possible values? I do not wish to be prescriptive, but I invite you to consider one perspective in the design of your future practice as veterinarians and educators.

John Heron (1989) developed a model which identified three levels of power to be consciously recognised in the process of project or learning activity (e.g. curriculum) design: (i) Hierarchical, with "power over" leading to "deciding for"; (ii) Cooperative, or "power with", leading to "deciding with" and (iii) Autonomous, or "power to" leading to "delegating deciding to". Whilst not consciously using Heron's model, it nonetheless encompasses principles which have guided the design of our CARR project. I invite you to consider these in the design of curricula, and in the development of co-researching or co-learning networks with your clients. The distinction between authoritative and authoritarian is important here. An educator or professional may have more experience and theoretical development in some domains. This clearly provides authority just as the farmer is an authority on his/her own context. The invitation is to value others authority and to resist transforming authority into authoritarianism (Priere and Shor 1987).

Participative eodesign is proposed as a new paradigm which might shape future professional practice in ways that change the nature and quality of relationships between "experts", clients and technology.

ACKNOWLEDGMENTS

I would like to thank David Russell and Greg Curran for their past and continuing collaboration. Some of the understandings expressed in this paper have arisen through my involvement in the CARR (Community Approach to Rangelands Research) Project funded by the Wool Research and Development Corporation. I acknowledge my collaborators in this project, especially David McClintock and Lynn Webber.

REFERENCES


Appleyard, B. (1992) Understanding
Design can be characterised as an involvement in a project that has many players and that translates human culture, technology and society (see, for example, Cooney and Snodgrass 1991). My focus on design is in response to Hooker's (1991) observation that: "The direct consequence of the profound changes in the character and role of organised knowledge is that the future must now be regarded as increasingly a human artefact - an art-in-fact. The future can no longer be regarded as a natural object, a fact already there or objectively determined by present trends. Rather it must be chosen.

Artefacts are the realisation of human judgments in tactic in the concrete design of our world. Artefacts are experiments, experiences, and represent what is possible, and then what is preferable. They are designed, chosen from among possible designs, because of the values they realise in the design. Design propels a process of futures design based on backcasting rather than extrapolation or projection from the present. (See Ison 1993).

Ecodesign is specifically concerned with bringing ecological principals and values (see, Russell 1991; Walters and Holling 1990) to bear on the design process. Future professional designers are thus likely to involve responding to and expanding these ecological principals and to involve technical, economic and social models in outcomes. The designer's role is to advise, consult and evaluate of alternatives, designing and facilitating the group processes, and co-managing and evaluating of plans and programs.

Appropriate values for design must be articulated and developed. What are our possible values? Do we not wish to be prescriptive, but rather consider one perspective in the design of your future practice as veterinarians and educators.

REFERENCES
Russell, D.B. (1986) How we see the world determines what we do in the world: preparing the ground for action research in the University of Western Sydney, Hawkesbury. 61p.


