

New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website www.nzsap.org.nz

[View All Proceedings](#)

[Next Conference](#)

[Join NZSAP](#)

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/).



You are free to:

Share— copy and redistribute the material in any medium or format

Under the following terms:

Attribution — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for [commercial purposes](#).

NoDerivatives — If you [remix, transform, or build upon](#) the material, you may not distribute the modified material.

<http://creativecommons.org.nz/licences/licences-explained/>

Think globally, act locally – Roles for science in enabling local actions for sustainable resource management behaviours

L.S. SAUNDERS

Landcare Research Ltd, P.O. Box 69, Lincoln, Canterbury, New Zealand.

ABSTRACT

Behavioural responses are prerequisites to sustainability and essential if the Think Globally, Act Locally concept is to become a reality. The introduction of the Resource Management Act adds weight to the requirement for land users to Act Locally, through enabling land use within the stated purpose of sustainable management of resources.

The provision of knowledge to enable land users to Act Locally is one of the priority roles for science, in order that the collective values of society are supported. It is postulated that the sustainable management of resources is likely to be symbolic and may have little direct influence on behavioural outcomes. Science needs to identify the utilitarian values associated with equity, efficiency, effectiveness and knowledge itself to enable local action. Local action will in turn support the symbolic beliefs of society at large. Failure to enable local action will result in society judging science on the basis of declining sustainability ie. symbolic and the possibility of reduced public funding for future research. A number of new science interrelationships involving society, policy and other science providers are recommended.

INTRODUCTION

Think globally act locally. The following paper is about local action for the purposes of sustainable resource management. The common expression of this statement typifies the recognition of environmental and resource management issues since the early 1980's. Traditionally, science focused on land resource assessments that involved identifying land uses best suited to the soil resource. Policy makers then used this knowledge to prescribe the spatial patterns of land use. Land users and owners were willing to accept this when society, via central government, was willing to share the risk of inappropriate land uses with land owners. Since deregulation of agriculture, with the associated passing of responsibility for risk to land owners, and other reform processes involving the removal of government from decision making, land use decision making has increasingly been passed to the investor.

The introduction of the Resource Management Act (RMA) reformed the prescriptive spatial allocation of land to land uses and replaced it with an enabling policy where all land uses are allowed providing the purpose of the RMA is achieved. The purpose of the Act is broadly stated as being sustainable management of resources. An interesting point to note is that for water the reverse situation exists ie. the RMA has adopted a prescriptive approach to the allocation and management of water resources.

Internationally, the concept of sustainability has developed a life of it's own defying continued attempts of a consensual definition, despite having a universal appeal to those associated with resources and the environment. Whittlesey (1994) noted that "while everyone agrees that sustainable resource use is desirable, few can define it, and no one knows how to actually do it." This is the nature of the challenge that society has set for resource users, managers, policy makers, and the science fraternity charged with providing knowledge that enables the sustainable management of resources.

I would like to develop this paper from a discussion of sustainability and the need to become more specific in the language we use. I will then identify how science and society may wish to address the knowledge of sustainability, and identify the inter-relationships between policy, science, and society that are likely to be necessary for the achievement of more sustainable behaviours. I use the word behaviours as I see it as a behavioural outcome. Therefore the essence of achieving sustainable resource management is to develop an appropriate set of behaviours.

SUSTAINABILITY

Any review of the environmental or resource management literature in the last ten years would be expected to report on sustainability. I would suggest that a review of any science or policy literature topics or titles would provide similar findings. If nothing else it is topical, yet there appears to be "little change in the focus or method of research by my colleagues in the last few years, **except that the term sustainable is now in the title**" (Nowak, 1992. pp 359 - emphasis added). Many believe that the notion of sustainability is over used and that it is not an end point but a process which comprises economic, ecological and social schools of thought (Williams, 1993). If a behavioural perspective is to be adopted all behaviours have these dimensions plus institutional and political dimensions. The repeated statement of economic, social, and ecological perspectives will not identify or assist behaviours for more sustainable land use. From both a political or institutional perspective the claimed causes of non-sustainable farming systems eg. use of chemicals, nitrate contamination of waterways, erosion, corporatisation of farming, are often no more than symptoms of the existing social-political organisation of agriculture (Allen and Sachs. 1992).

Failure to recognise them as such will simply develop strategies that, with the benefit of hindsight, may be misguided, with a the result that science, and science providers,

will suffer a loss of credibility. By adopting a behavioural perspective the role of policy settings is recognised which in turn incorporates the collective values of society along with the values of individual choice of the land owner.

The social political organisation of agriculture and the associated policy settings based on efficient allocation of resources ie. market allocation, will in all likelihood provide incentives for continued exploitative behaviour. If the rights of individuals do not reflect collective values there will be a need to manage the market, or alternately, find mechanisms for conflict resolution in society (Dragun and O'Connor.1993).

Greater specificity of what is to be sustained is essential if the debate is to progress and land users are to be enabled to **Act Locally**. A quick review of sustainability papers in the last year reveals at least four identifiable themes within sustainable agriculture literature. First, there are those who argue for reduced reliance on chemicals which I will label the food safety coalition. The second theme is based on preservation of the family farm perceived to be under increasing threat from corporatisation and a reduction in labour employed. The Technologists call for new technology to solve the problems of the day largely in response to the positions promoted by advocacy groups represent the third theme. An ecological/resource perspective represents those that believe the principles of ecosystems such as diversity, resilience, stability need to be factored into agriculture such that the environment is recognised as a constraint on production, as opposed to a factor of production. There is a professional responsibility on us all to identify the context, or position, from which we espouse the notion of sustainability. Failure to do so will only discredit ourselves to our customers as they realise we have no, or little, relevance to their problems.

Sustainability behaviours requires that land users, society, policy and science develop a common understanding of desirable goals. The questions that need to be addressed are what is it we are sustaining and how do we do this? At the present stage of the debate sustainability is largely about higher order values sets (Nowak, 1992), that may be largely symbolic which do not directly influence behaviours. I suggest that until a more utilitarian perspective is adopted where sustainability relates to the properties of time and space of any resource use, or management, behaviour we are unlikely to provide any real value to our science customers.

The following section identifies the issues that help advance the sustainability knowledge set from which land users can Act Locally.

SUSTAINABILITY VALUES.

What do land users need before they adopt sustainable behaviours? There appear to be four sets of values that are needed for this to occur. These are equity, efficiency, effectiveness and knowledge itself. Equity refers to the identification of those land users that need to change behaviours. Efficiency is a reflection of the extent that individuals have tools to make the desired changes. Effectiveness is measured by the degree that behaviours are changed and the relationship between land user's and the land. Knowledge is needed by land users within a specific physical environment to make the changes (Nowak, 1992).

Equity

To often calls for sustainable farming are directed at regions (eg. South Island High Country) or farming systems (eg. North Island Pastoral Farming) suggesting that either all farmers need to change or alternately the whole system of farming needs to change. Quite simply such calls are inadequate outside the realms of politics. Science must be able to determine which practices need to be changed so those who undertake these practices can be identified. It is no longer adequate to look where the "light is" by talking or addressing those that we deal with every day. For sustainable behaviours to be achieved access to the problem is needed, for to long we have worked with those that have listened and not those who need it.

Efficiency

Efficiency is presented, not in the sense of inputs relative to outputs, but in terms of understanding what will change, or influence, behaviours. In future science will need to deliver tools for specified managers within more closely defined physical environments. Nowak (1992) noted that "... we have the scientific knowledge to accomplish this, what is lacking is the value of efficiency needed to initiate this process. Instead of using an interdisciplinary scientific basis .. it appears we have been content to throw dollars, FTE's and regulatory threats at problems..." The problem is one of science organisation and operation.

Effectiveness

Effectiveness is determined by the achievement of outcomes which I have already defined as sustainable behaviours. It is not possible to separate the land user from the land such that changes to the physical status of resources is likely to be an inappropriate measure of effectiveness. It would represent the degree by which symbolic beliefs were supported but not the extent to which behaviours have changed. Measures of behavioural changes that add to the sustainable use of resources are needed by land users to establish the effectiveness of their behaviours.

Knowledge

To **Act Locally** land users' require answers to questions on whether their behaviours within their environments is adding to, or subtracting from, sustainable resource use. There must be real doubt about whether science can at this time answer these questions with the result that policy makers, scientists, and society have little legitimacy calling for sustainability when they can not identify when something is or is not sustainable. There is an opportunity for science to develop answers to questions like these.

Behaviours will also be guided by a range of other ethics and values that land users hold including such things as the market ethic, family ethic, and community values etc. Historically we know that stewardship ethics have fared poorly along side other ethics and values which highlights the need for a range of inter-relationships to be developed between Science and society, policy, land users, and other science providers. The next section develops the need for these inter-

relationships and outlines the response of Landcare Research Ltd to the demands arising from the need to **Act Locally**.

Sustainability Inter-relationships.

There are a number of relationships that should develop if more sustainable behaviours are going to be adopted. The first role is to identify where they are necessary and although there are a number of claimants for the recognition of non-sustainable systems there have been few calls for the identification of non-sustainable behaviours. The relationships which I introduce are directed at behavioural responses of science and include the relationships of science with society, policy, and other science providers. These relationships will enable the knowledge requirements of sustainable resource management to be developed in a comprehensive manner that supports the equity, efficiency and effectiveness values. Without the input from all parties land users may not **Act Locally** within an environmental context. The failure to enable actions will mean that science has failed in at least one of the roles assigned to it by society.

Science - Society relationships

The RMA devolves increasing amounts of responsibility for resource management to the wider society. Arising from devolution is an increased recognition of the collective values of society which may constrain the individual's actions within society. Science would benefit from the involvement of society, including land users, within the process of science both in terms of determining the right questions to be addressed, establishing the equitable access to sustainability, providing experiential knowledge sets, and testing tools developed. I argue that science has a fundamental role to play by informing the other agencies of collective values, where change is desired and necessary, and why existing behaviours are prevailing. Landcare Research Ltd has started to develop a number of research programmes that are striving to enable local communities to participate in the science process. The Hieracium Management Programme is collectively managed by a joint-science community steering group. The steering group function is to provide direction and farmer input to the programme at all stages of the research. The employment of expertise in sociology, economics and decision theory has enabled research into the underlying beliefs and values attached to resource management for input into programme design.

Science - Policy

Policy settings are designed to influence behavioural change or reinforce existing behaviours deemed to be desired. If behavioral change is the goal recognition of the role of policy in determining behaviours is required. Science needs to provide the knowledge about sustainability values to the policy process if perverse policy incentives are to be avoided. An example of such an occurrence is the Sustainable Agriculture Policy for New Zealand which identifies the need for land users to move into profitable but environmentally benign practices. Although the document states several outcomes which are deemed to be desirable there have been few, if any, institutional initiatives developed from this. If, as the

policy document identifies, stocking rates on North Island hill Country are considered to be too high what policy response is there. There are a number of documented research findings that conclude the economic incentives faced by producers is to increase stocking rates and that a change to these would assist the changes to behaviours. No where does the sustainable agriculture policy address the other policy settings that cause the non-sustainable behaviours. Within some of it's research programmes Landcare Research Ltd is increasing the involvement of policy agencies from the planning stage to identify what knowledge is required.

Science - Science

Behaviours associated with sustainability are complex and uncertain (Dovers and Handmer, 1992) and are located within heterogenous human-ecological systems Conway (1987). These systems exist within a wider policy and institutional setting and the prevailing socio-political organisation of agriculture. The ability of a singular discipline in science to address the diversity of issues that determine and influence behaviours is limited. The nature of the problematic of sustainability is such that a coordinated systematic interdisciplinary approach - including the discipline of the farm practitioner, will be needed to change behaviours. The limited ability of science to identify and debate the questions to date strongly supports the need for change in the directions outlined.

The value of science will be questioned by urban societies who see their values associated with rural environments being eroded. The risk arising from this is that, these same societies will turn their back on science as appropriate means to support their value sets are sought. The irony of this discussion is that science needs to move beyond the symbolic notion of sustainability to a more utilitarian perspective to enable land users to **Act Locally** whilst it is the ability to maintain the largely symbolic values sought by the wider society by which science will be judged. It is therefore imperative that land users are given the appropriate tools to **Act Locally** to ensure the higher order symbolic values are supported.

CONCLUSIONS

I have attempted to portray the need for a change in the manner in which science is undertaken, the scope of science, and the relationships around which science needs to be managed. In developing the portrayal I have stressed the professional responsibility of specifying what our sustainability objective is, so that land users may relate to the debate. Sustainability is an action concept it is about family, farm, and resource management behaviours that move individuals and society towards a specified objective. With greater involvement of society in decision making, a reduction in the spare capacity of our natural systems, and increasing constraints on individual choice from collective values of society, the values of sustainability need to be addressed in a comprehensive manner. Scientists will benefit from interactions across the sciences and by developing relationships between science and policy, and by involving society in the science process. Most importantly those individual land users that most need to change must be provided the tools that will assist them to adopt sustainable behaviours *ie. to Act Locally*.

REFERENCES

- Allen, P.L. and Sachs, C.E. (1992). The Poverty of Sustainability: An Analysis of current Positions. *Journal of Agriculture and Human Values*. Fall 1992.
- Conway, G. (1987). The Properties of Agro-Ecosystems. *Agricultural Systems*. Vol 24, 1987.
- Dovers, S.R. and Handmer, J.W. (1992). Uncertainty, Sustainability and Change. *Global Environmental Change*. Dec 1992.
- Dragun, A.K. and O'Connor, M.P. (1993). Property Rights, Public Choice and Pigouvianism. Paper submitted to *Journal of Environmental Economics*.
- Nowak, P. (1992). What Value Values in Resource Management. *Journal of Soil and Water Conservation*, September 1992.
- Whittlesey, N. (1994). Concepts and Issues Concerning Sustainable Resource Management in New Zealand: An Economists Perspective. Contract Report for Landcare Research Ltd.
- Williams, M. (1993) Sustainability: An Overworked Word? *Agricultural Science*. pp46-47.