THE FAILURE OF LEGUME PASTURES TO IMPROVE ANIMAL PRODUCTION IN THE MONSOONAL DRY TROPICS OF AUSTRALIA - A MANAGEMENT VIEW

T.H. McCOSKER* and C.A. EMERSON**

SUMMARY
Over two decades of pasture research in northern Australia, concentrating principally on legume based pastures, has not had a lasting positive impact on beef production. The effects on producer attitude and operational profitability have in many cases been negative. Reasons for this appear to be due to the approaches taken to research and development by researchers, extension personnel and managers. Suggestions to improve the record include using a multidisciplinary approach, more emphasis on systems research and a greater understanding of the impact of management constraints and practices.

INTRODUCTION
In our experience pasture research in northern Australia is not sufficiently relevant to producers to have a significant impact on animal production. This points to a weakness in the method of setting research priorities and allocating research funds. It is the object of this paper to give a property management view of reasons for this situation and to suggest ways of overcoming the problem.

The region referred to encompasses the large pastoral leases in the high rainfall (>900 mm) monsoonal area of north Australia. It essentially covers the tropical tall-grass grazing lands of the Kimberley, Victoria River, Darwin and Gulf, Peninsula and Gulf, and Inland North BAE Beef Regions. The climate has been described by Fitzpatrick and Nix (1970), the vegetation by Moore (1970) and production summarised by Winter (1978).

THE EFFECT OF LEGUME PASTURE
It is the authors' opinion that the majority of properties in this region, which did not get involved in the Townsville *Stylo* (TS) 'revolution' are today financially better off than those which did. Industry attitude to the 'legume only' approach to pasture improvement is evident by the areas sown to this pasture type. Scattini (1981) estimated that less than 160 000 ha had been sown to 'legume only' pasture in Queensland by 1980, and Sturtz et al. (1975) estimated that 121 000 ha had been sown to TS in the Northern Territory by 1974. Therefore less than 0.7% of the estimated potential area of 40 000 000 ha (Norman and Begg 1973) has been sown. The negative impact of a 'legume only' philosophy has been manifested in terms of overcapitalisation and ecological damage.

The management requirements of legume pastures have led to increased fencing, water installations, roadworks and yards which have not given sufficient return on capital. It has made properties, whose strength was low capitalisation, reliant on capital inputs frequently in the form of loans. It is apparent with the benefit of hindsight that, although it is technically possible to increase production from legumes, it has not yet proved to be commercially viable. Poor establishment and lack of persistence have compounded the economic problems.

Destruction of native grasses by either overgrazing or ploughing has made long term regeneration doubtful and has reduced animal production. Ingress by weeds such as *Hyptis* sp and *Sida* sp into sown pastures has followed the removal of native grasses. Regression of native pastures appears to be due to a lack of

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* Mount Bundey Station, P. O. Box 3, Adelaide River, N.T.5783
** Northern Territory Cattle Council, MNI Building, Cavenagh Street, Darwin, N.T.
understanding of their ecology, particularly with increased grazing pressure, a deliberate no burning policy, and inputs of phosphorus, calcium, sulphur and nitrogen. A desire to see whole-scale replacement of native pasture reflects a lack of recognition of its value as a cheap feed source.

**SOME REASONS FOR THE FAILURE OF LEGUME ONLY TECHNOLOGY**

**Research Factors**

(i) **Single discipline approach** The pasture agronomist has worked on pasture legumes as an entity. *Little attempt* has been made to integrate pastures with whole property needs and herd management systems (Winks 1975). The problem facing managers is how to use a legume, which has advantages over native pasture, to economically improve animal production in the system. Pasture development is only one of many options open to a manager who wishes to improve production,

(ii) **Institutionalised mentality** Experienced managers have a mistrust of researchers who, on the basis of their educational achievements, feel they are qualified to solve their problems. Researchers from urban backgrounds with research experience do not always develop an empathy for the views and problems of producers. It is natural that they develop, due to their daily contact with each other, the mentality and attitudes of the institution in which they work. The institutional views on property management and requirements are all too often very different from those of managers, primarily due to the very small degree of contact and interaction between the two.

**Extension Factors**

A manager always has time, monetary, equipment and/or manpower constraints overriding his intentions to implement new technology. Alternatively, and what may more often be the case, he will hide his real objections using one of the above as an excuse. The researcher and extension officer must acknowledge that any modification to an existing viable system needs to be technically and economically sound in the area to which the technology is to be transferred. The bulk of legume research in north Australia has been done in lower rainfall areas and technical problems occurred during transfer of results to commercial application in higher rainfall areas, e.g. dew and fog damage to standover feed (Winks 1975). It is the responsibility of the manager to interpret research results in the light of his own environment and limitations. Where he does not have those skills it is the responsibility of the extension officer to do it for him. A large number of failures have occurred because developers thought they could achieve research station performance in situations far removed from the point of research. Economic analysis prior to development has also been based on the fallacy of reproducing research results commercially. Davidson (1962) found that crop research results could be discounted by 40% when transferred to the commercial scene.

**Management Factors**

Pasture development, when the property has not developed an effective herd management system, is premature. If an animal class has been traditionally segregated and managed, the infrastructure and some of the capital is in place, then returns are more likely to be achieved. Attempting both phases of development together, on a large scale, places exceptionally high demand of management skill. Past experience has shown that rapid, large scale development is the wrong approach. Managers should start in a small way. Experience gained can then be used to make sounder investment decisions and would also ensure a higher success rate with pasture establishment and production.

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RESEARCH AND INFORMATION DISSEMINATION

The formalised approach to research operating in north Australia at present requires that CSIRO does basic research, universities teach and do basic research, while state departments do applied research and extension. Research priorities are set by each institution in consultation with each other. Whilst we have no argument with this structure, or with the very high standards of professionalism within the institutions, we do believe that the method of determining research priorities and needs requires a major overhaul.

Institutions and public servants are determining what property managers need to know. This is a severe case of the cart leading the horse and the reason for irrelevant and low priority research. We would suggest that research needs and priorities could best be set in the following manner:

The starting point for research must be a study of what producers are doing and why. Researchers should have a grasp of what system is being altered and the economic and physical impact of an alternation to the system. Morley (1981) suggested case studies and surveys as tools to arrive at this point. He then suggested experimentation as the next step and we would recommend modelling and simulation concurrently by applied researchers. Pre-evaluation of the economic and social impact of successful research and development would be useful to help set priorities and design improved systems at this point. Physical modelling of current pasture and herd recommendations would indicate many areas which require research and would further facilitate setting realistic priorities. Applied research is now at the stage where its yields and credibility would be greater if done on a large scale. Problems encountered in systems and applied research can be handed to the basic researchers. Basic research results should then come back to the producer via the systems and applied research.

At the applied research level it is important to separate the effects of management changes from the effects of inputs. Experiments are generally designed to measure the effects of inputs, e.g. pastures or supplements on cattle. However, to manage an experiment effectively, the management system is frequently altered to one which differs from commercial practice or cannot be practically or economically implemented. The results are then 'sold' on the strength of the experiment, when in fact it may be possible to improve on the results commercially or negate them solely with the management regime adopted. This is particularly so with breeding systems and production from improved pastures.

SUGGESTIONS TO IMPROVE PRODUCTION FROM RESEARCH MONEY SPENT IN FUTURE

Know what is being researched and why

It is essential to know how the industry operates and why. An excellent example of gaining and using this type of information is the ETES Project (Technical and Economical Evaluation of Meat Production Systems) conducted by CIAT in South America (Anon 1977). Researchers spent three years monitoring all aspects of commercial beef production in several regions in a properly designed survey. As a consequence, pasture scientists are not simply doing research to grow pastures, they are doing it with clearly defined management regimes, clearly defined objectives and certain animal classes in mind. The basic and applied researchers using the ETES data are in a better position than their north Australian counterparts to know where they are going and why, because their goals are based on real information rather than institutional or personal opinions. Such detailed information not only helps set research needs and priorities but also acts as a yardstick against which the future effects of recommended corrective action can be measured.
Integrate research and development

Consultations between organisations at a policy making level could do with more attention to avoid duplication and allow for more productive allocation of tasks and finance. The roles of basic and applied research require more definition and integration so that both managers and extension officers are fully aware of the stage of development of technology. There has been a tendency for basic research results to be given to management as an answer to problems without due interpretation and validation. The role of pasture legumes in property development should be addressed as an applied research question. However, this has been a sadly lacking link in the chain. In reality managers have had to be their own applied researchers without being aware that it was their responsibility. Research should be multidisciplinary and property management should be recognised as a legitimate discipline.

Setting research priorities

Sound data on which to base research priorities are not available in north Australia. To illustrate the point here we shall take the low weaning rates of the area, as it is essentially a breeding region. These could be due to poor nutrition, poor bull performance, poor culling policy, disease, predators, the mating regime adopted, the weaning policy used, genetic characteristics, parasites, the environment or combinations of all or several of these. The establishment of legumes is one option for improving nutrition which, although it is only one factor, is admittedly an important one. For the last 20 years however, a very large slice of the research dollar in north Australia has been spent on legume research, with much of that research being done on steers. It is little wonder then that managers see pasture research as being fairly irrelevant. It is high time that the research needs of north Australia were re-assessed and done so from the management end of the business.

REFERENCES