PHASE 1: DEFINING THE FARMING SYSTEM AND INFORMATION GAPS

Phase 1 comprises of five tasks, with the coordination of these project activities the primary responsibility of the project manager with support from the scientific sub-committee. It will be completed by March 2005 and will deliver:

1. A **characterisation of 5 properties as case studies** representative of the major land classes in the region. This activity is separate from the national effort where 5 properties are being benchmarked. In the project activity we propose to undertake detailed bioeconomic modelling of possible grain and graze management options. This will identify the key climatic, economic, natural resource and social drivers of grain and graze systems in the region and provide a focus for subsequent R&D with the sub-regional groups. Information collected from these properties will also allow a baseline to be established from which the project can measure progress through its life. The biodiversity survey exercise (see below) will also be conducted on these properties, so they will be chosen to represent the major geomorphic management units in the catchment. To place the description of these five properties in context, a wider characterisation will be undertaken of the numbers and areas of properties, soil types, prevailing climate, economic performance, areas of cropping and pastures in the region.
2. An **audit of current production systems and capacities to implement changes in practice** will be conducted across the region. In terms of production systems, an assessment of what systems are working and what systems are not will be concluded. This information will provide the basis for performance based assessment of a range of systems. An **assessment of extension capacity and relevance, in terms of** extension networks and skill capacities, for grain and graze producers, their advisors and participating agencies in the region. Integral to the successful implementation of profitable and productive systems that are sustainable is the capacity of the landholder to implement change will be conducted. The audit on capacity aims to provide that benchmark so that specifically designed extension and adoption strategies can be introduced and implemented.
3. **An audit of NRM threats and opportunities within current production systems** will be conducted in conjunction with the regional bodies. These assessments will describe (a) the NRM assets impacted by production systems, (b) the extent and type of impact (where enough information exists) on the natural resource base and (c) the degradation process within a landscape and property context where possible.
4. A comprehensive **literature review** will be undertaken to determine what work has gone on in the region to identify what information could be utilised by producers now and what new information is needed. This will include an audit of current threats and opportunities to NRM assets and how these could be overcome these through better management of mixed farming systems. These assessments will describe (a) the NRM assets impacted by production systems, (b) the extent and type of impact (where enough information exists) on the natural resource base and (c) the degradation process within a landscape and property context where possible.
5. A short discussion paper on appropriate approaches for economic analysis of performance of grain and graze systems

Task 6 will involve the consolidation of tasks 1 to 5 so as to **develop a process for regional analyses** that will be easily repeatable for sub regions within the Border Rivers region. This process will enable sub regional communities to develop sub regional projects around a central regional theme using similar methodologies. It is intended that this process will provide the building blocks needed to design localised sub regional projects aimed at addressing the central regional question, this being:

"**Is the introduction of a short or long term grazing phase in cropping systems in the Border Rivers Catchment profitable and environmentally, financially and socially sustainable?"**

PHASE 2: SUB-REGIONAL RD&E

Due to the diverse nature of climate, soils, native vegetation, natural resource threats and farming systems within the region, it is proposed to conduct on-farm RD&E in four sub-regions. The project team surveyed a total of 105 producers from the region at a series of workshops held at Moree, Tara, Goondiwindi, Inverell and Roma in June 2004. From this, a number of major themes relevant to Grain and Graze were identified, and the project has been designed around these. In each sub-regional project, a multi-disciplinary team of researchers and extensionists will work with a producer group of 10-20 farming families. This team will have skills in extension, pasture production, animal production, biodiversity, crop agronomy, environment, economics and soil fertility/plant nutrition. Modelling and economic skills will also be on hand to allow synthesis and extrapolation of research. It is expected that each group will want different activities undertaken. Each sub-regional group will have some resources that they can use outside the core project team. Each sub regional group will undertake a facilitated process with input from the technical sub committee to determine a set of locally-based activities framed by the question "Is the introduction of a short or long term grazing phase in cropping systems in the Border Rivers Catchment profitable and environmentally, financially and socially sustainable?" Around this broad research theme the following research activities and measurements are likely. These treatments will be modified according to the outcomes of the initial farmer workshops in each of the sub-regions, and the intensity of measurement will depend on the number of on-farm research trials.

1. Test a short term pasture-crop phase on soil types most suited to cropping. Short term pasture leys (1-2 years) are most suited to soil types suitable for cropping and not highly prone to runoff and erosion processes when soil cover is low, such as during the transition from pasture to crop. A short term ley may be beneficial to temporarily increase soil N and OM which subsequent cereal crops can utilise. The forage component is also high quality and liveweight gain (lwg) can be high (~1 kg beef/day/animal).

a) Modelling study: Utilise APSIM to investigate feasibility of short term pasture systems and quantify the risk of crop production following short term pastures. Potential treatments include: summer lablab-wheat x region; summer lablab-fallow-summer sorghum; opportunity cropping scenarios. The results from the modeled scenarios will guide the field studies in (b).

b) Field study- Potentially a core site and several other on-farm sites with limited treatments

Suggested treatments: One to two years of a pasture ley treatments such as: Grass only;

summer/winter legume only; fallow; followed by a cereal crop.

PHASE 3: CAPACITY BUILDING AND EXTENSION

It is acknowledged that not all producers wish to be actively involved in working on RD&E activities. Indeed, if this project restricted its engagement with the farming community to 10-15 farming families in 4 sub-regions then it would not achieve its desired impact. Therefore capacity building for the wider community of producers in the Border Rivers region is seen as a major activity for the project. Planned activities under this heading include:

- The development of a broad ranging extension program that coordinates activities from existing private providers, government agencies and regional body technical and facilitation staff.
- Training of landholders to improve skills and knowledge base. A number of mediums will be incorporated. An example of one of the mediums to be considered by the management committee is specific action learning modules. These modules may be developed and delivered to meet the needs already raised by producers at the consultation meetings and the issues that emerge from the sub-regional group work over the life of the grain and graze project. The selection of these action learning modules will be negotiated during the project and may include:
    - predicting and managing animal performance in mixed systems
    - impacts of ley pastures in cropping systems on soil fertility and plant nutrition
    - measuring and understanding the impacts of mixed farming systems on native vegetation and biodiversity
    - management of summer ley legumes in cropping systems
    - monitoring soil water and benchmarking water use efficiency and deep drainage in mixed systems

meeting production and sustainability objectives and trade-offs between them