Preserving Rural Land In Australia.

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1 Introduction

Australia's rural land is an important resource. It comprises a number of landuses, landforms and vast areas of native vegetation. It is productive as a source of food, fibre and consumerables; it is also important for biodiversity habitat and catchment management as well as a place for people to live and work.

Rural land is being placed under pressure for further subdivision as more people seek it as a place to live. Most of the good agricultural land is located on the coastal fringe of the continent between Brisbane and Adelaide. This land also has a vast resource of biodiversity habitat. It is also where much of the population growth is occurring in the form of urban and rural sprawl.

The population growth is placing pressure on the rural land and there is a need to provide a suite of strategies to ensure that it is managed and conserved in a sustainable manner. This should include land use controls, incentives and other mechanisms. This paper will discuss all of these but will focus on land use planning.

A methodology to classify rural land has been developed which considers the biodiversity, food and fibre as well as the lifestyle issues in a balanced and objective manner. It is based on a detailed study of the land use, lot size and natural features of the area in conjunction with the need to consider the concepts of ESD and TCM. The outcomes of the methodology are a series of land units which can be either converted to zones or places if a place management philosophy is to be pursued. The methodology has been applied to a number of LGAs in NSW.

Although this paper focuses on the Sydney region, the issues and problems are evident throughout Rural NSW, Australia and New Zealand.

2 What is Rural Land?

Rural land can best be described as land that is used for any land use that is not urban. However, the term rural does not define the use of the land, it defines the character - one of rolling hills interspersed with native and exotic vegetation and animals. The main feature of rural land is that it has an unplanned, non-uniform, natural look and can be described as "chaotic". This describes rural land the most accurately – it is a mixture of uses where no one use is the dominant one. The thing to note is that everybody has a different definition of rural land, depending on a range of things such as their background, age, where they live, etc. You could say that the dominant use is rural.

There are three basic components of the use of rural land as follows:

- Food, fibre and consumerables – agriculture, sand and mineral extraction, plant nurseries, some processing and manufacturing, tourism, etc
- Biodiversity and natural features – native vegetation habitat, flora and fauna, landscapes
- Place to live and work – rural, rural residential and urban centres

Rural land is where the bulk of the nation's food source is generated. As well as being a source of raw materials for a number of manufacturing and other products

These three components can be related to the three themes of Ecologically Sustainable Development (ESD) in the following manner:

Source of Food and Fibre	⇒	Economic
Biodiversity and natural features	⇒	Environment
Place to live and work	⇒	Social Equity

It can be seen therefore that there is a link between the issues surrounding the preservation of rural land and ESD.

3 The Paradox of Rural Land

As outlined above, rural land has three basic components which are coming into conflict with each other.

Australia's agricultural land is a finite resource and " … the physical environment has an underlying influence on Australia's pattern of agricultural land use. Topography, climate, soils and vegetation are all vital determinates of agricultural land use" (ABS, 1996, p13).

Sixty one percent of the Continent is within the temperate zone and 39% within the tropical zone (ABS, 1998). Australia's dimate is such that it is the driest inhabited continent on the earth. More than $^1/_3$ of Australia is classified as arid which means it receives an annual average rainfall of less than 250 mm. Another $^1/_3$ is semi arid with an annual rainfall between 250 mm and 500 mm. A good indicator of the aridity of the country is the amount of rainfall needed to grow crops without irrigation. In the far south of the continent, rain fed crops need about 250 mm of rain per year. In most of NSW it is 375 mm rising to 500 mm in northern NSW and southeast Queensland and 750 mm in the far north of the country.

Australian soils are among the most nutrient poor in the world (State of the Environment Advisory Council, 1996, p2-8) and thus providing very few naturally good soils for agriculture. Most of the soils are infertile and shallow which have deficiencies in nitrogen and phosphorous. This adds to the infertility. "Fragile soil structure and a susceptibility to water logging are rather common features of Australian soils while large areas are naturally affected by salt and/or acidity. The soil characteristics may restrict particular agricultural activities or rule out agricultural activity altogether" (ABS, 1996, p19). Australian soils are also very low in organic matter and thus are not highly productive for plants and animals. In total, only a small area of the country has soils with the valuable characteristics of being deep and well drained with high fertility and high water holding capacity.

Australia's agricultural land is a finite resource. Contrary to most beliefs, only 10 % of Australia's landmass is arable land suitable for soil based agriculture and livestock production. Much of this is marginal with respect to water and nutrient regimes. (Nix, 1988 p.75)

The presence of areas of natural vegetation is an important component of agricultural land and sustainable agriculture. The preservation of native vegetation and biodiversity has a number of benefits for agriculture. Native vegetation, on steep land, can prevent erosion and loss of soil adding to a healthy catchment. Native trees and shrubs provide a source of bees for pollination. They also play an important role in lowering the watertable and thus reducing the salinity problems as well as providing shelter for crops and stock. All of this adds to the productivity of agriculture and enables the achievement of a sustainable agricultural environment.

The major area of agricultural activity and good soils is on the coastal fringe, to the edge of the inland and are located on the eastern and southern western tip of the continent. When one considers the locations of the major agricultural areas, it is evident that much of the productive land, especially for intensive uses such as fresh vegetables are located along the coastal strip of the continent. Paradoxically, this is where the majority of Australia's population is located, due to historical settlement patterns and a desirable climate, which promotes lifestyle aspiration.

"The two main distinguishing characteristics of Australia's settlement pattern are the spread of urbanisation along the coast line and the concentration of Australia's population in five large cities." (State of the Environment Advisory Council 1996, p 3-8). Australia's resident population at 31 March 2000 was 19.3 million (www.abs.gov.au). The population is growing at a rate of 1.2% per annum.

The distribution of Australia's population is such that it is concentrated in two separate coastal regions. These being the south west of Western Australia and the south east and east coast focused on Southern Queensland, NSW and Victoria. In both areas the population is concentrated in urban centres mainly in the capital cities. "Half the area of the continent contains only 0.3% of the population and the most densely populated 1% of the continent contains 84% of the population. (ABS 1998 p135).

Australia is widely recognised as one of the world's most urbanised countries. In 1996, 79.5% of the population lived in towns and cities of 5,000 or more. This is an increasing trend as 75 years ago only 49.7% lived in cities. (Budge and Sinclair, 1998) Similarly, the population growth has been higher in metropolitan areas than other urban areas. "The worlds population is urbanising much faster than it is growing…by the year 2005, half of the worlds people will live in an urban area; by the year 2025 that number will be about 2 out of 3" (World Resources Institute, 1994, p 31).

Between 1993 and 1998 the country experienced an average annual population growth of 1.2% per annum (ABS 1999). Much of this population growth was concentrated along the east coast with almost all of the Local Government Areas experiencing growth. In fact, most Local Government areas along the NSW and Southern Queensland coast increased their population density by more than 1 person per square kilometre (ABS 1998, p137). The localities which experienced the greatest amount of population growth were those located on the fringe of the major

metropolitan areas being the capital cities of Brisbane, Sydney and Melbourne. The metropolitan areas of Australia have increased in their share of population from 53.6% in 1954 to 62.7 % in 1996. (Budge and Sinclair, 1998, p3) Most of these centres are located in the coastal or near coastal fringe of the continent between Brisbane and Adelaide. In NSW, 82% of the population lives in the coastal areas, with most of them in the Newcastle - Sydney - Wollongong regions (ABS, 1997).

There is a national trend in the movement of Australia's population. This has been described by Bernard Salt in his recently released book titled *The Big Shift* as the third Australian culture – the move to the beach. This has been a trend that has increased in the last 20 years of the 20th century. "The thing that most drives Australians to a particular location is the values that are held by the community. And of course, in the later decades of the 20th century, Australian values changed to embrace a beach lifestyle." (Salt, 2001b, p 5) It has been observed that there is also a move to inland areas within 2 hours drive of the metropolitan fringe, so it is more accurate to call it a move to 'lifestyle living'. People are now retiring or moving to towns for lifestyle reasons rather than purely for work. "And with the advent of telecommuting many will continue to spread out from the city in search of a sea change in places very much like Victoria's Barwon Heads." (Salt, 2001b p 27) "As if pushed and pulled around the continent by the land itself, Australians have more recently advanced along the length of the eastern seaboard, creating settlements based on new concepts of leisure, lifestyle and retirement." (Salt, 2001b p 21) 19% or nearly 1 in 5 Australians now live in a provincial coastal town.

So it can be seen that we are at a stage in the evolution of land use in Australia that needs to be addressed otherwise we will continue to have the problems we are facing at the moment. This will not achieve a sustainable outcome.

4 Preservation of Rural Land

There are three basic ways to recognise and preserve rural land:

- Land use zoning;
- Incentives / Monetary Compensation; and
- Education / Right to Farm Legislation.

4.1 Land Use Zoning

Land use zoning entails placing restrictions on the use of the land by way of statute. It is practised in Australia as the principal method for controlling the development of land. It is a system where land is designated for a principal use and uses that are considered not to be suitable or compatible with the principal use are prohibited. There is also the ability to require certain uses to submit an application for use of the land, which is then assessed having regard to a set of published assessment criteria.

4.2 Economic Incentives

The provision of economic incentives encompasses such things as a rate rebate, transferable development rights and purchase of development rights. They can be

used for the preservation of agricultural land and agricultural production as well as biodiversity conservation, landscape preservation and heritage conservation.

The amounts of money paid by farmers for the Council rates is one of the largest single outlays for the farming business. The amount of rates charged is based on the value of the land. It has been noted in the *Baulkham Hills Rural Lands Study Background and Issues Report* that as the land becomes more desirable for a rural residential lifestyle, the value increases and this has a corresponding increase in the amounts of rates that the farmers must pay. However as this cost to the farming community has increased there has not been a corresponding increase in the value of the production and therefore this is causing an economic hardship for the farmers. One way to compensate the farmers for this is to offer a rate rebate. This could be as much as half of the current rate or even more. This would have a corresponding impact on the other ratepayers of the Shire in that their rates would increase. To qualify for such a rebate, the farm should be in an agricultural zone, which would signify the importance of the area. It is considered that the issue of preserving agricultural land is an issue of significance for the entire Sydney region and not just Baulkham Hills Shire. Therefore some of the funding for this rebate should be provided by the State Government.

Purchase of Development Rights involves a farmer selling the development rights to the farm to a government or non-government organisation. In return a covenant is taken out over the land to ensure that the land is only used for agricultural purposes. The purchase of development rights can also be used to require soil and water management to be undertaken on the property. The property is inspected at regular intervals to ensure that it is being used properly. Transfer of Development Rights occurs where land is declared to be in a preservation zone and kept for agriculture. The development rights to this land can be purchased by developers who wish to gain an increase in the development potential of land declared to be in a development zone. Both of these methods exist in the United States. Of the two, the Purchase of Development Rights is the more successful. Both are applicable to the Australian situation with the issues of Transfer of Development Rights already in existence for heritage sites in the city of Sydney. Its application to agricultural land is problematical under the existing EP&A Act because the Planning NSW is of the opinion that there are no rights to develop land in NSW, merely the right to lodge a development application which is then assessed on its merits. However, this issue needs clarification as there is a transfer of development rights scheme in the City of Sydney for the preservation of heritage buildings (as mentioned above).

One problem with these last two is the need to establish development rights. In rural land, it is widely held that there is no right to develop land and the only right is to lodge a development application. Is it not contradictory that we give a right to develop land to a certain height in the City of Sydney but not for rural land? Shouldn't the same principle apply across the board?

4.3 Education / Right to Farm

Right to farm legislation basically allows farmers to have a right to continue farming as long as they are carrying out "good management practices" even if there is a loss of amenity for surrounding rural residential uses. It precludes surrounding rural residential

dwellers from suing in the courts for nuisance caused to them by the farm noises, odours or dust. This means that the farmer has to have the right to override the environmental pollution legislation, particularly in relation to noise control. This is a good concept in theory but in practice is difficult to implement effectively as it does not provide a solution for both sides of the problem. The farmer is able to continue operating but the surrounding rural residential users have not solved their amenity issue.

Of these three, only land use zoning is practiced in NSW. Although, Tasmania has Right to Farm legislation, its effectiveness as a tool to preserve agricultural land has been questioned because it doesn't override the environmental pollution legislation. Western Australia has a system of mediation for rural land use conflict. Purchase of Development Rights and Tradeable Development rights are not used for the recognition and preservation of agricultural land in Australia. However, it is considered that there should be an investigation into their applicability or modification for the Australian political and social environments. It may be that one, two or a combination of them or a modified version is applicable, but without investigation it will not be known.

5 Zoning of Rural Land

Rural land is a resource, it is not a commodity. It is a resource that is dwindling in the Sydney region as urban expansion moves further westward. This can be done using a suite of land use zones. Basically, there are 5 broad zones that should be used which are as follows:

- Agriculture
- Rural Landscape / Mixed Use
- Nature Conservation
- Rural Living
- Rural Fringe

The methodology that has been developed identifies the land based on a combination of its current land use, the amount of fragmentation, its agricultural land suitability and proximity to urban development.

The preparation of a strategy should precede any consideration of a new zoning regime. The strategy should include reference to the zones as well as the concepts of Ecologically Sustainable Development. The exhibition of the strategy should also have highlighted any other issues that are to be considered

5.1 Issues to Consider

Planning for the preservation of rural land is a complex issue. One cannot consider any of the issues in isolation of each other - they need to be considered together. The relevant issues can be grouped into 2 broad headings of:

- Environmental opportunities and constraints
- Social and economic factors

Underlying all of the issues is the philosophy of Ecologically Sustainable Development (ESD) and Total Catchment Management (TCM). It is shown graphically in figure 1. The arrows on the figure show that all of the issues are interrelated and one cannot be considered in isolation from the other.

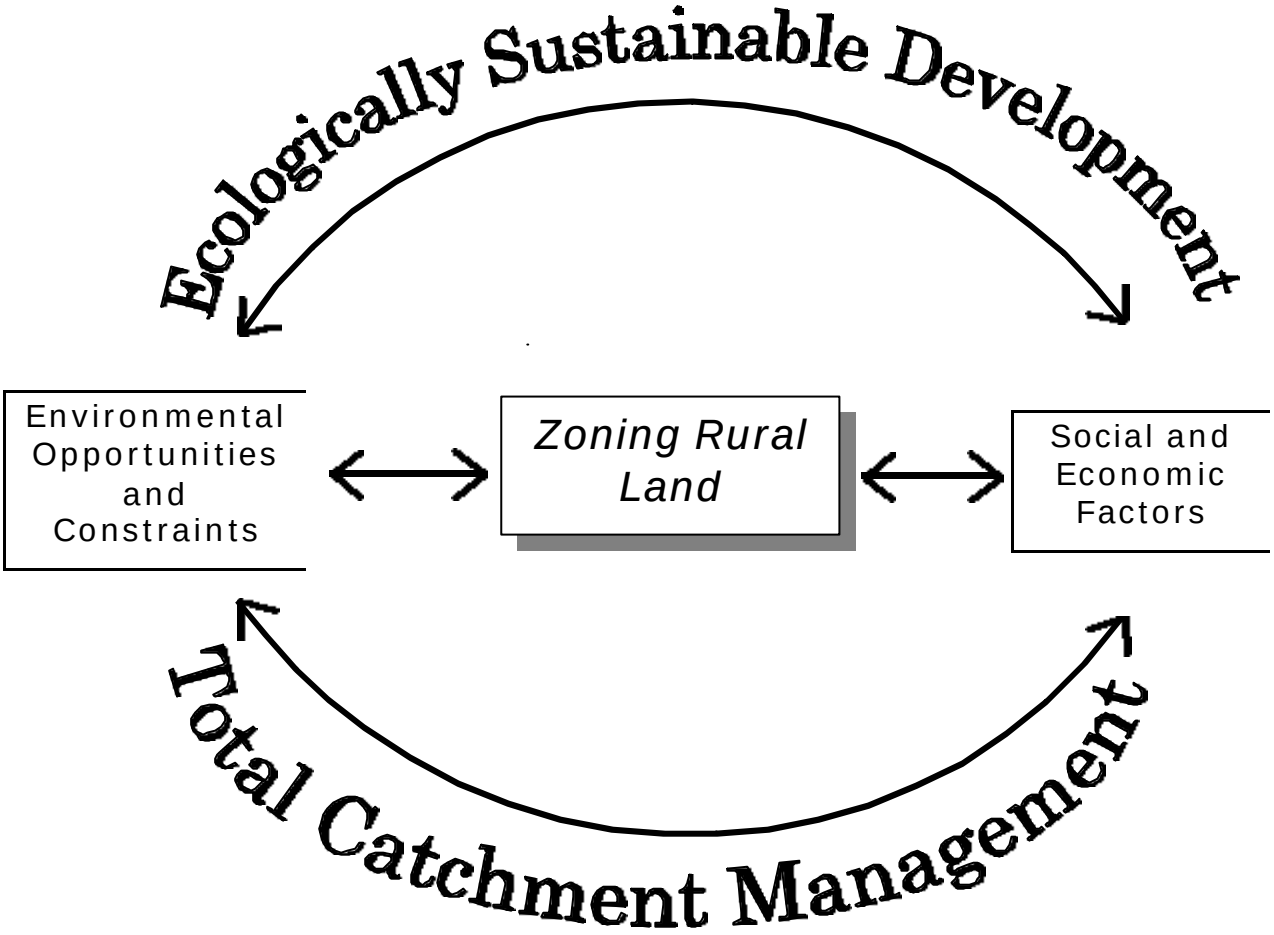

Figure 2.1: Issues and Themes for the Rural Lands Study
Source: Sinclair 2000

There is a need to consider the range of lot sizes, land use, land suitability, locational factors, location and extent of native vegetation areas, the critical mass of agricultural land and other issues related to a rural uses. All of these must be considered when developing planning policies for the retention of rural land. Most importantly, there must be a detailed land use survey and lot size analysis so that a clear understanding is gained of the location, holding size and spatial distribution of the rural land uses. It is also necessary to gain an understanding of the extent and significance of the areas of native vegetation so that such issues as habitat linkages and the 'edge effect' can be considered.

The utilisation of landuse zoning to segregate landuses is a commonly used practice in New South Wales and Australia. In rural areas however there has generally been one or 2 generic type zones that have been called a "rural" zone. One of the major reasons for zoning an area is to preclude or regulate specific uses that are considered

to be not in keeping with the general amenity of the area and to implement any aims and objectives that are outlined in the strategy.

Zone names such as residential, commercial and industrial are used to identify a list of specific land uses that are permissible in a particular location. Rural zones are often less specific. The term rural describes a character, not a use. It is therefore appropriate to use a zone name that provides an indication of the uses that are carried out within that area.

Zoning can also be used to identify the major objective for any future as well as existing development in an area for example, if an area is of high conservation status then a zone name outlining this is also appropriate.

As a basis for a future response in a new Rural Lands Local Environmental Plan, a methodology based on a combination of existing land use, lot size and physical features as well as proximity to services and infrastructure was used.

The use of landuse surveys and lot size analyses can be used to identify appropriate designations for certain lands as a foundation for future zoning. The landuse survey is used because it provides an overview of the existing landuse pattern within an area and therefore gives an indication of the predominant landuses which should be conserved. Is important to consider the size of the lots within an area because the existing fragmented lot patterns contribute to rural land use conflicts and the ability of the area to be protected from such a rural landuse conflicts.

There is also a need to have a good understanding of the extent and significance of the native vegetation in the area. This will enable the conservation and preservation of the biodiversity of the area being studied.

5.2 Data Collection

The basis of this zoning technique is to gather good, accurate and relevant data about the land to be studied. This will allow the compilation of opportunities and constraints. Without this the outcome will be flawed. It is not the intention to go into a lot of detail about data gathering and survey techniques. The basic data requirements for identifying the land use zones are:

- physical characteristics and hazards;
- land use, tenure and size, cover and quality; and
- social and economic data.

Physical Characteristics and Hazards

Physical constraints should include slope, drainage, flooding, land stability and areas of land degradation and salinity as well as bushfire prone areas. It should also include heritage (both Aboriginal and non Aboriginal), landscape and natural resources including minerals and sand. This information should be mapped, preferably on a Geographic Information System (GIS). The maps can then be combined to form constraint maps to aid in the analysis of the land to prepare strategies.

Land Use, Tenure and Size, Cover and Quality

Land use information is one of the most important and is linked to lot size and ownership. These should be entered into an electronic data base that can be linked to a GIS for mapping and also to allow cross tabulation of land use by lot size. These can then be graphed as shown in figures 1, 2 and 3, which have been taken from the recently published Penrith Rural Lands Study.

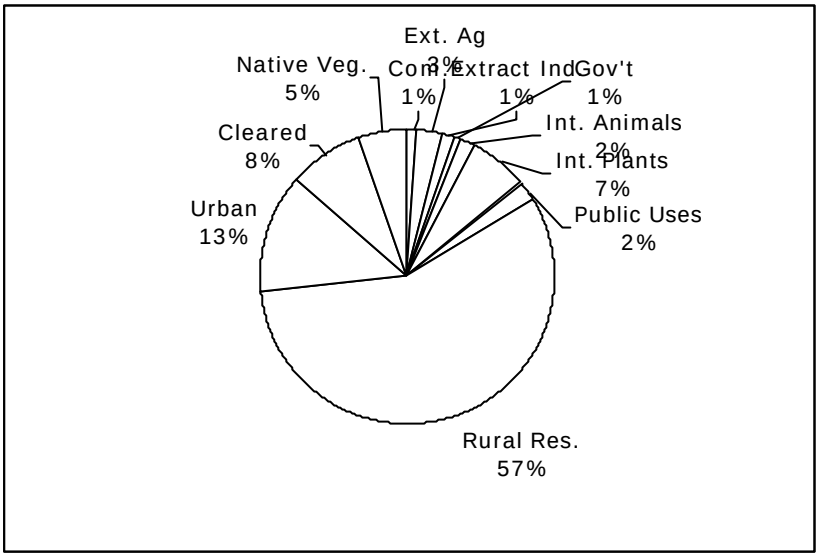

Figure 1: Total Land Uses for Rural Penrith

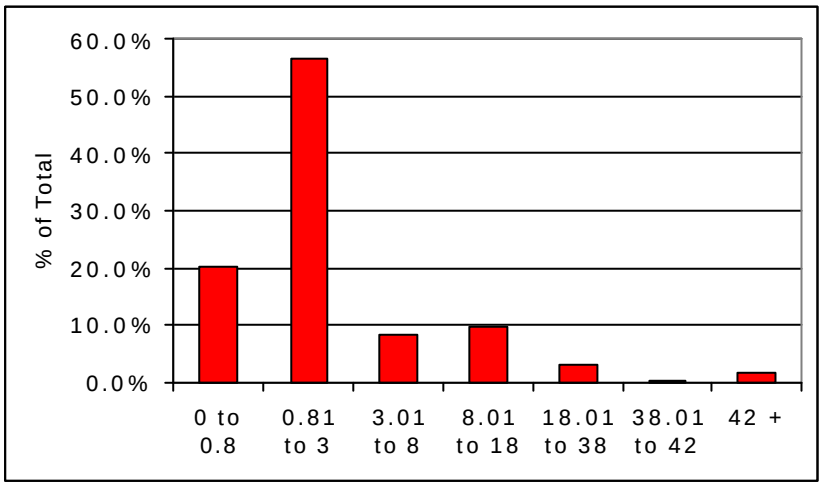

Figure 2: Total Lot Sizes for Rural Penrith

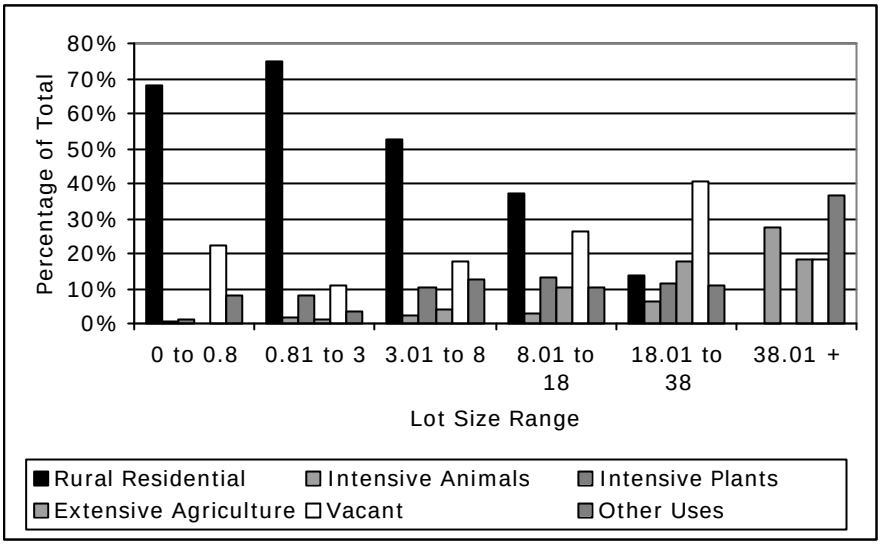

Figure 3: Land use by lot size for Rural Penrith

Land cover and quality refers to vegetation, agricultural suitability and rural capability. This too should be mapped. It is important to distinguish between agricultural suitability and rural capability mapping. Agricultural suitability mapping refers to the physical, social and economic issues for the location of agricultural land and should be only used on a Shire-wide basis, not for single properties. Rural capability mapping refers to the physical capabilities of land to sustain certain uses such as cropping, grazing and the construction of buildings and roads. Thus, it can be used for single properties.

The preparation of a land use survey is one of the most important components when zoning rural land. Each parcel of land within the study area must be inspected and given a land use designation. The first step is to identify a spatial boundary for the study area. The geographical localities are the best means of identify in the basis for data collection. This has two benefits, the first being that the area is generally mapped and can be identified easily and secondly it is easier for the public to understand the data once it has been collected and published.

The next step is to identify the categorisation of the land uses to be surveyed. The land use should be categorised into primary and secondary land use categories. The primary land use categories are as follows:

- Rural Residential
- Intensive Plants
- Intensive Animals
- Extensive Agriculture
- Vacant
- Commercial
- Extractive industries
- Public Use
- Villages or Towns

Within each of the primary categories mentioned above, secondary categories are identified based on the specifics of the area.

Lastly there is a need to identify the lot size ranges within the rural areas. This should be grouped into ranges that allow an identification of the dominant lot size, bearing in mind that there are a number of lots that are smaller and larger than this. The recommended lot size range and the dominant size are outlined below:

- 0 to 0.8 ha (4000 m^2)
- 0.81 to 3.0 ha (2 ha)
- 3.01 to 8 ha (4 ha)
- 8.01 to 18 (10 ha)
- 18.01 to 38 (25 to 30 ha)
- 38.01 to 42 ha (40 ha)
- 42 ha and larger

It is important to be consistent with the data collection so that areas can be compared.

Social and Economic

The social and economic data relates to the population size and age as well as social indicators and trends. The make up of the local economy and the contribution of the various components is also important. Other data about the local community is also useful in the preparation of strategies.

5.3 Methodology

The methodology will allow for the identification of land that is best suited for the following designations:

- Agriculture
- Mixed Uses
- Landscape
- Biodiversity Conservation
- Rural Residential

When applying the methodology, it is best to start with the identification of the agriculture areas. Then the other areas can be identified based on the uses and environmental and physical attributes.

The methodology is basically a sieve one and is outlined in point form below:

1. Data Gathering
   - Land Use Survey
   - Lot size analysis
   - Slope mapping
   - Fauna And Flora Study / Vegetation cover
   - Soils mapping
   - Drainage and Catchments
   - Agricultural land classification
   - Landscape features
   - Water quality and quantity

2. Identify Constraints
   - Urban expansion areas
   - Rural residential areas
   - Intensive agricultural uses
   - Land use conflicts
   - Native vegetation areas
   - Water courses
   - Steep land

3. Identify Land Units
   - Similar topographic features
   - Clusters of land uses

4. Assess Agricultural Potential
   - Identify high class land
   - Rank areas for land uses
   - Identify lot sizes and land uses
   - Assess the ability of the land to continue producing agriculture if it is to be an agriculture zone.

5. Consider the Appropriate Zone
   - Agriculture
   - Mixed Use / Agricultural landscape
   - Nature conservation
   - Rural living
   - Rural fringe

The application of the methodology will lead to the identification of a number of areas which have similar attributes that can then be designated as land use zones or as the basis for places if a place based approach is to be undertaken.

5.4 Rural Land Units

In order to identify the most appropriate future land management controls, the methodology used identifies a series of land units. These land units are areas which are contiguous, have similar characteristics and are generally homogenous in nature. These characteristics can be topographical, the abundance of vegetation, the similarities in landuses, land tenure, landscape character or the like.

There are five broad rural land units which are as follows:

- *Agriculture*. This land unit has a combination of large lots, existing agricultural production and high class agricultural land.
- *Rural Landscape*. The landscape character is the dominant element of this land unit. It has a variety of uses ranging from intensive agriculture, tourist facilities, extensive agriculture and rural residential.
- *Native Vegetation.* These areas have a significant amount of native vegetation on them and are crown land and are in the north of the study area.
- *Mixed Rural uses*. This land unit has a small lot size of approximately 2 ha and has a mixture of rural residential, rural business and intensive agriculture.
- *Rural Living*. Residential use of the rural land is the major use in this land unit.

These land units can then be translated into zones or can be used to determine 'places' if a place based approach is to be taken. A slight change in some of the names is necessary to give the zone names more relevance and to link them to the objective to be used. The name changes and suggested zone lettering, which is based on 1 being the number for rural and 7 for environmental protection, is as follows:

Agriculture 1 (a)
Rural Landscape 1 (r) or (l)
Mixed Rural 1(m)
Nature Conservation 7(n)
Rural Living 7(l)

Rural Fringe can be 7(f) or a residential zone for 4000 m^2 if that is sewered.

6. Conclusion

The conservation of rural land is a major issue facing planning in Australia today. There is a need to address statutory and non-statutory mechanisms in conjunction with each other.

A methodology has been developed which uses the land uses and capability as key indicators of the zoning. It is based on good data gathering using a land use survey to get the details of the current uses.

The application of such a methodology in conjunction with non-statutory mechanisms will allow us to achieve a balanced future and become more sustainable.

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