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## The concept of prime agricultural land : a Western Australian perspective

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# **The Concept of Prime Agricultural Land A Western Australian Perspective**

**V.T. Read**

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## **Disclaimer**

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

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## Preface

In the past resource planning by Government authorities in Western Australia has been concentrated in urban areas. The rural areas were referred to as non-urban and planning outside of country townships was confined to special rural zones. These zones were determined by the State authority (Town Planning Department) and were intended to limit the extent of farm fragmentation so as to control servicing costs and possible conflict.

The new State Planning Commission is expected soon to introduce the requirement of rural planning strategies for Local Government Areas where demand for land subdivision is high. The strategies will be based on physical, social and economic information and will be compatible with regional and State planning strategies. These Local Governments will have responsibility for the implementation of their own rural planning strategy.

The impending change in planning procedure for rural land has promoted the issue of agricultural land protection in this State. The protection of good agricultural land has previously been included in policy statements. Now, prime agricultural land will need to be identified and protected from non-agricultural uses.

The following report discusses a range of issues that are considered to be significant to the concept of prime agricultural land in Western Australia. It concludes with a definition of prime agricultural land which should assist in the planning procedure.

The location of prime agricultural land in Western Australia will be described in a separate report.

# 1. Agricultural Land Protection

## 1.1 Introduction

The protection of agricultural land is an emotive issue presented in the guise of rationality. Before a useful concept of prime agricultural land can be clarified, it is important to at least briefly analyse the motives for agricultural land protection (Chpt. 1). This will assist in the understanding and selection of criteria that are important in developing the concept of prime agricultural land (Chpt. 2).

An outline of an appropriate concept for prime agricultural land for Western Australia will be given (Chpt. 3).

Comparison is made of approaches to the protection of agricultural land between the Australian States and with overseas countries (Appendix 1).

## 1.2 Distribution of Resources

The population of the world was estimated to be 4.0 billion people in 1975 and is expected to rise to 6.3 billion by the turn of the century. Quite clearly, the requirements for the products of agriculture will be increased. The capacity to provide for this increase depends upon:

- the availability of land and water;
- increased productivity of existing and new crop types;
- willingness to adopt new technology; or
- international trade and co-operation.

While the availability of water and land may be the ultimate limit, the more immediate cause of hunger and malnutrition is the inequitable international distribution of resources. Many developed countries now produce an oversupply of some commodities which are not equitably distributed due to the perceived need to protect the agricultural industries of the producing countries by maintaining high commodity prices. Developed countries with a high consumption level of imported goods and services use agricultural exports to rectify their balance of payments. Consequently, food resources are available to the more populous and less wealthy nations at a cost which is proportionally large in relation to their economies.

Alternatively, resources may be redistributed through foreign aid programmes although these may be unreliable and are subject to manipulation by the donating country in favour of their own market requirements.

Apart from political and economic complexities, the most effective method of ensuring the adequate and equitable distribution of food and fibre resources is by technical and managerial assistance to those countries that are less advanced. Many of these countries have a tropical climate where the potential to increase productivity is probably greatest.

Agriculture in Western Australia is based on a dryland system using soils which are infertile by international standards. The potential to increase productivity to provide for the anticipated

increase in world demand for agricultural products is not high when compared with other areas. This state can best take responsibility by continuing to provide expertise in dryland farming systems.

### 1.3 National economic stability

Australia has been dependent upon agricultural exports since European settlement. The significance of agricultural commodities to the national balance of payments is compared with other industries in the following statistics:

- total value of exports for 1985/86 was \$32,818 million
- wheat contributed 9.0% to total value of exports)
- wool contributed 8.6% to total value of exports) = 22.3%
- meat contributed 4.7% to total value of exports)
- coal contributed 15.9% to total value of exports
- alumina and aluminium contributed 7.2% total value of exports
- petroleum, oils and products contributed 7.1% to total value of exports
- iron ore and concentrates contributed 5.9% to total value of exports

(Source: ABS records)

The major agricultural products are grown extensively across a wide range of land types. Reductions in grain prices and threats to meat exports over environmental standards has emphasized the need to diversify the broad export base. This includes the development of additional agricultural industries.

During the 1983/84 season, Western Australia produced 12.7% of the gross value of agricultural production for Australia. Table 1 shows the high dependence by Western Australia upon a narrow range of crops when compared with other States. Wheat, oats and barley contributed 75.8% of the gross value of principal crops and pastures in 1985/6. Both the National and State economies would have increased stability by a more diversified production base. The protection of agricultural land resources that provide the opportunity for this diversification should be a significant factor involved in rural land use planning.

**Table 1. Percentage of gross value of principal crops and pastures derived from wheat, oats and barley in Australia**

W.A.	N.S.W.	Vic.	Qld.	S.A.	Tas.	Aust.
75.8	53.3	36.6	23.7	59.4	4.4	47.1

(Source: ABS, 1985/86)



## **1.4 Security to society**

Many people in any country perceive the land as the source of their food and fibre requirements for living. Any decrease in the resource base destabilizes the associated psychological security. This is well exemplified by the United Kingdom where food supplies were seriously limited during World War II.

Agricultural land was subsequently zoned for exclusive agricultural use and high priority was given to achieving self-sufficiency in agricultural produce.

For these purposes, agricultural land adopts a 'sacred cow' image which may disadvantage alternative uses of rural land. The concept of self—sufficiency for agricultural commodities at the State level in Australia is not justified as it encourages inefficiencies in some sectors. The land should be used within its capability so commodities that are grown on more suitable land in other areas can be traded without seriously effecting social security.

The energy crisis during the 1970's led oil—importing nations to seriously consider their land policies. Suggestions were made to evaluate land on the basis of energy efficiency (Wood, 1976 and Raup, 1976).

The potential for energy crops in Australia has been assessed (Nix, 1978 and Stewart et al 1979). Although the conversion of coal to methanol is less costly than the conversion of renewable resources, there are advantages in retaining the option to produce energy from both sources (Stewart et al 1979). With growing concern about major climatic changes in response to increased atmospheric concentrations of carbon dioxide, there would be greater benefit to social security through environmental quality by producing fuel from a source that re-cycles CO<sub>2</sub>. Both cereal grain residues and sugarcane are relatively efficient when converted to liquid fuel (Stewart et al 1979). Land in Western Australia that is available for cereal grain production is not in short supply and the construction of the Ord River Dam has provided the potential to produce sugarcane.

## **1.5 Farm efficiency**

Farming properties that are located in areas where the demand for urban or small—scale farm development is high, may become relatively inefficient. This can be due to inflated values of the land which diminishes the returns on capital invested, and makes farm build-up more expensive. It can also be due to the uncertainty of whether to continue the farm enterprise as may be experienced by land owners in these areas so that they avoid further investment in capital items to improve farm efficiency.

Planning and adequate protection for agricultural land would reduce speculation and uncertainty.

## **1.6 Conservation of natural resources**

As the more productive land is removed from agricultural production, the same level of production is maintained by including other areas with lower land capability or the level of production is intensified on land that is currently farmed. Clearing more land on private property is at risk of exacerbating salinity problems in many areas. The release of further

Crown Land for agriculture to compensate for production losses would be a risk as the capability for agriculture of available land is generally considered to be marginal.

To achieve and maintain sustainable levels of agriculture on existing agricultural land in Western Australia, there should be no unnecessary pressures to use the land beyond its capability. The better rural land should be reserved for agriculture to reduce the requirement to use land beyond its capability.

### **1.7 *Free-market or controlled land—use***

There are many advocates of the free-market value of land as being the best resolution of land-use conflict. This is demonstrated to be inadequate as conflict remains in relatively unrestricted economies. Free-market forces may make economic sense for the use of capital but do not provide community requirements for open space, nor prevent land degradation by the transfer of land use priorities to less suitable areas.

When compared economically with major land developments, agriculture is almost always the least favoured option. Where land has value for purposes other than the immediate investment value, then protection is required.

### **1.8 *Private and public rights***

The conflict of rights to the use of agricultural land in Western societies is perennial (Engel, 1975; Millar, 1979 and Smith, 1986). Owners of rural land seek the right to use it according to their own discretion. In the United States of America, these rights have materialized into compensation payments when they are denied, or into tradable commodities in some of the States.

In Western Australia, the conversion of rural land to urban and industrial uses is not rapid by international standards. The annual expansion of the urban area of Perth is by 1000 ha. The more significant conflict here is caused by the high demand for a rural lifestyle close to urban areas as well as by recreational farming. The public without entitlement to rural land, claim an opportunity to enjoy a rural lifestyle equal to that of private landholders who have inherited or otherwise obtained the right.

Subdivision of agricultural land for recreational farming purposes usually results in the removal of that land from being a contributor to the value of agricultural production. However, a few small-scale landholders are genuinely interested in intensive production or managing the property to its physical capability by extensive agriculture. They can make a significant contribution to the local rural community.

Bona Fide small-scale farmers with a ready supply of capital may make better use of high quality agricultural land by intensive production than extensive use by larger scale agriculture. Unnecessarily stringent protection of large-scale agricultural land holdings may not provide these opportunities.

## 2. The Components of a Definition for Prime Agricultural Land

### 2.1 Introduction

The preceding discussion has shown a strong but not mandatory requirement to protect the best agricultural land from non-agricultural uses. The word 'prime', which is commonly adopted, implies that this land is better than the land with which it is being compared. Accordingly, the term only becomes meaningful when discussed within a given spatial context. For example, prime agricultural land in the Local Government Area of York is not necessarily prime land in Western Australia and is unlikely to be prime by international standards.

The definition of prime agricultural land for local and regional scales is paramount to the rational protection of agricultural resources. The areas identified according to a definition may be zoned for exclusive agricultural use or otherwise have incentives to discourage alternatives uses. This amplifies the importance of having a definition that allows the land to be evaluated for community requirements as well as for agricultural use. Community requirements may include such factors as environmental quality, decentralized population centres or robust local economies.

The intuitive assumption about land evaluation is that it is based upon soil type. While soils undoubtedly are significant, it is more useful to adopt the broader term of 'land' which is inclusive of the soils, landform, geology, hydrology, vegetation, local climate and major modifications by man.

A definition of prime agricultural land may aim to be broadly stated but irrefutable, or it may be precise. Unnecessary precision may deter from the usefulness of a definition. The objective measurement of the physical capability of the land is a variable procedure that is dependant upon available information or the ability to carry out further resource inventories. The Land Inventory and Monitoring (L.I.M.) division of the Soil Conservation Service (U.S. Department of Agriculture) has defined prime agricultural land using nine objectively defined sets of physical characteristics. All of these need to be acceptable for a prime classification (Fenton, 1975). This level of precision assumes that the objective categories of the definition are best for all agricultural land uses whereas they were selected for a single dominant commodity (e.g. corn). It also assumes that the required level of information is available. Soil surveys in Western Australia have not been consistent in the past because the reasons for which they were conducted differed. They were usually for specific crop requirements (e.g. tobacco) or for specific area requirements (e.g. on the Swan Coastal Plain for irrigation). The land capability surveys currently undertaken by the Division of Resource Management of the Western Australian Department of Agriculture would have substantial variation of the factors specified by the L.I.M. definition within the mapped units.

To restrict the definition of prime agricultural land to the objective measurement of physical capability of the land would be to overemphasize the scientific function when it is a policy statement based upon land suitability that is sought. The suitability of an area considers social and economic factors in addition to physical capability.

The limitations of a narrow, objective definition have been discussed by Wood (1976). These limitations include the assumption of uniform land requirements by agriculture when agriculture is far from a homogeneous practice. As the definition is usually designed for the major agricultural crops, it is presumptuous to assume that these are the best use of the land. A highly specified definition also ignores the important factor of flexibility in land use.

Wood points out the economic folly of adopting a narrow, specified definition. He suggests a range of alternative methods of less—specific evaluation but recommends a system which allocates a cardinal number on a scale of zero to ten for each significant variable involved in land suitability analysis. The variable values would be additive to give a site—related index. This approach is very similar to the one now adopted by the United States Department of Agriculture for the protection of agricultural land. The U.S.D.A. approach, called Land Evaluation and Site Assessment (L.E.S.A.) rates the agricultural potential (land evaluation) according to its land capability class, productivity and relative significance to the local area. It also rates the site (site assessment) according to geographical, infrastructural and planning factors. The value of the site assessment rating is double the value of the land evaluation rating. The L.E.S.A. system is described in detail by Wright (1984).

The process of mapping agricultural land that requires protection is usually adopted because it represents complex information in a comprehensible form. However, once an area has been mapped, it is unlikely that it will be re-mapped so the information represented by each mapped unit is fixed in time. The relative importance of factors used to develop map units may well change with time (e.g. those affected by changing technology) which reduces the effectiveness of the map.

Representation of information by map units strongly suggests homogeneity of all of the factors involved within each unit. It also over-emphasizes the boundaries. Environmental factors tend to change along gradients however map units represent this change as a finite but arbitrarily chosen line.

There is also the possibility that users of the map units will lose sight of the type of information represented and the scale at which it was obtained. This may result in an unreasonable interpretation of the units which exceeds the information content.

The combinational index used by the L.E.S.A. system provides an alternative to mapping areas of agricultural land that require protection.

Whether the classification of land results in mapped units or a combinational index, the factors that are involved need not necessarily differ. The range of factors that are probably relevant to the protection of agricultural land in Western Australia are discussed in the following sections. These are the factors that should be represented by a definition for prime agricultural land in this State. -

## **2.2 Agronomic factors**

Attributes of the land and its management (to produce agricultural commodities) that are significant determinants of growth and are measurable (directly or indirectly) make up the agronomic factors in the evaluation process. French (1986) has outlined key attributes for the assessment of land for dryland cropping. These also have relevance to irrigated agriculture. More detailed lists of agronomic factors are provided by Miller (1979) and F.A.O. (1976,

1983). Many of the attributes listed have not been recorded during resource surveys of Western Australia in the past. Some have been measured in more recent surveys although indirect estimates based on soil texture, structure and colour are used.

Some of the more significant agronomic factors are listed below.

### **Soils**

- the unimpeded depth of the root zone
- waterholding capacity in the root zone depth to a watertable
- infiltration rate
- drainage
- availability of macro— and micro—nutrients, or ionic concentrations.

### **Management**

- marginal rate of production increase in response to artificial fertilizer application crop yield per 1 mm of water use
- capacity to store water above ground or exploit water resources underground
- impediments to field operations (e.g. steep slopes, drainage lines, bogginess, stoniness, rock outcropping).

## **2.3 Environmental factors**

While the agronomic factors are closely related to the environmental factors, they are significant at a scale that affects individual farm land-use decisions. The following factors also have managerial significance at a regional scale (i.e. water catchment, Local Government Area or larger).

- climate
  - monthly rainfall (intensity and variability)
  - monthly vapour pressure deficit
  - occurrence of extreme temperatures
- water quality (Total Soluble Salt concentration)
- land degradation hazard
  - water erosion
  - wind erosion
  - loss of soil structure
- flood hazard
- susceptibility to drought
- air quality (e.g. SO<sub>2</sub> as it affects viticulture; or pesticide dispersion by spray drift or temperature inversions)

## 2.4 *Non—physical factors*

The occurrence of agricultural activities is partly determined by factors that are associated with market, industry or community requirements. The more significant of the non—physical factors are listed as follows:

- continuity of the supply of products which are not well suited to storage (e.g. table grapes, many vegetables) by a geographical distribution of production based on the time of harvest;
- size and location of markets (domestic and export);
- area of production required to maintain the viability of existing or proposed process—industries (e.g. canning or freezing plants). The term ‘critical area’ is used by some authors (e.g. Smit, 1981; Gustafson, 1981);
- area serviced by major public utilities that are specific to the industry (e.g. irrigation schemes);
- size of existing landholdings and the potential to subdivide;
- Significance of agriculture to the concept of open space.

## 2.5 *Economic factors*

“.... the concept of prime agricultural land rests in the final analysis on economic criteria, not on physical characteristics of the land” (Raup, 1976).

While economic factors are more complex to encompass within a useful definition, they are probably of overriding importance and cannot be ignored. The more significant factors are discussed below.

**Opportunity cost evaluation** - as the demand for land increases due to competing uses for a limited resource within a restricted area, its value rises. A threshold is reached where the returns to the investment value by even the most productive agriculture is exceeded and better resource utilization (i.e. profitability) may be obtained elsewhere. The (opportunity) cost involved to the landholder and to society by continuing agricultural is the income or pleasure foregone by that land not being available for other uses.

**Substitution of resources** - agricultural crops that have a narrow range of land requirements will be dependent upon restricted areas of production. Wheat is grown on a wide range of soil types where there is adequate and reliable rainfall. Land suitable for wheat production in Western Australia is not limiting and the loss of relatively small areas by urban expansion is unlikely to seriously affect the wheat industry in this State in the foreseeable future. In contrast, the production of some fruit types (e.g. cherries, stone fruits) are dependent upon an adequate quantity and quality of supplementary water as well as a sufficient period of low temperatures to induce flower opening. The occurrence of a combination of these factors in Western Australia is not widespread and other areas are not suitable for substitution.

**Flexibility of use** - land that is suitable to a wide range of agricultural uses is of value to all economies (farm, Local Government, State and National). When prices are depressed for

one commodity, another may be produced. This factor is modified by the restrictive nature of capital equipment required by some commodities. For example, an expensive harvester will be required if a grower were to produce potatoes in place of cauliflowers. This capital item would be left idle if the production priority were reversed.

**Externalities** - the benefits and costs to society that cannot be measured adequately by monetary values should still be considered for agricultural land protection. These include environmental quality, public open space, national heritage value of rural landscapes, the capacity for choice of land use in the future, and security to society in the visible existence of the resources that are most capable of producing food and fibre.

### 3. An Appropriate Concept for Western Australia

#### 3.1 Characteristics of agriculture in Western Australia

The most distinctive physical characteristic of agriculture in Western Australia is the inherent infertility of the soils. The 'Soil Resources' map sheet of the Atlas of Australian Resources (1980) shows the distribution of soils with least physical or chemical limitations (the A2 unit which includes red, and brown or yellow duplex soils without subsurface bleaching) to be confined to isolated areas from Northampton to Walpole with the largest area being associated with the Avon Valley. These soil types are more widely distributed in other States.

Infertility of soils has been avoided by using low input systems, by the use of leguminous crops and pastures and by the application of artificial fertilizers. The potential for high yields in extensive crops and pastures is limited as the marginal rate of return in response to fertilizer application decreases especially on the sandy textured soils which are dominant in the agricultural areas. The more intensive horticultural crops have higher marginal rates of return so the relative infertility of soils are a less significant factor.

The landforms of Western Australia are generally subdued and present relatively minor limitations to agriculture. Local relief and extensive rock outcropping are limiting to arable agriculture only in areas where dissection of the ancient Yilgarn Block peneplain on the uplifted western edge (i.e. along the Darling Scarp) is most recent.

The climate in Western Australia is well suited to growing cereal crops. It is also more consistent between years than in most other areas of Australia. The most reliable climate occurs west of an approximate line between Perth and Albany (Climatic Atlas of Australia, 1986). However the growing season is relatively short. Only on the southern coast does it exceed 9 months and it decreases to 3—5 months for most of the inland cereal growing districts. The atmosphere is relatively dry during spring which limits the potential yield that may be achieved but also facilitates low cost cereal production (i.e. relatively inexpensive weed control, harvesting and grain storage). Higher yields for more valuable crops require irrigation.

The availability of water for irrigation is from groundwater and surface storage. Groundwater supplies are used for horticultural crops in the Gascoyne basin and along the Swan Coastal Plain. Further inland, subsurface water is often saline or occurs in aquifers that have very low permeability.

Apart from the very large storage of the Ord River Dam (5.8 billion m<sup>3</sup>), the principal public irrigation schemes are supplied from water catchments in the high rainfall areas of the Darling Ranges with reticulation to adjacent incised valley's, the foothills and the Swan Coastal Plain. The schemes are as follows:

Collie River	5,799ha watered in 1984/85 season
Harvey	5,763ha watered in 1984/85 season
Waroona	1,758ha watered in 1984/85 season
Preston Valley	202ha watered in 1984/85 season

(Source: ABS)



Significant volumes of water storage on private land are associated with the deeply incised valleys and duplex soils in the Shires of Manjimup and Donnybrook. While the more economically efficient sites for water storage are currently in use, considerable potential still remains to increase the volume of storage for use on horticultural crops with high financial returns.

A significant limitation to agriculture in most areas is the potential for land degradation. Salinity and waterlogging of soils are the effects of rising groundwater tables following clearing. Wind erosion occurs in areas of high wind run (particularly in coastal regions) where there are light textured surface soils exposed during the dry summer months. Water erosion, loss of soil structure and increasing soil acidity also occur.

Western Australia does not have large areas of land in reserve for agriculture. Some areas north and east of Esperance have been suggested for agricultural use but the potential is not known and at best, will be marginal land. Some areas of uncleared land still remains on private land but this is generally of lower productivity. Further clearing in many catchments would exacerbate salinity and waterlogging problems.

The products of dryland farming systems in Western Australia are not diverse. The gross value of wheat production accounted for 83% of the value for all cereal crops and 72% of the total value of crops (including horticultural crops) grown during the 1984/85 season. The large scale of this system makes it a very efficient form of agriculture. While the typical farming system of cereal grain and wool production has considerable flexibility for management (i.e. the proportion of each commodity produced may be varied according to market values), there is limited potential for diversification.

The irrigated areas offer most potential to broaden the agricultural trade base. This may be by the intensification of existing horticultural crops or new industries (e.g. floriculture).

The growth of markets for agricultural products is dependant upon export opportunities. Domestic markets have either slow growth (2% per annum in Western Australia generally but 5% per annum for some manufactured products) or are competitively disadvantaged by distance to markets in other States.

Because of the relative isolation of Western Australia, the regularity of supply to markets from local production is important. The location of horticultural areas are from the Ord River Scheme, Carnarvon and Geraldton to the metropolitan areas, the Swan Coastal Plain and the lower south-west. The potential for extended market supply from a range of localities for some crop types (e.g. tomatoes, table grapes) exists and should remain available for development.

### **3.2 The demand for non—agricultural use of land**

The population of Western Australia is relatively small (1.3 million people, 1981 census) and has a growth rate of only 1.9%. Urban residential expansion requires approximately 1,000 ha annually (assuming a housing density to accommodate 40 people/ha). The expansion in the Perth metropolitan region is increasing the demand for rural land at Wanneroo, the Swan Valley, Gosnells, Serpentine-Jarrahdale, Kwinana and Mandurah.

A more significant increase in demand for rural land is being caused by the requirement for rural residential and recreational farming. In addition to the areas listed above, there is significant pressure for subdivision and rezoning of land at Busselton, Capel, Donnybrook, and Greenough.

The State Planning Commission recognizes the need for more flexibility in subdivision and zoning policies. The Commission also recognizes the requirement for the assessment of land suitability for a range of alternative land uses prior to additional subdivision or rezoning.

The assessment process for rural land suitability in Western Australia is developing. The Department of Agriculture has developed a five class land classification system which correlates the land requirements for a range of land uses with physical land qualities to provide a capability rating (Dixon, 1986). The integration of this information with social and economic factors to provide suitability ratings is still to be developed.

Where the classification has been applied, the priority of allocating land for non-agricultural use may be rationalized with respect to the local area. Where the classification has not been applied, land allocation depends upon the recommendations of town planning consultants, advice from district officers with the Department of Agriculture or policy statements from the S.P.C. Included in the policy statements is the requirement to protect prime agricultural land.

### **3.3 Defining prime agricultural land**

While the provision of a definition is appropriate, it should not be taken as a complete summary statement of the complex issues incorporated within the concept of prime agricultural land. The issues need to be developed individually and weighted according to their relative importance in the total concept. A definition does not provide for such judgment.

Prime agricultural land in Western Australia may be defined as:

*“ that land which occurs where the agronomic factors (e.g. soils and management) and environmental factors (e.g. climate, water quality and availability) combine so that the value to society from agriculture is greater than the value from alternative uses of the land.”*

There are some circumstances where land is prime according to the definition but may not obviously be so. Alternatively, land may not be defined as prime but should be attributed the same protection status as prime agricultural land because of its less obvious agricultural value. The value of land to society is composed of both monetary and externalized values. The circumstances of less obvious agricultural land value is due to a greater emphasis of externalized value. Such circumstances are as follows:

- areas that are serviced by significant public infrastructure (e.g. irrigation and drainage systems);
- areas that are limited in area and have specific land qualities for the production of a crop type that is required to maintain the viability of a processing industry;
- areas that are significant for the continuity of supply of a product to domestic and export markets.

Land described by these factors is fundamental for the continued existence and growth of industries related to agriculture so should be protected as prime agricultural land.

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## Appendix 1

### AGRICULTURAL LAND PROTECTION ELSEWHERE

#### i Introduction

The following sections discuss the definition and identification of prime agricultural land and land protection in other Australian States and overseas. To an extent, this has recently been undertaken by Smith (1986) who compared case studies from U.S.A., Canada and the U.K. with Australia. Unnecessary duplication of this document will be avoided.

#### ii Other States in Australia

##### *New South Wales*

Rural land in N.S.W. is classified under two separate systems. The Soil Conservation Service uses an eight class system to classify soils on the basis of their limitations to agricultural productivity. This is described as land capability mapping.

The N.S.W. Department of Agriculture classifies land according to the five class system which is described in the Rural Land Evaluation Manual (Woodward and Neilson, 1981). This system was construed following the introduction of the Environmental Planning and Assessment Act (1979) which includes the requirement for planning of agricultural land. While this system is based on physical factors, it also incorporates social and economic considerations that are significant to production (i.e. land suitability assessment).

The policy for protection of agricultural land by the Department of Agriculture is ‘... to support the retention of good agricultural land for commercial food and fibre production. Such agricultural land is defined as being Classes 1, 2 and 3, as described in the Rural Land Evaluation Manual, plus special purpose lands as defined by the Department of Agriculture’ (Department of Agric., N.S.W. 1984).

Class 3 land in the R.L.E.M. is described as follows:

“Land suitable for grazing - well suited to pasture improvement and can be cultivated for an occasional cash or forage crop in conjunction with pasture management. The overall level of production is moderate as a result of high environmental costs which limit the frequency of ground disturbance. Has a moderate capability for agriculture. Pasture land capable of sustained high levels of production, although conservation measures may be required”. Classes 1 and 2 describe more intensive agricultural uses.

To define areas that should be retained for agricultural production in this way is excessively comprehensive. If applied in Western Australia, most of the agricultural areas would be included with the exception of some areas that are not suitable for cultivation (i.e. too steep or excessive rock outcropping). Because there is no apparent shortage of land included in the first three classes, this approach is not necessarily appropriate for agricultural land protection in Western Australia.



The policy has been adopted by the N.S.W. Department of Environment and Planning for the North Coast Region of that State (Dep. Env. and Plann., 1985). Zoning is recommended to protect this agricultural land which is estimated to include at least 20% of the Region.

The N.S.W. Department of Agriculture policy recognizes the family owned farm as the basic unit of production. This basis is used to estimate the minimum area for subdivision in relation to zoning and land use in North Coast Region (Appendix A of Dep. Env. and Plann., 1985).

### **Victoria**

Victoria has two systems of land classification for rural land. The former Soil Conservation Authority (now Land Protection Service within the Department of Conservation, Forests and Lands) initiated a five class classification system for which predetermined land units are assessed on the basis of requirements for specific land use activities and requirements for soil conservation (Rowe et al 1981). The main uses of this land capability information is for planning purposes.

Agricultural quality is assessed by the Department of Agriculture for rural municipalities according to the Rural Mapping Guide produced by the Ministry for Planning and Environment (1982). Agricultural Land Units are defined and delineated in terms of the following factors:

- existing land use
- productivity
- versatility
- non—physical criteria

The units are then rated on the basis of productivity and versatility assuming consistent good management. Detailed primary environmental information (e.g. soil type, slope, climate) are not directly considered.

The non-physical criteria are summarized as follows:

- location in relation to markets, receival points etc.
- machinery use limited by topography very limited extent of agricultural unit
- irrigation potential
- salting problems
- small size of holdings
- special zonings
- soil conservation controls on land use
- existence of production quotas.

These criteria are some of the social and economic factors encompassed in a land suitability assessment.

This approach to land quality assessment has been used for mapping rural land in the Shire of Otway (Ministry for Plann. and Env., 1984) and in Gippsland (Swan and Volume, 1984). The Shire of Otway report recognized that there is no published policy on the use of agricultural land<sup>1</sup> but recommends that “areas of very high agricultural quality be preserved and maintained for future agricultural use”. It also recommends that “.... the bulk of high quality land be retained for agriculture”.

- irrigation schemes
- drainage schemes
- freehold forestry
- extractive industry
- urban development
- public land.

Five classes of agricultural land and one class of non-agricultural land have been defined by these criteria (Swan and Volume, 1984). While there is no specific recommendation to retain the best classes for agricultural purposes, the general implication is that this should occur.

The Gippsland report also includes a list of factors that should be considered by planners when using the assessment. Some of these factors are:

- location of land in regard to markets
- the provision of supporting infrastructure
- variability of markets
- technological change
- specific requirements of some agricultural land uses
- the demand for land
- maintaining sizeable areas of good equality land.

It is debatable whether these factors should be an inherent part of the land suitability assessment or whether they should be considerations made by planners. The resolution depends upon the requirements of the planning authorities.

In Western Australia, land classification is similar to the approach of the Land Protection Service.

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<sup>1</sup> The factors that were included in the Gippsland study of agricultural land quality are as follows:

Although there is no formal agricultural land use planning policy in Victoria, guidelines have been developed (Hamer, 1982). The guidelines recognize that the supply of good agricultural land is limited and recommends priority for agricultural use where there is an optional location on lower quality land for a proposed non-agricultural use.

The State Planning Commission of Western Australia is seeking an assessment of land which includes all of the relevant physical, social and economic factors that determine high agricultural quality. Areas defined by such an assessment would probably be excluded from alternative uses. This approach differs to that of the Victorian planning authority where a basic assessment of high quality agricultural land is required and planners interpret this assessment by taking into account the additional social and economic factors.

### ***Queensland***

Concern has been expressed at the rate at which agriculture is being displaced from the coast to the less productive areas of Queensland due to urban expansion and the increasing demand for rural—residential lot sizes. The sugar, dairying and horticultural industries are most susceptible as they are dependent upon specific land requirements (Leslie and Johnston, 1982).

Agricultural land is controlled by zoning. Four zones determine the minimum subdivision size allowed. The location of zones is determined by each local authority in strategic and development control plans. These plans are reviewed every seven years and are subject to intermittent rezoning so long term protection of high quality agricultural land is not necessarily guaranteed. The control of subdivision and rezoning is in relation to each local authority which does not provide for more regional or State—wide land protection requirements.

The Department of Primary Industry has no specific policy on agricultural land protection but advises local Government authorities on subdivision proposals. Land has been classified according to suitability criteria into five classes. However subdivision proposals are not necessarily evaluated in relation to these classes. Instead, there is a general policy of having no lots smaller than 20 ha and approval for subdivision depends largely upon the local agricultural land requirements.

### **iii Overseas**

#### ***United States of America***

The U.S.A. currently has about 140 million ha of what is broadly described as prime land (McCracken et al., 1985), which is 23% of all non—Federal land. The area of land used for cropping was approximately 190 million ha in 1982. The rate of loss to other uses from the crop land is about 0.4 million ha each year (NALS, 1981). Tankersley (1981) has noted that by the year 2030, the U.S. will require 185 million ha of cropland to meet domestic and foreign demands for food and fibre. Data given by Hexam and Anderson (1984) suggests that over 100 million ha of potential cropland still remains available for use. While this may not all be described as prime, there is clearly no shortage of good agricultural land nationally.

Concern for the protection of agricultural resources became significant during the 1970's due largely to the world energy crisis. The U.S. was made aware of other possible major demands on agricultural land to produce such commodities as liquid fuels and rubber during an international crisis.

The concern resulted in a national seminar on the retention of prime lands (U.S.D.A., 1975) at which the concepts involved were developed. The National Agricultural Lands Study

(1981) subsequently estimated the rate of rural land conversion to other uses and recommended a national policy for control.

The response to public concern over the loss of agricultural land has been on a State basis. Some States are seriously concerned about the loss of land while others are concerned about the possible loss of their high ranking trade potential. For example, it is claimed that 80% of the cropland in the State of Illinois is prime and that this State provides more than one-tenth of the Nations food supply and over 17% of its exports (Block, 1981).

The approach to the protection of prime agricultural land has varied but has been dominated by the demand for compensation where development rights are foregone due to regulation (Gustafson, 1981). The range of protection policies is summarized in Table 2 and discussed further in the Soil and Water Conservation News, May 1981.

There is still no National policy on agricultural land protection. The approach being adopted by the Soil Conservation service of the U.S.D.A. to resolve the conflict of urban encroachment on rural land is the L.E.S.A. system, previously described in Section 2.1. This system rates the productivity of the land for agricultural production separate from other non—physical factors. The rating of land productivity, is based on the following factors:

- (potential ratings for each mapped soil unit in an area being considered (McCormack and Stocking, 1986);
- land capability classification based on the limitations of soils to crop and pasture production;
- the ranking of agricultural land as ‘prime’, ‘unique’ or ‘important’;
- relative importance of the size of the area being considered.

For these purposes, ‘prime’ land is that which produces the highest yields with the lowest expenditure of energy and economic resources and the least damage to the environment. ‘Unique’ land is that which is required for the production of specific high value crops. ‘Important’ lands is a term used by some State or Local Governments and has a similar meaning to ‘prime’.

### **Canada**

Information obtained by the Canada Land Inventory has shown that only 8% of the total area is suitable for crops with a further 5% being suitable for pastures (Nowland and McKeague, 1977). The shortage is further exacerbated by the coincidence of the best agricultural land and urban development, particularly in the Windsor-to—Quebec corridor and the Niagara fruit belt (Davidson, 1984). A case study of the Waterloo Region in Ontario described by Smith (1986) exemplifies the conflict.

The shortage of agricultural land in British Colombia has lead to the establishment of land reserves within which non-agricultural uses are prohibited. The reserves are selected on the basis of land capability and by 1980, 5% of the province was included (Little, 1980).

Saskatchewan has established a Land Bank to assist farmers on uneconomic holdings to sell their property and by reallocation of holdings, ensure that young farmers or those new to the industry make better use of the resources (Little, 1980). This is a long term approach to

agricultural land protection which maintains the economic viability of agriculture in the face of competing land uses. It also discourages land speculation and subdivision of land by farmers just prior to their retirement.

The concept of competing land uses in the evaluation process is further developed by the Land Evaluation Project at the University of Guelph (Smit, 1981). The relative importance of a land use is assessed by comparison with alternative uses. This approach is quite applicable for the identification of prime agricultural land.

### **France**

To assist those wishing to remain in farming to obtain suitable land, and to keep prime land from being subdivided, a system of *Societes d'Aménagement Foncier et d'Establishment Rural* (SAFER) was established in 1960. A SAFER buys land that is offered for sale within previously designated areas as well as land offered voluntarily from elsewhere. Within the designated areas, sale to the SAFER is enforced by decree. Land is redistributed to purchasers in a way that ensures the best use of resources (Little, 1980).

### **New Zealand**

Land in New Zealand is classified by an eight class land use capability system based on versatility of use and physical limitations. Recognition is made of the relativity of the concept of prime land so versatility is assessed on a regional rather than a national basis. The importance a specific land requirements for a high value crop is also recognized (G. Eyles, *pers. comm.*)

Table (i). Agricultural land protection in the United States of America

	X Activities of State Ag Dept's	+ Activities of Other State and Local Agencies	* Legislative Equivalent	Right to Farm Law	Tax Relief/Pref/Diff.	Purch. of Dev. Rights	Trans Dev. Rights	Ag Districting	Ag Zoning	Gov. Executive Order
Alabama	X	X								
* Alaska	X	X								
Arizona	X	X								
Arkansas	X	X								
** California	X	X						.	.	
Colorado	X	.						.	.	
** Connecticut	X	X	X/.							.
Delaware	.	.							+	X/.
Florida	X	X				.		X		
Georgia	X	X								X
** Hawaii	X	X						X		
Idaho	X	X						.	.	
** Illinois	X	X					X	.	.	X/.
Indiana	.	.						.	.	
Iowa	.	.					.	.	.	
Kansas	.	.						.	.	
Kentucky	.	.						X	.	X/.
Louisiana	X	.								
Maine	X	X						.	.	
Maryland	X	X	X/.	.	.	X				X
Massachusetts	X	X	X							.
** Michigan	X	X						X	X	
* Minnesota	.	.						X	.	.
Mississippi	.	X								
Missouri	X	X								
Montana	X	X								
Nebraska	.	.						.	.	
Nevada		X								
New Hampshire	X	X	X/.	.	.			.	.	
New Jersey	X	X	X/.	.	.	X		.	.	
New Mexico	X	.								
New York	X	X	.			X	.	.	.	
* North Carolina	X	X	.					.	.	.
North Dakota	X	.						.	.	
** Ohio	.	.						X		X
Oklahoma	X	X								
Oregon	X	X						X		
Pennsylvania	X	X	.				X	.	.	X
Rhode Island	X	X	X							
South Carolina	X	X								
South Dakota	.	.						.	.	
Tennessee	.	.								
Texas	.	.								
Utah	.	X						.	.	
* Vermont	X	X	.	.	.			.	.	X
Virginia	X	X	.	.	.	X	.	.	.	.
Washington	X	X	.	.	.			.	.	X
* West Virginia	.	.	.							
Wisconsin	X	X						X		
* Wyoming		X						.	.	

\* States amending or passing new protection laws in '84

**RIGHT-TO-FARM LAWS** Protect the farmer/rancher from certain legal actions against normally accepted farming practices.

**TAX RELIEF-PREFERENTIAL/DIFFERENTIAL** Allows farmland property to be assessed at its current ag use value rather than at its market value.

**PURCHASE OF DEVELOPMENT RIGHTS (PDR)** State and local govts. may purchase the development rights of farmland by paying the owner the difference between the market value and farm-use value of the land. Land owners retain all other property rights.

**TRANSFER OF DEVELOPMENT RIGHTS (TDR)** Local jurisdictions designate "receiving" and "sending" areas. Developers in receiving areas can increase density of development by purchasing development rights from farmers whose property is located in the sending area. All transactions are handled privately.

**AG DISTRICTING** One or more farmers organize districts of ag land as legally recognized geographic areas. In exchange for keeping land in the district for a specified number of years, farmers receive benefits such as protection from annexation.

**AG ZONING** Approximately 300 jurisdictions use one of two types of programs: "Exclusive" or "Non-Exclusive" ag zoning. Both allow and restrict various activities within the zone.

**GOVERNOR'S EXECUTIVE ORDER** Governor's policy which usually declares the importance of agriculture to the state; addresses the rate of ag land loss, and orders state agencies to mitigate farmland converting activities.

Source:

NASDA Research Foundation, Farmland Project  
1616 H St. NW, Washington, DC 20006  
202-628-1566

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