

Recent Changes in Agricultural Land Use in Australia

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Abstract

Results are presented of analyses of ABS statistics to determine gross changes in land use, including measures of intensification, between 1983 and 1997 as part of a National Land and Water Resources Audit Project. Few consistent trends were discernible, although considerable changes occurred in some areas. The most striking are a 25% increase in the area under irrigation and a reduction of 19% in the total number of farms.

Introduction

The National Land and Water Resources Audit will deliver a series of reports on the status of, and changes to, Australia's land, vegetation and water resources by June 2001 (for details see <http://www.nlwra.gov.au>). Theme 5 of the Audit is entitled Land Use Change, Productivity, Diversity and Sustainability of Agricultural Enterprises with a working short title of Productivity and Sustainability. It addresses the first objective of the Audit, namely "to provide a clear understanding of the status of, and changes in, the nation's land (including vegetation) and water resources and implications for their sustainable use".

The foundation project to the Theme (Project 5.1) was designed to provide a framework on *where* different land uses occur, *how* efficient and profitable is their performance, and *what* are the main drivers of change over time. This poster paper reports some findings on where changes in land uses occurred.

Methods And Materials

A selected set of 475 items from 1982/83 to 1996/97 were taken from the Australian Bureau of Statistics (ABS) AgStats database using their \$22,500 Estimated Value of Agricultural Operations (EVAO) cutoff and concorded to the 1996 Statistical Local Area (SLA) boundaries. The ABS provides, within the Integrated Regional Data Base (IRDB), geographic concordances that are expressed as weightings based upon populations (ABS, 1998). In this study, a method was developed to concord the agricultural data items of AgStats, using a geographic information system (GIS) technique based on a land use mask database (BRS, 1999) using weightings based upon the agricultural land area. This assumes that all commodities were evenly distributed across the agricultural land within the SLA, while the actual situation may be quite different

There are some concerns about the concordance of this set of AgStats data. One relates to apportioning the 'unallocated' areas (those not collected in AgStats such as forestry, or not ascribed an area eg tree numbers, animal numbers) and the 'residual' areas (the difference between total area of agricultural holding and allocated land uses in AgStats) within the SLAs. A second relates to the level of aggregation that should be applied for different land use categories. A third is the accuracy of the concordance given some large changes in some SLA boundaries in the 15 year period. A comparison of the concordance between the two systems indicated that the reliability of the concordance was generally closely related to the changes in the concordance factor: the more changes in agricultural land area, the less reliable the concordance. In the end we took the view that this data should reflect the original data from ABS as accurately as possible and we believe the concordance provides a workable solution, although the reliability could be greatly improved with better land use information or geo-referenced statistical data.

Subsets from this data set, eg for intensive land use areas were selected for analyses of change in land uses and productivity. Individual items were aggregated each year to levels of intensification similar to that proposed by Baxter and Russel (1994) into the following land use categories: sown pasture, grazing

land (sown pasture + native pasture + residual area), broadacre crops (pulses, oilseeds and cereals excluding rice), semi-intensive crops (rice, cotton, sugar and potatoes) and intensive crops (vegetables, fruit). Indices of intensity were calculated using two intensity factors – one based on simple nominal value for the grouping, and the other on 1992/3-1994/5 3-year average cost of inputs taken from ABS Farm Financial Surveys.

Results

The number of holdings registered in the ABS data base has declined by 18.5 % from 1982 until 1997. Most of this decline, in actual and percentage terms, has occurred in farms with less than 1,000 ha and particularly of those with less than 50 ha. This decline is part of a trend that has been occurring since 1970. Some categories of farm sizes have registered increases, namely 2,500 - 10,000 ha and 50,000 – 200,000 ha and these in fact had the largest change in proportion to their 1982 numbers.

Pasture and grazing lands. Data on sown pastures in the AgStats are inconsistent from year to year. Consequently the most reliable estimates relate to the difference between total area of holdings and cropped area. Sheep numbers increased during the 1980s and declined since to register overall losses in all states by 1997. However, there also appeared to be increases in the drier parts of most states. By contrast beef cattle numbers increased consistently in all states except Tasmania which had no change. Nevertheless some areas have reduced numbers – the south east of WA, and adjoining south west of SA, the closer settled areas around Melbourne, and Wodonga in Victoria, coastal NSW and parts of Tasmania, south west WA and eastern Qld – likely supplanted by more valuable uses for the land.

Broadacre crops. The number of farms growing grains has declined by only 4% since 1982. Most (more than 75%) of grain producers use between 100 and 2,500 ha, with very few using less than 100 ha or more than 5,000 ha. There were few trends evident in the area sown to broadacre crops during this period, although there were substantial changes both higher and lower evident between years. This was most marked in New South Wales and Western Australia, while South Australia and Victoria were relatively stable.

Semi-intensive cropping. Sugar cane, rice, cotton and potatoes were grouped for this category. There have been substantial increases in area of the rice growing area of southern NSW, the cotton growing areas of northern NSW and eastern Qld and the sugar cane areas of coastal Qld. The area in the north coast of NSW and the south east of Qld declined in area, most likely due to changes in area cropped to sugar cane.

Intensive cropping. The number of farms producing fruit or vegetables declined by 11% since 1982. Most (70%) of these farms are less than 50 ha in size and this category has declined most in numbers. Very few are more than 500 ha in size, although this category has increased most proportionally. Areas of horticultural production have increased in southern NSW, eastern South Australia, southwest tip of WA, the north east coast of Qld and southeastern Qld. Areas to decline appeared around Sydney and Brisbane and the north coast of NSW.

Irrigation. The total area under irrigation increased by 26% to 2.06 million hectares in 1997 with most of the increase occurring in NSW and Qld. There was a trend for increasing area under irrigation in NSW, Qld, South Australia and the Northern Territory, but to remain relatively static in Victoria, Western Australia and Tasmania.

Attempts were made, using the two indices, to measure intensification of agricultural land use. The first, using the nominal measure of relative disturbance, did fluctuate during the 15 years but did not indicate any noticeable trend. The second, using the value of inputs measure, indicated a consistent increase until 1994 and a fall during 1996 and 1997. As might be expected the areas of highest intensity occur around the major metropolitan centres, in irrigation areas and those with a high proportion of intensive cropping such as the north eastern coast of Qld and the Huon valley of Tasmania. The areas with the next highest degree of land use intensity appear mostly in the southern crescent of broadacre cropping.

More comprehensive results at SLA level and covering more commodities and land uses will be available from the Australian Natural Resources Atlas (<http://www.nlwra.gov.au>).

References

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3. Bureau of Rural Sciences. 1999. Agricultural land distribution and non-agricultural land use classification: Preliminary product of BRR5 for National Land Water Resources Audit.