Potential changes to scope of agricultural surveys and censuses in Australia

Nicholls, Allan
Australian Bureau of Statistics
45 Benjamin Way
Belconnen, ACT, 2616, Australia
E-mail: allan.nicholls@abs.gov.au

Abstract

This paper describes the traditional scope of Agricultural Censuses and Surveys in Australia and the origins of that scope definition. Increasing demands for information related to agriculture are examined, including the need for data on natural resource management, sustainability, farm families, farm finances and organic and GM production. Implications for the scope of agricultural collections are then discussed, including the population of interest and the type and size of farms to be included within scope. Options for meeting these needs, including choice of appropriate collection vehicles and population frames are then discussed. Finally, the paper discusses strategies being adopted in Australia to satisfy some of these data needs.

1. Background

The role of the Australian Bureau of Statistics (ABS), as specified in the ABS mission statement, is to "...assist and encourage informed decision-making, research and discussion within governments and the community by leading a high quality, objective and responsive national statistical service".

In relation to the agriculture sector, the ABS and its predecessors have been doing this for over 140 years. However the type and range of agricultural information we now collect is substantially different to that collected over 100 years ago. This is not surprising given the changes which have taken place in agriculture and the current sophistication of users of statistical data.

Over 100 years ago, the agriculture industry accounted for around 20% of Australia's Gross Domestic Product (GDP). In addition, almost 30% of the male population and just over 10% of the female population were employed directly in the agriculture industry. Currently the industry accounts for around 3% of GDP and 3.5% of employment.

This decline in share of GDP and employment reflects structural changes in the economy, rather than any decline in the size of the industry. Australian agriculture, like agriculture in most developed countries, has moved from a labour intensive industry to one that is capital intensive, using modern machinery and other technology to undertake tasks previously done manually. At the same time, the national economy has become more diverse, reflected most dramatically in the rapid growth of the services sector, which now contributes almost half of GDP.

However, despite the relative decline in GDP, agriculture is still a very important sector from other perspectives. It utilizes a large proportion of natural resources, accounting for 65% of stored water use and almost 60% of Australia's land area. In regional and rural areas, it is a significant employer and the life-blood of many rural towns. At a more personal level, Australian agriculture directly affects every person in Australia (and a significant proportion of people living in many other countries) through the quality and availability of the food it produces.

2. The Agriculture Program in the ABS

The agriculture program in the ABS comprises a number of collections:

- Agricultural Census (conducted every five years)
- Agricultural Survey (conducted in inter-censal years)
- Value of Agricultural Commodity Production (annually - derived from census/survey data and prices data from other sources)
- Apples and Pears (annually)
- Vineyards survey (annually)
- Livestock slaughtered (monthly)
- Poultry and Game birds slaughtered (quarterly)
- Wool Receivals, Purchases and Sales (quarterly)
- Stock of Grain held by Bulk Handling Companies and Grain Traders (currently monthly)

Because available space on the Agricultural Census/Survey questionnaire is limited Australia has introduced another collection vehicle, based on the same frame of farm businesses – this is the biennial Natural Resource Management Survey. The introduction of this survey has taken some of the pressure off the Agricultural Census/Survey, but even so, there is still unmet demand for a range of data.

2.1 Agricultural Survey/Agricultural Census

The basic source of Australian agricultural commodity statistics is the Agricultural Survey, conducted on a year ending 30 June basis. This reference period is consistent with most other business based collections undertaken by the ABS. Despite the diverse farming activities which are undertaken in different States throughout the country, the collection provides comparable and consistent State tabulations which can be aggregated to statistical totals for Australia as a whole.

The Agricultural Survey replaced the annual Agricultural Census in 1997-98 which had been conducted by some States for 140 years. The Agricultural Survey consists of a sample of approximately 25% of the population of agriculture establishments, and includes all farming activities above a certain size. The Agricultural Census is now conducted every five years, starting from 2000-01.

Both collections have the same scope and coverage criteria, and are mail based collections. The unit for both collections is the farm business. In general for agriculture, this equates to a farm holding, incorporating all activities undertaken from that holding. In order to reduce costs, farm businesses which make only a very small contribution to overall agricultural production, (typically hobby farms), are excluded from the population frame, based on a measure of size called the Estimated Value of Agricultural Operations (EVAO). In recent years, the EVAO cut off for excluding small farms has been set at $5,000.

A wide range of commodity and related data is collected in the Agricultural Survey/Census including area of holding, production and area for a large number of crops, fruit and vegetables, and numbers of livestock. In addition, in recent years, questions have been asked on land use, water and a range of environmental and land management related topics.

In terms of geographic detail, in the past, the Agricultural Census has produced information at the Statistical Local Area level, which roughly equates to the lowest tier of government in Australia. The Agricultural Survey has produced data at Statistical Division level, which is an aggregation of Statistical Local Areas.

3. Expansion in demand for data

In recent times, and in particular the past 10 years, demand for data has changed significantly, with an increasing interest in issues relating to environmental, economic and community sustainability. Demand for data on traditional items of production and yields remains strong, with these new demands an additional requirement.

Traditionally, core agricultural data focused on production data, specifically area of each crop planted, the quantity harvested and numbers of livestock held and sold for each type of livestock. This information was used by National Accountants to estimate agriculture's contribution to the economy, and by other users to monitor the development of the agricultural industry in terms of types of commodities produced and the areas in which particular commodities and activities were expanding or contracting.

For most of the 20th century this information was sufficient to meet the needs of policy makers involved in the agricultural industry. However towards the end of the 20th century, there has been increasing pressure to expand the dataset to include more information on matters relating to the sustainability of the industry. Policy makers are now asking questions such as:

- Can the current rate of expansion in agriculture be maintained in the long term?
- Are natural resources being utilized by the most efficient industries?
- Is the cost to natural resources exceeding the benefits received from their exploitation?
- Are farmers earning enough to maintain the natural resource base in an acceptable condition?
- What management practices do the more profitable farmers use?

Data to provide answers to these questions are not easy to find, and increasingly the satisfaction of these demands results in additional challenges for statistical organisations. With the increasing sophistication and power of models used to measure, for example, the impact of agriculture on the environment, users now require data at very fine geographic levels so that regional issues can be examined in detail. Indeed, data is required for input to Geographic Information Systems (GIS), so that it can be overlaid with other spatial data.

The following sections examine the range of data now being sought, the appropriateness of the Agricultural Census/Survey to collect this data and other possible solutions.

3.1 Commodity Information

3.1.1 Vegetables

Over the years, the number of vegetable commodities included on the Agricultural Census/Survey has gradually reduced in order to reduce costs of collection. However, with an increasing number of vegetables being grown in Australia, particularly Asian vegetables, industry and policy users' need for detailed information has increased. The Agricultural Census/Survey is the appropriate vehicle to collect this information, and industry has decided to fund the collection of this additional information.

3.1.2 Organic commodities

The market for organic produce continues to expand, and with it demand for information about the production of organic agricultural commodities. The Agricultural Census/Survey is the appropriate vehicle to collect this information. However, this would require significant change to the questionnaire and the relatively low priority for this information means that these changes have not yet been explored. Given the limited capacity to add questions to the Agricultural Census/Survey, priority for this data would need to increase significantly to warrant further work.

3.1.3 Genetically Modified (GM) commodities

At this stage, production of GM commodities in Australia is limited to trials which are carefully monitored. The demand for data on these commodities is therefore low. However, if and when approval is given to grow GM commodities on a commercial basis, demand for this data will become high priority. Ultimately the Agricultural Census/Survey will be expected to provide this data.

3.1.4 Aquaculture

Aquaculture commodities are not currently included in the Agricultural Census/Survey. Data on aquaculture production is compiled by the Australian Bureau of Agricultural and Resource Economics (ABARE). Given that the scope of the Agricultural Census/Survey is farm businesses above a size cut-off, this is not a suitable vehicle for the collection of aquaculture data.

3.1.5 Forestry

Forestry is not currently within scope of the Agricultural Census/Survey. Data on forestry is compiled by the Bureau of Rural Sciences. Given that the scope of the Agricultural Census/Survey is farm businesses above a size cut-off, this is not a suitable vehicle for the collection of forestry production data. However, in recent years there has been strong growth in the number of trees being planted by farmers for a variety of reasons including commercial forestry and environmental and biodiversity protection. The Agricultural Census/Survey has been used to monitor this activity for a number of years.

3.2 Natural Resource Management information

There is a very strong demand for data on a wide range of natural resource management issues. Since farmers are responsible for about 60% of Australia's land area, and use about 65% of stored water resources, the Agricultural Census/Survey and the Natural Resource Management Survey are key collection vehicles for obtaining data on these issues.

3.2.1 Water Use

Australia is the driest inhabited continent on earth and has experienced prolonged drought over parts of the continent for the last five years. The availability and use of water is therefore a high priority policy issue and data to support decision making is in high demand.

In recent years a range of questions related to water have been asked on either the Agricultural Census/Survey or the Natural Resource Management Survey. These have included questions on area watered and volume applied for a range of commodities, sources of water by volume, irrigation methods used, irrigation scheduling tools, changes to irrigation practices, barriers to changing irrigation practices, expenditure on irrigation activity, receipts from the sale of water or irrigation equipment, total value of irrigation infrastructure, water entitlement and allocation, and water trading.

As water will continue to be a high priority policy issue for some time, it is expected that demand for this data will continue.

3.2.2 Land Management Practices

Australia's agricultural landscapes support a wide range of soils. Most are ancient, strongly weathered and infertile by world standards, with deficiencies in phosphorus and nitrogen. Those on floodplains are younger and more fertile. Very few are considered good quality soils for agriculture. Fragile soil structure and a susceptibility to waterlogging are other common features of Australian soils, while large areas are naturally affected by salt or acidity. These soil characteristics require farmers to use a range of fertilisers, soil conditioners and other practices to support productive farming.

Land management practices used by farmers can also impact on natural resource condition, both on-farm and off-farm. Changes to natural resource condition occur very slowly and are difficult to measure. Policy makers responsible for natural resource condition are increasingly looking to measure changes to more sustainable land management practices as an indication of future improved natural resource condition.

The Agricultural Census/Survey has been used to ask questions about land management practices such as use of fallow land, cultivation practices, treatment of crop stubble, use of soil conditioners, and use of fertilizers. The Natural Resource Management Survey has asked a range of questions related to the management of native vegetation, weeds, pests, soil problems and water problems.

It is expected that these types of questions will remain a high priority for inclusion in these surveys.

3.2.3 Climate Change

Climate change has the potential to have a significant impact on farming productivity. Agriculture policy makers have raised this as an emerging issue for which they require data. In response the ABS has included some questions on the Natural Resource Management Survey to seek preliminary information on the impacts of climate change, and changes to farm management practices in response to climate change.

It is expected that further questions will be required in future surveys, but at this stage no work has been done to determine the detailed issues for which data is needed.

3.3 Other Information

3.3.1 Demographic and Social Characteristics

There is considerable demand for information about the demographic and social characteristics of farmers and farm households. This demand relates to two aspects of policy. Firstly, there is the issue of succession planning. As many of Australia's farmers are ageing and their children have careers in cities, this is a significant issue confronting rural communities. The Population Census provides a large amount of information to address this issue.

Secondly, farmers are responsible for approximately 60% of Australia's land area and therefore play a central role in improving natural resource management outcomes. By better understanding the factors which significantly influence farmers behaviours in relation to farm management practices, the uptake of new technology and undertaking environmental protection work on the farm, policy makers can better design and target policies to change farmers behaviour. The Population Census cannot link personal characteristics with management practices and so is unable to provide data to support an understanding of this issue. At times the Agricultural Survey has been used to collect some personal data, but this has not been sufficient to inform this issue. The main problem has been that data has been asked only about the person completing the form, who may not be the farm manager. An approach, similar to that used by the United States Department of Agriculture, of asking operator characteristics for up to 3 operators would be required to fully understand this issue. The possibility of using such an approach in the Australian context needs to be tested.

3.3.2 Farm financial data

Data about the financial position of farms is also in high demand. Prior to 2001, Australia conducted an annual Agricultural Finance Survey to obtain a range of details about the financial position of farms. However, this collection was very costly and did not provide the level of detail which users were seeking. Since then, broad information about farm finances has come from an economy wide survey of economic activity. More detailed information for broadacre and dairy farms has been provided by ABARE, but this is also based on a relatively small sample.

The ABS now has access to business taxation data from the Australian Taxation Office. This is quite an extensive dataset and ABS is currently examining how it could be used. It has the potential to provide information about the financial position of farms at the level of detail required by users.

3.4 Related issues

3.4.1 Geographic level of detail

Until recently, data from the Agricultural Census/Survey were provided using standard ABS geographic structures based around government administrative regions. Specifically, the Agricultural Census provided data at the Statistical Local Area level, while the Agricultural Survey provided data at the broader Statistical Division level. However, this regional structure is not useful for many of the applications for which data from these collections are now being used. In particular, the importance of natural resource management issues has seen the emergence of a set of Natural Resource Management regions which have been agreed by all levels of government and are now the focus of a large number of programs. Data at this level, and at other regions based on water catchments etc are now needed.

In response to this need, the 2005-06 Agricultural Census obtained information which will enable farms to be coded to a very small geographic unit called a mesh block. This will then enable Agricultural Census data to be provided for a wide range of different regional structures based on concordances with mesh blocks. This information will also enable future Agricultural Surveys and Natural Resource Management Surveys to be designed to produce data for Natural Resource Management regions.

3.4.2 Scope of Agriculture collections

The scope of agriculture collections has been set to exclude farm businesses which make only a very small contribution to overall agricultural production, (typically hobby farms). These units are excluded from the population frame, based on a measure of size called the Estimated Value of Agricultural Operations (EVAO). In recent years, the EVAO cut off for excluding small farms has been set at $5,000.

While this scope is appropriate when measuring agricultural production, it is not ideal when measuring aspects of natural resource management, since small farms can collectively have a significant impact on natural resource condition.

The ABS response to this has been to consider the use of a population frame based on all land parcels and collecting information from owners of selected land parcels. This approach has been trialed in two separate regions and has worked well for the range of data collected. Experience with the trials suggests that this approach is suitable for collections which target particular regions, but that costs and levels of provider load would be too high to use this approach for a national collection.

3.4.3 Use of administrative data

Identifying alternative sources of data, including administrative data held by government agencies and private organisations, offers the potential to significantly improve the ability to meet new and existing demands for data. The use of external datasets to supplement data collected by the ABS can also provide significant savings in data collection costs and provider load for a number of ABS collections.

The main administrative data set used by ABS is business taxation data from the Australian Taxation Office. This is quite an extensive dataset and ABS is currently examining how it could be used to

provide financial information about farms. It has the potential to provide information about the financial position of farms at the level of detail required by users.

3.4.4 Linking datasets

One other way of satisfying new demands for data is to make better use of existing ABS datasets by linking them.

Investigations have been undertaken into the linking of unit record data from the Census of Population and Housing and the Agricultural Census. While this linking looked to be feasible, privacy considerations resulted in a decision not to proceed. The coding of both farms and households to mesh block level should allow better linking at aggregate level and this issue will be pursued when data from both censuses are available.

A project is currently underway to link unit record data from the Agricultural Census with taxation data. This would result in an expanded dataset and allow analysis of a number of aspects of farm profitability and sustainability.

4 Conclusion

Agriculture is an important part of the rural community and is also dependent on the use of land and other natural resources. The industry is facing a range of issues including natural resource management, climate change (including the current extended drought) and sustainability (both in a financial and natural resource sense).

There is increasing demand for data on a wide range of issues related to agriculture and this increasing demand is expected to continue for some time as the sophistication of users and the ease of data analysis increases. The Agricultural Census and Agricultural Survey are considered to be suitable vehicles for the collection of a large amount of the required data.

The main constraint is capacity, including both the costs of collection, and the provider load imposed by data collection. In response to this increasing demand / capacity constraints, the ABS:

- has obtained funding to conduct a new survey of farmers, the Natural Resource Management Survey
- has sought user funding to undertake some other collections
- is exploring more extensive use of administrative data
- is exploring linking of datasets

These steps have gone some way to addressing pressures for more data, but have only had a small impact in terms of overall demand.

Agriculture Program
Australian Bureau of Statistics
September 2007