

Parallel Session 3.1

Agricultural Censuses in the Small Island Developing States (SIDS) – Recent country experiences

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Abstract:

Despite their size, Small Island Developing States (SIDS) face many of the same challenges as much larger countries when it comes to planning and conducting an agricultural census. This paper looks at the extent of agricultural census taking in SIDS, the capacity constraints, methodological considerations of most concern to SIDS and the implications of the new approach to agricultural census taking put forward in the FAO World Programme for the Census of Agriculture 2010 (WCA2010).

Of the 38 countries in this FAO grouping, all but three have undertaken an agricultural census at some point in their history but only ten undertook such a census in the last census round (1996-2005). Some countries include specific questions on agriculture in their census of population and housing and the relationship between these two national censuses is considered in the context of the SIDS experience.

SIDS are confronted with many of the methodological challenges faced by larger developing countries such as the estimation of crop area harvested from subsistence farms in the context of mixed cropping and continuous planting/harvesting systems and the associated challenges of land area estimation where farmers cannot provide reliable estimates. The paper considers these issues and discusses some practical ways of addressing them.

The WCA2010 adopts a new approach to agricultural census taking with emphasis on conducting a 'core' module through complete enumeration and 'supplementary' modules(s) on a sample basis. Given the small size of many SIDS, sampling may not be an efficient approach where small area data is required. The paper discusses this and other issues related to the implementation of the WCA2010 in the SIDS environment.

1. The History of the Census of Agriculture in Small Island Developing States (SIDS¹)

Of the 38 countries in this FAO grouping, all but three SIDS have undertaken an agricultural census at some point in their history. The most significant census round was the 1950 round when 27 (71%) of the countries participated. Since then participation has been less than 50% with the most recent round (2000) the lowest with only ten countries participating. No country has participated in all seven rounds and only three countries have participated in 6 out of the seven rounds (see table at annex).

2. Resources

Acquiring sufficient resources to conduct a census of agriculture is a major challenge for many countries. For SIDS, the resource challenge is often both financial, institutional and human. With the importance of the agricultural sector declining in many SIDS, agriculture is no longer afforded the same high priority it used to be and securing the necessary funds to conduct a census of agriculture is becoming increasingly difficult. One solution is to conduct a 'national census programme' and to plan the census of agriculture and the census of population and housing as a joint exercise under one funding envelope (see section 5). External funding is also an option for some SIDS but there are increasing demands for such funds across the whole spectrum of government activity and agriculture and statistics do not always feature as high priorities. Many agricultural censuses are, therefore, conducted with less than the optimum level of funding. This can impact on the methodology for the census of agriculture which has to be adjusted to accommodate the level of funding available, often resulting in a reduction in the scope and coverage of the data collected and, if sampling is used, a reduction in the geographic detail available and the range of items.

In considering the institutional arrangements, it is helpful to consider the census of agriculture as made up of a statistical component (census) and a thematic component (agriculture). In SIDS, very few line ministries have a dedicated statistical unit with capacity and skills in the methodological aspects of statistical survey and census taking. The bulk of the human resource skills, to the extent they do exist, will be found in the NSO but very few NSOs have subject matter experts such as agriculturalists. From this it is evident that the optimum arrangement for the census of agriculture in a SIDS is for the two government agencies concerned to work together and to share the responsibility for the census. The need to institutionalize this relationship between the NSO and the line ministry in developing and implementing an integrated system of food and agricultural statistics, within the broader context of the National Statistics System, is considered an essential pre-requisite for the success of the census of agriculture.

The human resource capacity is closely linked to the institutional capacity. In larger countries, the establishment of a separate agricultural census unit or office is the preferred approach but this is not always possible for SIDS because of the small numbers of staff. In this case, a 'census team' approach is a pragmatic solution with a full-time census coordinator and staff seconded or co-opted' on an 'as needs' basis. In developing the census team, a range of key skills has to be planned for. These include census methodology, field coordination, data

¹ FAO SIDS countries: Antigua and Barbuda, Bahamas, Barbados, Belize, Cap Verde, Comoros, Cook Islands, Cuba, Dominica, Dominican Republic, Fiji, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Marshall Islands, Mauritius, Micronesia (Federated States), Nauru, Niue, Palau, Papua New Guinea, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Samoa, Sao Tome et Principe, Seychelles, Solomon Islands, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Tuvalu, Vanuatu.

processing, analysis and dissemination. Again, the full range of these skills is difficult to find in most SIDS and is rarely available in a single institution. Given the relatively infrequent nature of census taking (every ten years), it can be argued that SIDS cannot afford the luxury of creating and maintaining a capacity in all these skill areas. A regional network of international experts may be one solution but again there are cost implications and, by taking an expert from one country to another, a gap may be created in the releasing country's human resource base which may be detrimental to the work programme in that country.

3. Methodological challenges

SIDS are confronted with many of the same methodological challenges faced by larger developing countries. One such issue is the estimation of crop areas for both permanent tree crops and also temporary garden crops. At the household level, permanent tree crops are often grown as 'scattered' crops with only a few trees on the holding. In this case the numbers of trees should be recorded and these numbers converted to 'a single crop equivalent area' using standard spacing data provided by the Ministry of Agriculture or from information provided by farmers growing the same crop in a compact plantation where both numbers of trees and area can be recorded. As these scattered tree crops often account for the majority of trees for crops such as mangoes, breadfruit and avocado, it is important that the information collected is as complete as possible, even from households not qualifying as operating a holding. Generally, farmers are able to provide this information quite readily but good publicity on the information required and active farmer participation in the census can improve the data quality considerably. A copy of the full questionnaire, or the key sections on livestock numbers, tree and garden crops, can be provided to the farmer in advance of the enumeration and s/he can be asked to complete these sections. Alternatively, should the farmer not be able to provide all the information at the time of the interview, s/he can be given a form to complete and a follow-up visit can be arranged, or the information can be passed by telephone.

For temporary garden crops the situation is more complex. Issues faced by SIDS include the farmer's lack of knowledge of area measurements (both standard and traditional), scattered plantings, continuous planting/harvesting farming systems, inter-planting, mixed cropping and repeat plantings. In some countries (St. Lucia, Antigua and Barbuda), no attempt is made to collect information of individual crop areas as extensive field testing has confirmed farmers are not in a position to provide such information based on a single visit enumeration. Only the total area of land under temporary crops, as part of the land use evaluation, and the presence of each crop at the time of enumeration or in the last 12 months is collected.

In other countries, an attempt has been made to address these issues, sometimes in innovative ways. In countries where the concept of 'area' is not understood two options present themselves. The first is for the enumerator to measure each parcel of land while the second is to train the farmer to measure his own land using simple pacing techniques. The first option is of course very time consuming (and thus expensive) but should be more reliable than the second, at least for the parcels measured. However, there is empirical evidence that this method tends to under-estimate the number of parcels per holding since enumerators generally wish to minimize their workload and, therefore, only record a minimum number of parcels per holding and generally those near the household's dwelling. The second option, while the individual area measurements may be less reliable, has the advantage that it is a much cheaper option and farmers may be more willing to include more, if not all, of their parcels. The downside is that the farmers have to be willing to participate and the training

must be conducted to a sufficient standard. Enumerators have to be 'on call' to assist farmers and to work with them in this exercise. Inducements, such as T-shirts, caps, seeds, etc., may be necessary to ensure active farmer cooperation.

To some extent, the issues of scattered plantings, inter-planting and mixed planting can be addressed by collecting both numbers of plants and areas and identifying the planting pattern for each planting. In some countries (Cook Islands, Niue, Samoa, Tonga) where crops are inter-planted or a particular mix is planted, farmers are asked what proportion each crop accounts for in the mix, using simple fractions. This enables two sets of data to be generated, the actual physical area covered by each crop (includes double counting) and the single crop equivalent area. This is a useful approach to presenting data on mixed and inter-planted crops. Scattered temporary crops are handled in the same way as scattered permanent crops.

Continuous harvesting/planting systems and repeat plantings are perhaps the most difficult issues to address. Repeat plantings suffer from recall problems and the fact that the crop is not present and thus not visible at the time of the enumeration and the area or the number of plants is difficult to estimate. Continuous harvesting/planting systems, commonly used in the Pacific Island Countries, are an extension of repeat plantings but with an even more serious recall problem. The timing of the census is one critical factor in addressing these issues since most countries have regular planting patterns. In countries where short-term crops are grown throughout the year, the most reliable option is to conduct the census using multiple visits (two-four visits in the year). As these issues can seriously affect the estimates of annual area harvested they need to be carefully addressed.

Many SIDS also attempt to collect information on production in their census. While production estimates for cash crops have met with some success (where the greater part of production is sold), measuring production of own consumption has proved to be much more difficult. Even for cash crops, farmers tend to report in local units, which have to be converted, and often under-report because of tax implications. The Household Income and Expenditure Survey (HIES), if it includes consumption of own production, is a better vehicle for measuring such production if only because it involves the keeping of diaries and multiple visits over time. The downside is that the sample size for the HIES is often small limiting any geographical breakdown and the data reliability for the less common items.

4. Complete Enumeration versus Sampling

The WCA2010 adopts a new approach to agricultural census taking with emphasis on conducting a 'core' module through complete enumeration and 'supplementary' modules(s) on a sample basis. While this approach will present a much higher degree of flexibility in the conduct of the census programme it has limitations for SIDS, in particular where the total number of holdings is small. The Census of Agriculture in Antigua (1984) provides a good example. Of the 19,866 households enumerated, 4,639 holdings were identified. For the sample module, 421 holdings were selected based on a stratified sampling technique with 100% of all large holdings, 50% of medium size holdings, 19% of small holdings and 10% of very small holdings. These strata were shown in the resultant tables as were three geographic strata. Apart from the 100% strata, all other size strata generated large sampling errors to the extent that the data was not considered reliable. The geographic breakdown also suffered from large sampling errors even at the national level for many items. The overall result was that the data was not used. While this is an extreme case, it highlights the weakness of sampling with small numbers. In most SIDS, the sample size (percent) to generate reliable

data even at the national level would need to be so large, that little or no savings would be gained by the use of sampling. Also, most countries look to the census as the sole source of disaggregated data, and data on rare items, which again rules out the use of sampling.

5. The relationship between the Census of Population and Housing and the Census of Agriculture

The FAO World Programme for the Census of Agriculture 2010 (WCA2010) highlights the importance of integrating the agricultural census within the National Statistical System. In particular, it stresses the importance of the relationship between the population and housing census and the agricultural census in the following areas:

- use of common concepts, definitions and classifications
- sharing of field materials
- collecting additional agriculture-related data in the population census
- using the population census as a household frame for the agricultural census
- making use of agriculture-related data from the population census
- linking data from the two censuses
- conducting the two censuses as a joint field operation

This relationship is echoed in the “Principles and Recommendations for Population and Housing Censuses, Rev 2, UNSD 2007”.

Nearly all countries use common concepts, definitions and classifications for the two national censuses and share cartographic materials. There is also some evidence of the inclusion of specific questions on agriculture in the census of population and housing. In some cases, such information is collected ‘in lieu’ of conducting a separate census of agriculture (Kiribati and Tuvalu). In other countries, specific information on agriculture is collected in the population and housing census to supplement the information collected in the census of agriculture (Cook Islands). Such information is particularly useful for comparison with other data sources and as benchmark information where the census of agriculture is not conducted on a regular basis.

The biggest single problem faced by the census of agriculture is access to an up-to-date and reliable frame of agricultural holdings in the country. This frame can be sub-divided into the frame for household operated agricultural holdings and non-household operated agricultural holdings. The number of non-household operated agricultural holdings is usually small and the frame can be fairly readily compiled from land and business registers, lists of large farms and other sources. The frame of household operated agricultural holdings, however, is a much larger and more complex task. It effectively means visiting all private households to establish the extent of agricultural activity in each household, the number of separate holdings the household members are engaged in and the operational structure of each holding (individual, group of individuals from the same household, group of individuals from more than one household). It is further complicated by the use of ‘minimum size limits’ in most countries which determine whether a household’s agricultural activity should qualify as a holding or not. Such minimum size limits are usually based on numbers of livestock, numbers of trees (tree crops) and area of land (temporary crops) but may also include value of annual sales and purpose of production (breeding livestock).

In countries where only a small proportion of households operate an agricultural holding, there is a strong argument to include the identification of such households in the census of population and housing to avoid the need for a separate listing exercise. The information can be collected either through the standard visitation record or through a separate section in the household questionnaire. The information can also be collected as part of the pre-census cartography and field work.

One advantage of an integrated census approach is that a reduced budget will be needed compared to the two censuses being conducted as separate exercises. Furthermore, a single funding envelope can be sought. Other advantages may also be realised. The same infrastructure, logistics, personnel and equipment can be used for both censuses. Basic information on livestock numbers, numbers of fruit trees and the area of temporary crops will be available for all households. The minimum size criteria can then be set at a higher level than has traditionally been the case as information on the smallest holdings has already been collected and little would be added by administering a further lengthy questionnaire to such holdings. Efforts, and resources, can then be focused on the more productive holdings. Also, by collecting the two sets of data at the same time, direct linkages can be made, through the unique household identification number, to provide a much richer data set than would be possible through two separate statistical exercises. Lastly, by institutionalising the arrangements for the conduct of the two censuses as an integrated exercise will ensure that the census of agriculture is conducted on a regular basis in future rounds.

Conclusion

Despite their size, Small Island Developing States face many of the same challenges as much larger countries when it comes to planning and conducting an agricultural census. Resource constraints, particularly human resources, pose the single biggest challenge and careful planning is needed to minimize these constraints. Having the right institutional arrangements is considered to be critical to the successful conduct of the census and the NSO is seen as having a critical role in any census undertaking.

Methodological considerations of most concern to SIDS are also faced by many other developing countries. Issues related to the estimation of land areas and crop areas, mixed cropping, etc., can be overcome to a large extent by farmer education and participation, but this again requires careful planning, good publicity and dedicated follow-up.

On the question of complete enumeration versus sampling, the conclusion for SIDS is that sampling has limitations in terms of its efficiency when dealing with small populations.

Establishing a much closer relationship between the census of population and housing and the census of agriculture is recommended both by the United Nations Statistical Division (UNSD) and the Food and Agriculture Organization of the United Nations (FAO) in their respective census programmes for the 2010 round of censuses². In many SIDS a joint approach to census taking under a 'national census programme' umbrella may be a practical, efficient and economical solution and should be explored.

² Principles and Recommendations for the Census of Population and Housing Rev 2, UNSD, 2007
The Word Programme for the Census of Agriculture 2010, FAO, 2005

Country	1930	1950	1960	1970	1980	1990	2000
ANTIGUA AND BARBUDA	1929/30	1950	1961	1974	1984		
BAHAMAS	1929/30	1950			1978	1994	
BARBADOS	1929/30	1950	1961	1971	1984	1989	
BELIZE		1950		1973/4	1985		
CAP VERDE					1981	1988	2004
COMOROS							2004
COOK IS		1950				1988	2000
CUBA		1952					
DOMINICA	1929/30	1950		1974		1995	
DOMINICAN REPUBLIC		1950	1960	1971	1982		
FIJI	1929/30	1950		1968	1978	1991	
GRENADA	1929/30	1950	1961	1975	1981	1995	
GUINEA-BISSAU		1953	1960/1			1988	
GUYANA		1950		1968/9			
HAITI		1950		1971			
JAMAICA		1950	1961	1968/9	1978		1996
KIRIBATI	1929/30	1950					
MALDIVES							
MARSHALL IS				1970	1980		
MAURITIUS	1929/30	1950					
MICRONESIA (FED. STATES)				1970	1980		
NAURU							
NIUE						1989	
PALAU				1970	1980		
PAPUA NEW GUINEA		1951	1961/62				
ST KITTS AND NEVIS	1929/30	1950				1987	2000
ST LUCIA	1929/30	1950		1974		1986	1996
ST VINCENT AND GRENADINES	1929/30	1950		1973		1986	2000
SAMOA		1950			1980	1989	1999
SAO TOME ET PRINCIPE						1990	
SEYCHELLES	1929/30	1950	1960		1978		
SOLOMON IS	1929/30	1950					
SURINAME			1959	1969	1981		
TIMOR-LESTE							
TONGA	1929/30	1950			1985		2001
TRINIDAD AND TOBAGO		1951	1963		1982		2004
TUVALU	1929/30	1950					
VANUATU	1929/30	1950			1983/4	1993	
Total No.	16	27	11	16	18	16	10
Percent	42	71	29	42	47	42	26