Office for National Statistics

Census Advisory Group

AG (09) 05b

2011 Census Geographies (England and Wales)

Purpose

To outline the current development plans for geographies on the 2011 Census

Recommendations

The Census Advisory Group Members are invited to:

i. Note the progress towards developing the 2011 Census output geographies
ii. Note the continued drive towards a final set of geographies in line with user needs
iii. Note the need for an additional round of consultation with users

Background

The requirement is for census data to be output at any area needed, whether electoral wards/divisions, local authorities, health authorities or any other geographical unit, whilst ensuring comparability with the previous census. In order to meet such needs the 2001 Census developed a series of geographical codes each designed with a specific purpose. These codes will continue to be employed and adapted for the 2011 census.

Output Areas

The smallest unit for which census data is published is the Census Output Area (OAs) containing at least 40 households (preferably 100), and are built up from postcode blocks, with a view to being socially as homogeneous as possible.

Super Output Areas

Super Output Areas (SOAs) are a set of geographies developed after the 2001 census. The aim was to produce a set of areas of consistent size, whose boundaries would not change (unlike electoral wards) enabling comparisons with other censuses data. They are an aggregation of adjacent Output Areas with similar social characteristics. Lower Layer SOAs typically contain 4 to 6 OAs with a population of around 1500. Middle layer SOAs on average have a population of 7,200. A set of Upper Layer SOAs were planned, to cover a population of at least 25,000, but were never created nationally.

Statistical Wards, CAS Wards and ST Wards

Census OAs in England and Wales were designed to fit into wards and parish boundaries in operation at the time they were created. Specifically, they were fitted to 2003 statistical wards, which reflected administrative boundaries promulgated by 31 December 2002. Most 2001 Census outputs however used Census Area Statistics (CAS) wards or Standard Table (ST) wards, a subset of CAS wards.

Census Area Statistics (CAS) are identical to the 2003 statistical wards except that 25 of the smallest (sub-threshold) wards have been merged into 7 receiving wards to avoid the confidentiality risks of releasing data for very small areas. There are a total of 8850 CAS wards in England and Wales.

Standard Table (ST) wards are those for which the 2001 Census Standard Tables are available. They are a further subset of the statistical wards such that those with fewer than 1000 residents or 400 households have been merged. This was required to ensure the confidentiality of data in the Standard Tables. There are a total of 8800 ST wards in England and Wales.

2011 census geographies

Administrative boundary changes

A fundamental problem with any census and all other administrative geographies is that of matching together data when the boundaries of the areal units are not coincident. This applies equally to the temporal comparison of data from two different censuses when the boundaries have changed, or the association of census data with some other areal units which have been independently constructed and which are not therefore assembled from the same elemental units.

In 2001 Output Areas and administrative boundaries (electoral wards/divisions, local authorities) were coincident and therefore unproblematic. However administrative boundary changes since 2001 means this is no longer the case at the ward level. Further, census data users have expressed the desire to use both OA geographical hierarchies for comparison with 2001, whilst also demanding data based on current administrative boundaries.

Data released on slightly varying geographical bases means smaller geographical populations can be revealed by subtracting one geography from the other (known as differencing) and will often reveal characteristics of the population at a less than acceptable disclosure threshold. There are two possible solutions to this problem. The first would be to best fit OAs to current administrative boundaries; however this suggestion was not met with much support from users in the last round of consultations. The second is to produce data on both administrative and OA geographical hierarchies, and to 'fix' the data for the 'revealed population' by applying some form of disclosure control.

Some early plans have been drawn up to address this question. The idea is to define the number of areas where differences between the two

geographical hierarchies exist and the size of the population within them. Statistical disclosure control methodologists will then evaluate whether it would be possible to apply some mechanism by which an acceptable level of disclosure control could be applied without lowering the utility of the data too far. If no acceptable mechanism can be applied a best fit solution may be the only alternative. Whatever solution is forthcoming a further round of consultation with users on this issue is required.

Proposal for producing Workplace Zones

The 2007 Consultation on OAs/SOAs for 2011 found no strong desire for a separate geography to be created for reporting business data. In view of this the conclusion of the consultation was to defer plans "to establish business or workplace OAs". Department of Transport, supported by key academics and commercial users, have now asked ONS to consider creating a more suitable geography for workplace statistics for 2011 (Workplace Zones), built from OAs rather than as a separate geography. ONS is now planning research into the feasibility of creating Workplace Zones for 2011, as a set of merged or split OAs. This is subject to approval and funding.

Output Areas geographies

The 2007 Consultation supported the policy for OAs/SOAs to be as stable as possible. ONS policy is that any redesign will only take place where population changes have breached thresholds. Where OA/SOAs have fallen below minimum population thresholds they will be merged with a suitable adjacent OA/SOAs. Where the population has become too big, OA/SOAs need to split. It is expected that any redesign of OA/SOAs will only be carried out on up to 5% of cases, and could be significantly less. Since OAs will only be split or merged continuity with OAs produced for the 2001 census will thus be maintained and comparability between censuses achieved.

Southampton University, who were the lead developers of the 2001 OA creation, are working with ONS on the developing a fully automated procedure for the maintenance of 2001 output geographies, and thereby the creation of the 2011 output geographies. The team has employed a hybrid approach, providing more flexibility than the code used for the 2001 OA creation. This approach has the advantage that ONS can then either take the code as is, or take the conceptual design and/or some or all of the code and amend it for their own purposes.

Sub-optimal **Output Areas**

Following the last round of consultation in 2007 some respondents took the opportunity to submit examples of OA/SOAs where, as created by the

automated process, are deficient in some way. These sub-optimal OAs fall into four distinct types

1. Where there are split communities within a single zone, often caused by the zone boundary crossing a feature like a river or railway line.
2. Where they are not socially homogeneous
3. Where aligning to real-life features would have improved the shape.
4. Where the zones have strange and unexpected shapes

These sub-optimal OA/SOAs are the result of the automated process and it is clear how these zones have come to be created, although understandable why users have issues with them.

Whilst the overriding policy is for OA/SOAs to remain stable ONS concluded that it would consider whether the algorithms being developed to maintain OA/SOAs could be adjusted to align to features provided:

- 2001 populations within the OAs were unaffected by the change, so that any time series changes in the OA/SOAs are not a consequence of those adjustments;
- licensing terms were not significantly affected. The more spatial data, e.g. rivers, canals, railways line, used to adjust the boundaries, the more the boundaries will cost. There was overwhelming support in the consultation for keeping OA/SOA boundaries (effectively) free.

ONS cannot commit to “fix” suboptimal OA/SOAs, although there may be exceptional instances where some adjustment would be beneficial to the population within the OA. For example, where the population is not harmonious, and a characteristic of a sub set of residents is hidden. Only a limited number of users submitted suboptimal OA/SOAs during the 2007 Consultation, and there has been no criterion or definition laid down for what qualifies as suboptimal. ONS needs to decides on how to deal with suboptimal OA/SOAs that balances the need for stability of the statistical geography, but addresses those zones which are proven to be unfit for the purpose of reporting statistics. Further consultation on these suboptimal OA/SOAs is needed.

Further consultation

There is a need for further consultation with users on all the issues highlighted in this paper. The consultation will be conducted in conjunction with the planned consultation on outputs and will be detailed in the output strategy plan which should be in place by the end of June 2009.The topics covered in the outputs strategy will include: output content, delivery mechanisms, visualisation requirements, funding and charging policy, uses of microdata, disclosure control policy and geography.