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THRESHOLDS AND COVERAGE IMPLICATION OF AGRICULTURAL SURVEYS AND CENSUSESⁱ

Invited paper submitted by the Netherlands*

Summary

An important decision is whether an agricultural census (and a farm register) is to be limited to a business type of farming or should include also households that grow food for only or almost only home consumption. Agricultural censuses in general are limited to ISIC 011, 012 and 013. However, decisions still have to be taken whether rather rare activities have to be included. Apart from this for more usual agricultural activities different types of thresholds can be applied to avoid including in the system large numbers of households with own food production and/or very small units that altogether contribute very little to agricultural production. Practices in the USA and a few European countries are described from which it becomes clear that harmonisation in this area up till now cannot yet set a good example. Also some observations regarding the application of different kinds of thresholds and of sampling in the smallest size

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class are given. Possibilities for international comparison may benefit from giving up the idea of applying identical thresholds in all countries, but instead establishing thresholds that bring about statistics covering 99% of business agriculture in each country.

What is agriculture ?

1. Of course we all know what is agriculture, but for the sake of completeness I refer to ISIC Rev.3, the International Standard Industrial Classification of all economic activities. (New York 1990, ISBN 92-1-161319-0). In Rev.3 co-ordination has been pursued with the General Industrial Classification of Economic Activities within the European Communities (NACE) and the Classification of Branches of the National Economy (CBNE) of the Council for Mutual Economic Assistance. NACE in the meantime has its Rev.1, (Luxembourg 1996, ISBN 92-826-8767-8). This second version of the NACE now is the subject of EU legislation and it has also been adopted by a large number of other European States.

2. For convenience I reproduce the first three digits of agriculture in NACE Rev.1 (equal to ISIC Rev 3. (Only in the fourth digit a small difference regarding farming of animals appears.)

- A. Agriculture, hunting and forestry
 - 01 Agriculture, hunting and related service activities
 - 011 Growing of crops; market gardening; horticulture
 - 012 Farming of animals
 - 013 Growing of crops combined with farming of animals
 - 014 Agricultural and animal husbandry services, except veterinary activities
 - 015 Hunting, trapping and game propagation, including related service activities
 - 02 Forestry, logging and related service activities
 - 020 Forestry, logging and related service activities
- B. Fishing
 - 05 Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
 - 050 Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing.

3. The publications mentioned in the first paragraph contain extended explanations and it is clear that the classification tends to be more or less complete. Agricultural censuses however often are limited to 011, 012 and 013. And even these ISIC groups include activities that are often not covered in agricultural censuses. Farming of animals (012), has for instance also 0122: "Other animal farming; production of animal products this includes among others: "breeding of pet animals and raising of diverse animals". For this we can think of breeding of e.g. dogs, ornamental birds,

earthworms or ichneumonflies (wasps used for biological insect control). Limiting the field of survey by excluding these activities is certainly of a different character compared with applying a threshold. It however is mentioned here, for there may be comparable reasons for including or excluding certain units from the field of survey. Considerations for this are not easily to be found in publications. Reasons may be:

- the activities concerned are expected to be of a modest scope;
- there is no government policy in the area concerned;
- for the activities concerned, other sources of information are available.

4. On behalf of the EU Farm Structure Surveys, the restriction on the scope of agriculture as indicated above is simply realised by establishing a list of characteristics. What is not on the list need not to be included in the survey (ichneumonflies are not). But even then, countries have to take additional decisions. Crops that are on EU level important may be hardly grown in a certain country and not to be included in national questionnaires.

5. For the purpose of constructing National Accounts, the extent of these "small activities" of course has to be estimated in some way. This often can be done by means of data from associations and on consumption, commerce etc.

Business agriculture or households that grow food for home consumption also

6. An important question is whether units that grow agricultural products for home consumption only are to be included in agricultural censuses and surveys. With regard to this, circumstances and opinions within Europe differ considerably. In the (north) west of Europe a very modest percentage of households partially grow their own food. And in a substantial number of cases it regards more a way of life or a hobby or more confidence in home made food, than being of much economic interest for the households concerned. And certainly the governments do not feel the need for a policy in this. In case there is a governmental interest, it may be with an eye on physical planning and recreational facilities (allotment gardens for instance). In other parts of Europe e.g. the CEE countries, the phenomenon however is much more widespread, for certain countries maybe up to 30% of households. The knowledge of processing and preserving food is still available in lots of families. And there is a strong feeling that in statistics it cannot be neglected; even in case there is not a special government policy in this area.

7. From former discussions on the above question, the following considerations can be derived:

- Families (units) that grow food for own consumption, may sooner or later extend production.

- For certain crops and animals the total percentage grown for home consumption is very high.
Neglecting this would produce misleading figures for totals.
- For data on rural development, the exclusion of small units is unwanted.
- In behalf of studies on the possibilities of professional farming, information on production for home consumption may be useful; (It is difficult for farmers to sell potatoes to families that have a surplus already).

8. These considerations once more ask for concentrating on the question regarding which information is relevant for what reason. In the meantime a comparison with other branches of industry show that for agricultural statistics the ambition in general seems to be relative high. Many countries have statistics on ISIC 9301, laundry industries, completely neglecting the manifold washing of clothes by households. On the other hand, in many countries the government does not have a washing policy.

9. In case the number of households, that grow their own food or sell on an accidental base a surplus, is relative high, it is likely to be efficient to look for a system of sampling. Possibilities for this may be enlarged for the variability of the smallest units, is likely to be modest as far as research characteristics are concerned.

10. A switch to sampling for this type of units may be attractive for two reasons. One is a reduction of costs. The other is that huge numbers of forms constitute a logistical problem and a real threat for vital information becoming available in time.

11. A decision regarding sampling becomes even more profitable, when it is decided also, not to maintain a register with all the "small" ones. In that case a conventional frame for sampling is lacking and one should think of an area frame. It is likely that a classification of municipalities according to degree of urbanisation can constitute a good frame. In case it may be assumed that a high percentage of households are engaged in food production, it may be even considered to use the register of population as a frame. Due to the fact that the areas of the plots concerned are in general likely to be small, it is uncertain whether a kind of point sampling would be appropriate.

12. In case the interest is not primarily in exactly the food growing activities of households, but more in the extent to which families grow their own food, a completely different approach may be considered. A modest adaptation of the budget survey that exists in most countries, could provide information on the percentage of households hardly buying food. And one could think of distinguishing commodity groups like e.g. potatoes, fruit, vegetables, meat, eggs and others. Unfortunately it was not easy to find out whether in certain countries experience exists regarding such approach.

Possible thresholds

13. In case activities mentioned in ISIC/NACE are looked upon as sufficiently important to include in an agricultural census (and possibly a register), in definitions of farms or agricultural holdings, in general reference is made to a certain minimum size. The idea behind this often being that not every family with a modest food production, maybe only (partially) covering own needs, should be looked upon as a unit that has to be enumerated. Such a minimum size or threshold indeed can be applied to limit the total number of farms to be included in a farm register or in an agricultural census. It may be expected that a balance is pursued between value of information and costs involved.

14. Very often a threshold is expressed in physical terms. It can be a certain cultivated area, an area of arable land or a number of animals e.g. 0.1 ha of arable land or one cow or three pigs or five sheep or 50 hens or etc. Within Europe a considerable number of different thresholds of this type exist. For horticulture on very few occasions a minimum area is mentioned. The economic importance of one ha cultivated area indeed varies enormously. In the Netherlands the production value of one ha roses under protective cover equals to 250 ha of wheat. The ratio between mushrooms and wheat is even about 750. Therefore for horticulture in general the criterion is whether systematically production is sold to a certain extent.

15. A general disadvantage of a threshold consisting of a number of criteria is that a unit staying just below quite a few of these, may be much bigger than a unit passing only one. Another problem is that for relative small geographic areas or countries the results may give a "clear picture" because the consequences of applying a physical threshold can be understood easily. But in Europe the differences in production circumstances and economic conditions are so big, that 1 ha is no longer 1 ha, a pig is not a pig and cut-flowers are certainly not cut-flowers. So, for international comparisons this type of threshold is not very adequate.

16. An alternative for a threshold expressed in physical terms, is one expressed in value of money or in an amount of labour. Value of money may refer to value of total production, total production sold, value added or a related criterion. For this the actual value can be taken into account but also some kind of standardised value. Asking for the actual value in many countries is looked upon as full of risks. Respondents may be somewhat hesitating in giving direct information on financial results. And in case only the production sold has to be reported, home consumption may turn out to be surprisingly high on quite a few occasions.

17. Standardising has been a way out for the above difficulty. It can be made operational by developing a series of coefficients indicating the value of for instance total production or value added to be realised with all the different kinds of agricultural activities (keeping a cow, growing a ha of

potatoes and so on). An example of such an approach is the list of coefficients indicating the "standard gross margins" (SGM) which is used in the Farm Structure Surveys in member states of the European Union. The standard gross margin being the difference between the standardised monetary value of gross production and the standardised monetary value of certain specific costs. This difference is determined for the various crops (or groups of crops) and species of animals (or groups of animals) and it is expressed in European Size Units (ESU). One ESU is equal to 1000 ECU for all surveys before 1985. To avoid migration of farms to higher or lower ESU-size classes due to inflation or declining output prices only, the number of ECU per ESU has to be adapted from time to time. For 1993, 1995 and 1997 it was established at 1200 ECU. The total standard gross margin of a holding is obtained by multiplying the areas and the number of animals by the corresponding coefficients. However, in this case these coefficients and the calculated number of ESU per holding are only used for the typology system and for constructing size classes, but not necessarily for defining a threshold.

18. When the amount of labour is the criterion for size, one could easier think of the actual amount of labour spent on agricultural activities, assuming that the latter is defined. Asking for the total amount of labour spent is likely to be more successful than a question on for instance the value of total production. But here also one could think of standardisation with the aid of coefficients that indicate the amount of labour needed for all kinds of agricultural activities. Following the same procedure as for the total SGM, one could calculate total standard person days and develop a size classification and define a threshold. By focusing on labour, the substantial differences in the use of capital however being neglected.

19. Of course the calculation of these coefficients provides all kinds of problems that are not discussed in this paper. The only thing to be said here is that for two reasons one would prefer coefficients with a relative small variance. The first is that this would facilitate the computation of such coefficients. The second is that when the criterion to be used has a wide variance, even when the coefficient (the average) is calculated properly, the procedure of standardisation leads us in many cases rather far from reality. The latter in fact being one of the limitations of standardising. It is almost impossible to develop coefficients for all activities. These can only be calculated for more or less homogeneous groups. And agriculture has very special products.

A few examples

20. In the USA, as a definition of a farm is used: "Any place that produced and sold, or normally would have sold, \$1,000 or more of agricultural during the census year". So, units that grow food for own consumption only and also the ones selling a small surplus, are not included in the agricultural

census. The figure in the class up to \$1,000 indeed indicates that units occasionally selling less than \$1,000 are not left out immediately. The size distribution shows a remarkable similarity with the figures for the EU, reflecting a nice hyperbole. Some 50% of the units count for 1.5% of total sold production. The comparability of data within the USA of course profits from bringing the range of agricultural activities or products on one nominator. However, keeping the threshold for a long period on an absolute amount of money may cause units entering the field of survey, due to inflation only.

TABLE 1. FARMS AND MARKET VALUE OF AGRICULTURAL PRODUCTS
SOLD PER SIZE CLASS IN THE USA, 1997

\$1000

size class	total sales	farms %	size class	total sales	farms %
< 1	0.0	14.5	50 - 100	5.8	8.3
1 - 2.5	0.2	11.5	100 - 250	15.3	9.9
2.5 - 5	0.4	12.0	250 - 500	15.5	4.6
5 - 10	0.9	12.4	500 - 1000	14.9	2.2
10 - 20	1.5	11.1	1000 - 2500	14.2	1.0
20 - 25	0.7	3.2	2500 - 5000	7.0	0.2
25 - 40	1.9	6.1	> 5000	20.5	0.1
40 - 50	1.2	2.8			

Total sales: \$ 196 864 649 000 Total number of farms: 1 911 859

21. In the existing EU Regulation regarding the Farm Structure Surveys the threshold problem also is handled. Article 6 reads:

The survey shall cover:

- a) Agricultural holdings where the agricultural area utilised for farming is one hectare or more.
- b) Agricultural holdings where the agricultural area utilised for farming is less than one hectare, if they produce a certain proportion for sale or if their production exceeds physical thresholds.

22. However, Member States which use a different survey threshold commit themselves to fixing this threshold at a level excluding only the smallest holdings which together contribute 1% or less to the total standard gross margin (SGM), within the meaning of Decision 85/377/EEC, for the Member State concerned.

23. Before the surveys are carried out Member States shall inform the Commission of the methods used to fix their thresholds.

24. The wording cited in the above paragraph: " .. a certain proportion for sale or if their production unit exceeds physical thresholds" leaves considerable possibilities for different approaches. In fact also units that (normally) do not sell their products but almost only produce for home consumption may be included in the surveys. However in a recent document Eurostat has made clear that so far it has been assumed that the units concerned, have not been included in the Farm Structure Surveys.

25. The description of the minimum size in the EU Regulation indeed left possibilities for considerable national differences. A few examples with regard to 1993: Italy (marketed production of at least 1.5 mln lire), Greece (0.1 ha agricultural area), Spain (0.2 ha horticulture or 0.75 ESU) and Portugal (0.05 - 0.2 ha for about 10 different crops and minimum numbers for 10 species of animals) have relatively low thresholds. Denmark (5 ha or 3 ESU) and the Netherlands (3 ESU) are on the other side. Denmark mentions that less than 0.5% of total (business) agriculture production is not covered by the census. For the Netherlands this might be about 1%. Poland and Hungary (0.1 and 0.15 ha cultivated area respectively, or very modest numbers of animals) in most recent agricultural censuses also applied rather low thresholds.

26. Partly due to these different thresholds, statistics for European countries show considerable differences as far as the structure is concerned. The figures in table 2 are derived from the 1993 EU Farm Structure Survey and show the distribution of holdings and of standard gross margin by size classes of standard gross margin. However, the numbers in especially the smallest size classes and therefore the total number of units is for the time being not comparable.

TABLE 2. HOLDINGS AND STANDARD GROSS MARGIN (SGM)
PER SIZE CLASS IN EU COUNTRIES 1993ⁱⁱ

		SGM per holding (ESU)									
		0-<2	2-4	4-8	8-16	16-40	40-100	>100	tot.		
		%							(1000)		
A.											
B		11.9	8.1	9.6	11.3	22.5	28.2	8.1	100	Holdings	(76.3)
		0.3	0.6	1.4	3.4	15.7	45.5	33.0	100	SGM	(2980)
DK		0.6	5.0	14.0	18.5	23.6	25.6	12.6	100	Holdings	(73.8)
		0.0	0.3	1.7	4.4	12.6	34.3	46.4	100	SGM	(3594)
BRD		19.7	12.0	13.0	14.3	22.8	15.1	3.0	100	Holdings	(606.1)
		0.8	1.3	2.8	6.3	23.1	34.2	31.4	100	SGM	(15937)
Gr.		32.7	20.3	22.4	16.2	7.5	0.9	0.0	100	Holdings	(819.2)
		5.0	9.5	20.6	29.0	27.8	7.5	0.6	100	SGM	(5118)
Sp.		40.8	18.5	15.9	12.3	8.6	2.5	0.7	100	Holdings	(1383.9)
		4.7	6.4	11.0	16.8	24.9	17.5	18.7	100	SGM	(11458)
Fi.											
Fr.		18.6	9.1	9.7	13.1	26.3	18.3	4.9	100	Holdings	(801.3)
		0.6	0.9	1.9	5.3	24.1	38.1	29.1	100	SGM	(23373)
Ie.		17.0	16.1	19.6	17.9	20.2	8.2	0.9	100	Holdings	(159.4)
		1.2	3.2	7.5	13.7	34.5	30.9	9.1	100	SGM	(2393)
It.		49.5	18.2	13.2	8.9	6.7	2.6	0.9	100	Holdings	(2488.4)
		5.7	6.7	9.7	13.1	21.4	20.1	23.4	100	SGM	(18970)
Lux.		13.2	8.8	10.9	9.4	24.1	31.5	1.2	100	Holdings	(3.4)
		0.5	0.9	2.2	3.7	23.9	63.2	5.5	100	SGM	(99)
Nl.		0.1	1.6	9.9	12.7	18.9	35.2	21.6	100	Holdings	(119.7)
		0.0	0.1	0.9	2.1	7.3	34.7	54.9	100	SGM	(8274)
P.		49.3	24.2	14.3	7.1	3.6	1.1	0.4	100	Holdings	(489.0)
		10.2	13.6	15.9	15.6	17.6	12.9	14.2	100	SGM	(2443)
S.											
Uk.		21.1	9.9	11.0	11.8	17.8	17.9	9.6	100	Holdings	(243.5)
		0.4	0.8	1.7	3.6	12.5	30.0	51.2	100	SGM	(9247)
EU-12		36.4	16.4	14.3	11.6	11.6	6.7	2.2	100	Holdings	(7264.0)
		2.4	3.3	5.7	9.2	20.8	28.8	29.8	100	SGM	(103886)

27. As indicated already, in table 1 the differences between countries as regards the percentage of holdings in the classes 0-2 and 2-4 ESU is somewhat overstated. The fact that Denmark and the Netherlands use a relative high threshold is clearly reflected in the figures. Using a lower threshold in these countries would enlarge the number of holdings below 4 ESU considerably. Denmark mentions for this some 7 400 holdings that are small but still sell part of their production (10% of the number that is included now). In the Netherlands this could be about 20 000 holdings (16% of the number surveyed). But in both countries it would hardly affect the total SGM. Recently the BRD lifted the threshold to be applied considerably.

Some observations regarding thresholds and international comparison

28. In many countries the size distribution is of a shape in which small changes in the threshold to be applied have considerable consequences for the total number of units to be included in an agricultural census and a farm register. This is true for countries that include units that grow food for home consumption only as well as for countries that do not. And one should not expect that the effort needed for updating registers for small farms and surveying these is relative modest. It can easily be the opposite. When resources are restricted - which may be the case now and then - one could ask whether it wouldn't be better to concentrate on the question for which size classes, enumeration of all the units is absolutely necessary. A good reason for complete enumeration e.g. being the intention to use the census results as a sample frame. For many samples however, it is not very efficient to survey the smallest size class. In other words, a solution of the problem connected with a census could be, not carrying out a full census at all. In fact the considerations given with regard to units growing only their own food (paragraph 2.3, 2.4 and 2.5) maybe taken into account as well for the smallest units in agricultural business.

29. It is a comforting thought that the shape of the size distribution also implies that in most countries, reducing or extending the population to be surveyed with e.g. 10% hardly affects the totals of most characteristics

30. Due to the fact that production circumstances and the economic situation differ considerably between countries, possibilities for comparisons between countries are rather limited when a threshold is expressed in absolute figures, be it area, numbers of animals, man days or money. Holdings of a size which is near to such a threshold may be looked upon in one country as a "real agricultural holding" whereas in other countries it would be regarded as a "hobby farm" and in any case of to small economic interest. In fact it would be interesting to know to what extent holdings near the threshold applied, are dependent on their agricultural activities. Unfortunately in many countries no information is gathered about non farm income. It would anyhow be helpful to have more information on the

smallest holdings, in order to take justified decisions on a threshold to be applied.

31. The more agriculture is looked upon as a branch of economic activity like other branches are handled, the more there seems to be a tendency towards a relative high threshold. And it seems rather difficult to pursue authorities paying attention to a phenomenon in which not a problem is felt at all.

32. However nowadays frequently the need for data on rural areas and on rural development is expressed. And it seems as if agricultural statistics can be used as a vehicle to gather information on various aspects of rural life. And this might be a good reason to apply a low threshold. However, before a conclusion regarding this aspect can be drawn, there has to be more certainty about what kind of information on rural areas has to be looked for. And concepts on rural policy often do not excel in lucidity when data needs are concerned. As long as this has not become clear it cannot be assumed that just applying a low threshold in agricultural statistics is an efficient way to provide the information needed. Maybe paying attention to agricultural services, hunting and forestry (01.4, 01.5 and 02 of the table in paragraph 1.2) is more adequate.

33. And this once more has to be the most important point. Which information is really necessary for which policy? In case policies have to be served that can hardly be looked upon as agricultural, one could even wonder whether carrying out the surveys concerned under the headline (and budget) of agricultural statistics is a good strategy.

34. In case units that grow food for own consumption only are not to be included, possibilities for comparison between countries may gain from the alternative available to EU countries to set a threshold in a way that 99% of total standard gross margin is covered. In other words, to leave out the smallest units that altogether represent less than 1% of the total SGM. Such an approach would inevitably lead to different thresholds in different countries. However, it seems that anybody working with statistics of different European countries would have a more clear picture of what the figures refer to than is the case nowadays. And one of the intentions still is to make things clear. In stead of 99% of total SGM, again one could think of total production or net value added etc.

35. In order to know what is 99% of total agricultural production (or SGM), one unfortunately has to know what is 100%. This really can constitute a problem. It means that from time to time an orientation is needed with regard to the question which percentage of total agricultural production is left out when using a certain threshold. For this check regarding the only 1% to be left out, there of course is not a need for keeping the very small units in a register. An area frame sample might provide a check on completeness of the register and the share of small units as well.

36. For countries with a different structure of agriculture in different regions one could possibly think of adopting different thresholds for these regions. Otherwise in regions with comparatively many small farms, an unacceptable high percentage of "agriculture" would be neglected. As a consequence of adopting different thresholds for different regions, the 1% left out does not consist on a national scale of only the smallest units.

37. Another problem that has to be kept in mind is that for some agricultural activities a surprisingly high percentage can be included in the 1% of total business agriculture to be left out. In the Netherlands for instance according to an estimate about 35% of sheep are not included in the agricultural censuses. In this case however an estimate of the total herd can be made, due to the fact that also sheep of "hobby farmers" sooner or later end up in a slaughterhouse and as yet appear in statistics. So in this case the statistics on slaughters is one of the sources to provide for estimates needed to check if indeed only 1% is neglected.

Conclusions

38. For international comparison it is important that a distinction is made between units that grow food for only or almost only own consumption at one side and units with a business type of agriculture at the other side. Selling a small surplus does not make business agriculture. A "first" threshold might be established to ensure this distinction

39. In case the units below this first threshold are to be surveyed, possibilities for sampling without keeping a full register should be considered. Attention is to be given to a modest extension of existing budget surveys as well.

40. It might be an illusion to think of an absolute threshold to be applied in many countries as to enable or to facilitate international comparison. However, establishing for every country (or possibly region) separately thresholds in a way that a certain percentage e.g. 98% or 99% of agricultural activity is covered, would lead to more clear possibilities for comparisons.

41. Available figures indicate that sampling below a certain size (a second threshold) could be an attractive procedure for many countries. The notion "census" should not hamper an efficient procedure too much.

42. The request for integral data on also the small units in behalf of policies on rural development urgently needs specification, the latter often completely being absent.

END NOTES

1/ This paper concerns an updated and extended version of a paper that has been distributed at the IWG-AGRI seminars in Budapest and St. Petersburg.

2/ The figures for Austria, Finland and Sweden refer to 1995.
