Study Visit
AGRICULTURE STATISTICS

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Use of IACS data in crop surveys

Roberto Gismondi

Istat

IACS

- ✓ IACS (Integrated Administration and Control System) is the most important system for the management and control of payments to farmers made by the Member States in application of the Common Agricultural Policy
- ✓ IACS is operated in the Member States by accredited paying agencies. It covers all direct payment support schemes as well as certain rural development measures
- ✓ The legal requirements concerning IACS are laid down in Council Regulation (EC) No 73/2009 establishing common rules for direct support schemes for farmers and in Commission Regulation (EC) No 1122/2009 laying down the implementing rules
- ✓ In physical terms, IACS consists of a number of computerized and interconnected databases which are used to receive and process aid applications and respective data. The IACS databases have to be updated by the Member States and the historical data for the farmers must be saved

IACS

- ✓ As regards the Italian IACS authority, obligation by law should limit the risk of cases for which agriculture producers or traders do not subscribe. On the other hand, the logic underlying the IACS register is based on self-declarations as regards surface used for agricultural purposes: this feature may hamper data reliability
- ✓ Potential risks:
  - missing declaration from holders
  - mistakes due to producers' declarations;
  - duplications derived from double counting of some productions
- ✓ Common "population coverage" problems which must be tackled whenever an administrative source is intended to be used for statistical purposes

IACS – Preliminary codification: example

Macrouse	Description	Product	Details	Code Variety/Use	Variety/Use	Crop survey - Italy	Crop survey - Eurostat	Land use - Italy	Land use - Eurostat
240	CITRUS	201	ORANGES	000		T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	001	MORO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	002	TAROCCO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	003	SANGUINELLO	T1000	T1300	T0000_MA	T0000
240	CITRUS	201	ORANGES	004	SANGUIGNO COMUNE	T1000	T1300	T0000_MA	T0000
240	CITRUS	201	ORANGES	005	ALTRE VARIETA' PIGMENTATE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	006	GRUPPO NAVEL	T1000	T1100	T0000_MA	T0000
240	CITRUS	201	ORANGES	007	BIONDO COMUNE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	008	VALENCIA LATE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	009	ALTRE VARIETA' BIONDE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	010	ARANCE AMARE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	011	LANE LATE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	012	MORO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	013	NAVEL LATE	T1000	T1100	T0000_MA	T0000
240	CITRUS	201	ORANGES	014	OVALE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	015	SANGUINELLO	T1000	T1300	T0000_MA	T0000
240	CITRUS	201	ORANGES	016	TAROCCO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	017	TAROCCO DAL MUSO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	018	TAROCCO GALICE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	019	TAROCCO GALLO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	020	TAROCCO LAMBISO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	021	TAROCCO MANUELE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	022	TAROCCO NUCELLARE	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	023	TAROCCO SCIARA	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	024	TAROCCO SCIRÈ	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	025	TAROCCO TAPI 898	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	026	TAROCCO TARTUFO	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	027	VALENCIA *o BLANCAS????*	T1000	T1200	T0000_MA	T0000
240	CITRUS	201	ORANGES	028	VANIGLIA	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	029	NAVEL	T1000	T1100	T0000_MA	T0000
240	CITRUS	201	ORANGES	030	NAVELLINA	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	031	NEW HALL	T1000	T1000	T0000_MA	T0000
240	CITRUS	201	ORANGES	032	W.NAVEL	T1000	T1100	T0000_MA	T0000

IACS - Comparisons

- ✓ Comparison among IACS data and the ISTAT crop statistics as regards 2014
- ✓ IACS data compared with ISTAT crop statistics and FSS (Farm Structure Survey) data
- ✓ The kind of cultivations analyzed cover the 20% of Italian agricultural area: they are rice, olives, grapes, fruit and citrus fruit
- ✓ As regards fruit, additional details are presented
- ✓ The main outcome is that IACS data are aligned with crop statistics and are not systematically higher or lower, both at the whole Italy and at the geographical area levels

IACS - Comparisons

Table 1 – *Agricultural surface use in 2014 - Comparison among sources (hectares)*

Source/Cultivation	Rice	Olives	Grapes	Citrus fruit	Fruit	Total
IACS						
Italy	234.813	1.119.633	653.697	106.476	377.557	2.492.176
North	229.981	17.879	253.983	17	159.437	661.298
Centre	422	176.959	101.243	313	62.238	341.175
South	4.410	924.795	298.471	106.145	155.883	1.489.703
CROP STATISTICS						
Italy	219.532	1.125.183	682.183	142.011	372.582	2.541.491
North	215.342	23.343	230.959	55	133.559	603.258
Centre	378	201.986	107.984	653	37.893	348.894
South	3.812	899.854	343.240	141.303	201.130	1.589.339
FSS 2013						
Italy	212.238	1.073.324	635.979	129.155	388.808	2.439.504
North	209.960	20.121	246.962	16	164.886	641.945
Centre	0	182.122	103.056	2.286	51.834	339.298
South	1.834	871.081	285.961	126.853	172.088	1.457.817
% DIFFERENCE (ITALY)						
IACS vs crop statistics	7,0	-0,5	-4,2	-25,0	1,3	-1,9
IACS vs FSS 2013	10,6	4,3	2,8	-17,6	-2,9	2,2
Crop statistics vs FSS 2013	3,4	4,8	7,3	10,0	-4,2	4,2

Source: elaboration on ISTAT and IACS data.

Istat

IACS - Comparisons

Table 2 – *Fruit surface use in 2014 - Comparison among sources (hectares)*

Source/Cultivation	Nuts*	Peers	Peaches	Other fruit	Fruit
IACS					
Italy	136.531	28.278	59.141	153.607	377.557
North	21.191	26.098	24.323	87.825	159.437
Centre	32.346	576	2.829	26.487	62.238
South	82.995	1.604	31.988	39.295	155.883
CROP STATISTICS					
Italy	125.558	30.145	63.733	153.146	372.582
North	15.598	23.756	20.823	73.382	133.559
Centre	19.665	907	4.088	13.233	37.893
South	90.295	5.482	38.822	66.531	201.130
% DIFFERENCE (ITALY)					
IACS vs crop statistics	8,7	-6,2	-7,2	0,3	1,3

Source: elaboration on ISTAT and IACS data. *Hazelnut, almond, pistachio.

CASE STUDY: Production of oil - Context

- ISTAT produces regional data on olive oil through the «estimative» technique. Data are obtained multiplying surface data by the average production x hectare.
- The payment agency AGEA (IACS) manages the list of olive oil producers through oil mills, olive oil traders and enterprises which transform table olives. The update is done monthly and contains data on the single production declarations.
- Oil mills are obliged to communicate within the day 10 of the month (*m*) quantities of olive pressed and of oil produced related to the month (*m*-1)
- **Topic: progressive substitution of montly estimatives with administrative data (macro/micro) used for statistical purposes?**

CASE STUDY: Production of oil - Problems

- Different definitions and observation fields
- Under-declaration of respondents (units which declare their production). In some cases we may have over-declarations.
- Total hidden production (no declaration)
- Other errors (potential duplications,…)

CASE STUDY: Production of oil - Models

a) Level estimate through trasformation of the original data

$$\hat{y}_{True,T} = \theta_{Def}[y_{Agea,T}(1 + \alpha_{Underdeclare,T}) + \beta_{NoDeclare,}] + \varepsilon_T$$

Implies the estimation of 3 parameters of which 2 should change monthly.

b) Change estimate through original data

$$\hat{y}_{True,T} = \hat{y}_{True,T-1} \frac{y_{Agea,T}}{y_{Agea,T-1}}$$

Same logic of index numbers. It avoids the problem of transformation (a) but requires the estimate of the «true» base level and looses precision as *T* grows. The periodic estimate of a «true» level implies revisions.

CASE STUDY: Production of olive oil - Sources

- Actually, statistical data on olive oil are provided by the 20 Italian Regions to ISTAT through estimates supplied by experts and / or local panels of influent farmers and category associations
- Estimates are based on product between utilized surfaces and average production x hectare

Census 2010 data

- They do not concern production, only surfaces
- They may be used for estimating the population of olive oil producers, which however is composed by enterprises without a specific NACE code and agricultural holdings
- Some census data can be linked (surface,..)

CASE STUDY: Production of olive oil - Registers

- Apulia accounts 1.303 olive pressers, of which 988 (75,8%) are enterprises

NACE class	Description	Number	Number %
Total		**988**	**100,00**
10.41	Manufacture of oils and fats	545	55,16
01.26	Growing of oleaginous fruits	151	15,28
01.63	Post-harvest crop activities	106	10,73
11.02	Manufacture of wine from grape	22	2,23
01.61	Support activities for crop production	20	2,02
01.21	Growing of grapes	15	1,52
01.11	Growing of cereals (except rice), leguminous crops and oil seeds	13	1,32
46.33	Wholesale of dairy produce, eggs and edible oils and fats	13	1,32
10.39	Processing and preserving of fruit and vegetables n.e.c.	11	1,11
46.31	Wholesale of fruit and vegetables	10	1,01
01.50	Mixed Farming	9	0,91
46.21	Wholesale of grain, unmanufactured tobacco, seeds, animal feeds	9	0,91
01.13	Growing of vegetables and melons, roots and tubers	6	0,61
46.38	Wholesale of other food, including fish, crustaceans, molluscs	4	0,40
55.20	Holiday and other collective accommodation	4	0,40
56.10	Restaurants and mobile food service activities	3	0,30
Others		47	4,76

Source: elaboration on IACS-ISTAT data.

CASE STUDY: Production of oil – Apulia data

Number of months of declaration

Number of months	Frequencies			Frequencies %		
	2011	2012	2013	2011	2012	2013
0	411	163	388	31,5	12,5	29,8
1	46	156	50	3,5	12,0	3,8
2	631	377	134	48,4	28,9	10,3
3	207	259	256	15,9	19,9	19,6
4	3	134	190	0,2	10,3	14,6
5	4	127	116	0,3	9,7	8,9
6	1	55	95	0,1	4,2	7,3
7	0	20	59	0,0	1,5	4,5
8	0	7	7	0,0	0,5	0,5
9	0	1	2	0,0	0,1	0,2
10	0	3	2	0,0	0,2	0,2
11	0	1	1	0,0	0,1	0,1
12	0	0	3	0,0	0,0	0,2
Total	1.303	1.303	1.303	100,0	100,0	100,0

CASE STUDY: Production of oil – Apulia data on olive oil

Method 1 – All respondent oil producers

	PRODUCTION (Tons)		% CHANGES	
YEAR	IACS	CROPS STATISTICS	IACS	CROPS STATISTICS
2011	148.440	185.072		
2012	200.079	190.160	34,8	2,7
2013	194.859	184.826	-2,6	-2,8

CASE STUDY: Production of oil – Apulia data on olive oil

Method 2 – Panel of respondent producers (couple of years)

	PRODUCTION (Tons)		% CHANGES	
YEAR	IACS	CROPS STATISTICS	IACS	CROPS STATISTICS
2011	143.329	185.072		
2012	155.979	190.160	8,8	2,7
2012	180.684	190.160		
2013	190.210	184.826	5,3	-2,8

CASE STUDY: Production of oil – Apulia data on olive oil

Method 3 – Imputation of non respondents

$$\hat{y}_{T,i} = y_{T-1,i} \frac{\bar{y}_{(P),T}}{\bar{y}_{(P),T-1}} \quad \text{or} \quad \hat{y}_{T-1,i} = y_{T,i} \frac{\bar{y}_{(P),T-1}}{\bar{y}_{(P),T}}$$

	PRODUCTION (Tons)		% CHANGES	
YEAR	IACS	CROPS STATISTICS	IACS	CROPS STATISTICS
2011	208.921	185.072		
2012	206.854	190.160	-1,0	2,7
2013	218.125	184.826	5,4	-2,8

CASE STUDY: Production of oil – Apulia data on olive oil

Method 4 – As method 3 + employment adjustment

$$\hat{y}_{T,i*} = \hat{y}_{T,i} \frac{x_{T,i}}{\bar{x}_{(P),T}}$$

	PRODUCTION (Tons)		% CHANGES	
YEAR	IACS	CROPS STATISTICS	IACS	CROPS STATISTICS
2011	206.793	185.072		
2012	211.067	190.160	2,1	2,7
2013	219.009	184.826	3,8	-2,8

CASE STUDY: Production of oil – Apulia data on olive oil

Method 5 – As method 4 + outliers correction

	PRODUCTION (Tons)		% CHANGES	
YEAR	IACS	CROPS STATISTICS	IACS	CROPS STATISTICS
2011	207.955	185.072		
2012	211.067	190.160	1,5	2,7
2013	221.063	184.826	4,7	-2,8

CASE STUDY: Production of oil – Perspectives

The work should be continued on the basis of further steps, among which:

- extension of the database length to other years
- Replication of the above mentioned simulations to all the Italian Regions
- Estimation of the hidden production, as formalized in the method a)
- Elaboration of indicators able to measure quality of estimates obtained through administrative sources

Similar AGEA (IACS) data on wine production may be used as well