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Agricultural census in Montenegro – methods of data collection

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Abstract

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Keywords: Agricultural Census, agricultural holdings, agricultural structure, data collection

1 Background

1.1 General data on Montenegro

The area of Montenegro is 13 812 km², out of which 2 213 km² (221 297.6 ha) is utilized as agricultural land, accounting for 16%.

Location: Montenegro is located in South-Eastern Europe
Area (in km²): 13 812
Population as per 2011 population census: 620 029
Capital: Podgorica
Old Royal Capital: Cetinje
Currency: EUR
Coastline (km): 293.5

Bearing in mind that the structure of agriculture in the Member States of the European Union varies as a function of differences in geology, topography, climate and natural resources, as well as the diversity of regional activities, infrastructure and social customs, the structure of agriculture in Montenegro is also conditioned by these parameters. Due to terrain configuration and vicinity of the sea, the following

climate types are present in Montenegro: maritime, continental, moderate-continental and mountain climate.

Table 1. Average monthly air temperature (º C), in Montenegro in 2015, by few municipalities

	Average annual	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Pljevlja	9.4	0.9	0.2	3.6	7.4	14.9	16.8	21.1	20.2	16.3	10.2	4.8	1.2
Kolašin	8.5	1.3	0.5	2.0	6.0	13.2	15.5	19.8	18.8	14.4	9.6	4.8	
Nikšić	12.3	2.4	2.6	5.7	9.6	16.0	19.8	25.1	22.4	18.4	12.4	8.6	4.4
Podgorica	17.2	6.4	7.7	11.0	14.7	21.1	25.6	31.0	29.0	24.1	17.0	11.9	6.6
Bar	17.3	9.2	9.3	11.6	14.1	20.0	23.6	27.0	27.0	23.0	17.9	14.2	10.5
Herceg Novi	16.7	8.0	8.3	10.7	13.8	19.5	23.5	28.0	26.8	22.3	16.9	13.4	9.6

Source: Hydro-meteorological Institute of Montenegro

The specific terrain configuration and vicinity of the sea condition various climate types that enable agricultural production of the wide range of agricultural products.

1.2 Main statistical findings

Census of Agriculture is one of the largest statistical operations of collecting, processing and disseminating data on the agricultural structure. The main objective of the Census is to provide accurate, comprehensive and internationally comparable data on number of agricultural holdings, area of total land used for agriculture, livestock by type and categories, agro-technical measures, agricultural machinery, etc. In addition, the Statistical Office conducts the survey on the structure of agricultural holdings, also known as the Farm structure survey (FSS), which helps assess the agricultural situation in the country, monitoring trends and transitions in the structure of agricultural holdings, while also modelling the impact of external developments or policy proposals.

‘’The bottom-line for policy makers in agriculture and development, rests on the numbers’’. - FAO senior statistician, Mukesh Srivastava.

1.2.1 The size of agricultural holdings

Total number of agricultural holdings in Montenegro enumerated by the 2010 Census of Agriculture is 48 870. Family agricultural holdings and business entities in Montenegro enumerated by the 2010 Census of Agriculture had 221 298 ha of total utilized agricultural area (UAA). The average agricultural holding has 4.6 ha of agricultural utilized area.

In 2013, there were 10.8 million agricultural holdings within the EU-28. An analysis by economic size shows that among these there were 6.5 million (or 59.8 %) that had a standard output in excess of EUR 2000. The utilized agricultural area in the EU-28

was almost 175 million hectares (some 40.0 % of the total land area), giving an average size of 16.1 hectares per agricultural holding.

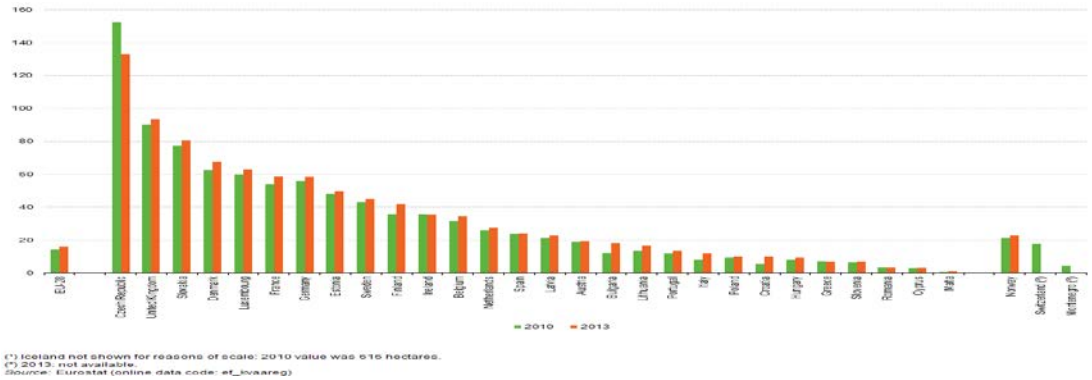
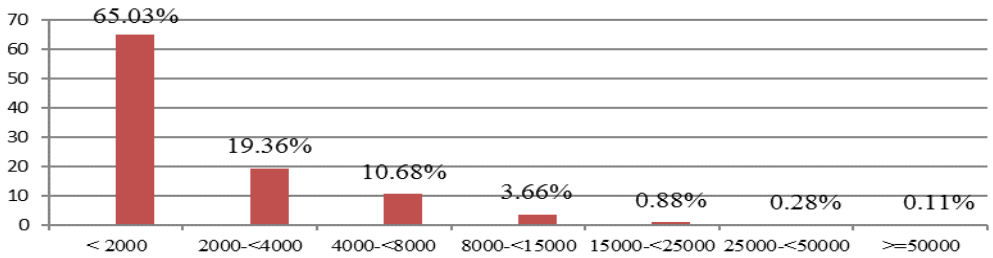


Chart 1. Average utilized agricultural area per holding in EU-28 in 2010 and 2013 (1) (ha)

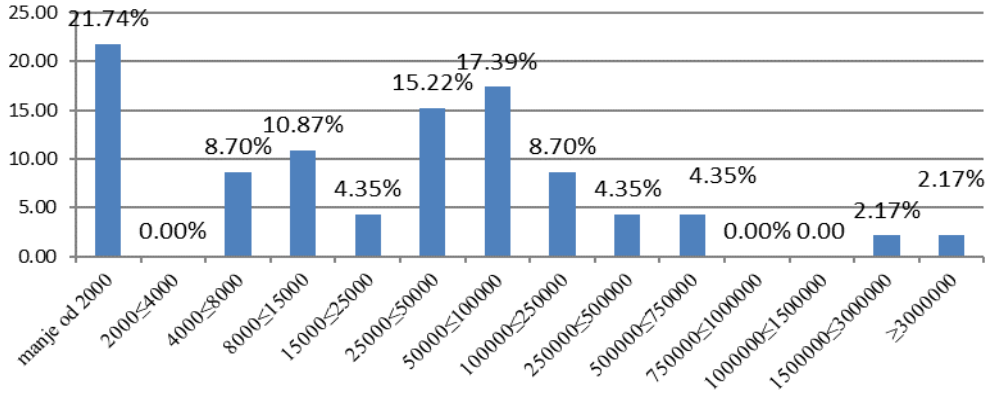
The average size of agricultural holdings in the EU-28 grew from 14.4 hectares per holding in 2010 to 16.1 hectares per holding in 2013, resulting from fall in the number of holdings and a fall in the utilised agricultural area. An increase in the average utilized agricultural area per holding between 2010 and 2013 was recorded in most of the EU Member States, with the Czech Republic recording the only substantial fall and Greece and Ireland recording smaller reductions.
Over 65% of family agricultural holdings in Montenegro are of economic size value less than EUR 2 000. Of the total number, there are only 168 family agricultural holdings, i.e. 0.34% with the economic value over EUR 25 000.



Source: MONSTAT

Chart 2. Family agricultural holdings by economic size in Montenegro in 2010

The average economic value of business entities is EUR 358 658.3. Somewhat more than a half of business entities possess the economic value over EUR 25 000.



Source: MONSTAT

Chart 3. Business entities by economic size

1.2.2 The farm labour force

In accordance with the data from the 2010 Census of Agriculture in Montenegro there are 98 949 of working persons on agricultural holdings, or 2.03 working members per holding. There is 0.47 AWU of farm work in average (Labour force on the family agricultural holding AWU/total labour force on the holding) at the level of total members of the holding (holder and other working members) making a total of 48 (1 000 annual work units).

Table 2. Output, labour force and livestock, in EU 28 in 2007 -13

	Standard output (EUR million)			Labour force (1 000 annual work units)			Livestock (1 000 livestock units)		
	2007	2010	2013	2007	2010	2013	2007	2010	2013
EU-28	285 597	308 082	331 044	11 850	9 946	9 509	136 793	135 212	130 174
Belgium	6 638	7 248	8 407	66	62	57	3 798	3 799	3 584
Bulgaria	2 314	2 537	3 336	494	407	320	1 246	1 149	1 025
Czech Republic	3 593	3 952	4 447	137	108	105	2 053	1 722	1 728
Denmark	6 918	8 431	9 580	56	52	54	4 582	4 919	4 133
Germany	44 202	41 494	46 252	609	546	523	17 985	17 793	18 407
Estonia	491	595	676	32	25	22	313	306	310
Ireland	4 570	4 298	5 013	148	165	164	5 918	5 787	5 929
Greece	7 677	6 873	8 070	569	430	464	2 627	2 407	2 143
Spain	33 363	34 173	35 979	968	889	814	14 381	14 831	14 502
France	45 978	50 733	56 914	805	780	725	22 544	22 674	21 871
Croatia	1 373	2 115	2 029	189	184	175	883	1 020	864
Italy	40 543	49 460	43 767	1 302	954	817	9 901	9 912	9 374
Cyprus	604	459	495	26	19	17	247	201	175
Latvia	597	777	990	105	85	82	488	475	486
Lithuania	1 322	1 526	1 919	180	147	145	1 031	900	839
Luxembourg	227	269	314	4	4	4	161	168	165
Hungary	4 655	5 241	5 578	403	423	434	2 409	2 484	2 259
Malta	85	96	97	4	5	4	50	42	35
Netherlands	18 071	18 930	20 498	165	162	153	6 415	6 712	6 602
Austria	5 199	5 879	5 671	163	114	111	2 473	2 517	2 439
Poland	17 035	18 987	21 797	2 263	1 897	1 919	11 118	10 377	9 165
Portugal	3 681	4 640	4 509	338	363	323	2 030	2 206	2 036
Romania	10 120	10 420	11 990	2 205	1 610	1 553	6 042	5 444	4 975
Slovenia	885	913	1 009	84	77	82	554	518	488
Slovakia	1 269	1 731	1 812	91	56	51	747	668	645
Finland	2 729	3 098	3 398	72	60	58	1 152	1 121	1 173
Sweden	3 736	3 733	4 679	65	57	59	1 785	1 752	1 715
United Kingdom	17 722	19 555	21 819	306	266	275	13 872	13 308	13 106
Iceland	:	237	:	:	4	:	:	161	:
Norway	3 030	3 156	3 410	56	46	44	1 268	1 229	1 241
Switzerland	:	5 717	:	117	98	:	1 770	1 794	:
Montenegro	:	127	:	:	48	:	:	118	:

Source: Eurostat (online data code: ef_kvaareg)

The total farm labour force in the EU-28 was the equivalent of 9.5 million annual working units in 2013, of which 8.7 million (92 %) were regular workers.

1.2.3 Livestock units

The EU-28's livestock herd was 130 million livestock units (LSU) in 2013. The total number of livestock in the EU-28 decreased between 2007 and 2013 by 6.6 million LSU, equivalent to a fall of 4.8 % (see Tab.2). Total number of agricultural holdings in Montenegro which breed livestock is 32 675, while total number of livestock units (LSU) is 117753 (see Table 2).

1.2.4 Agricultural land use

As noted above, utilized agricultural area accounted for two fifths (40.0 %) of the total land area of the EU-28 in 2013. The following charts represent the structure of agricultural land used in EU 28 and in Montenegro.

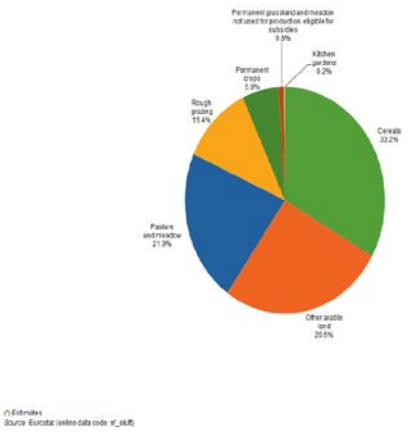
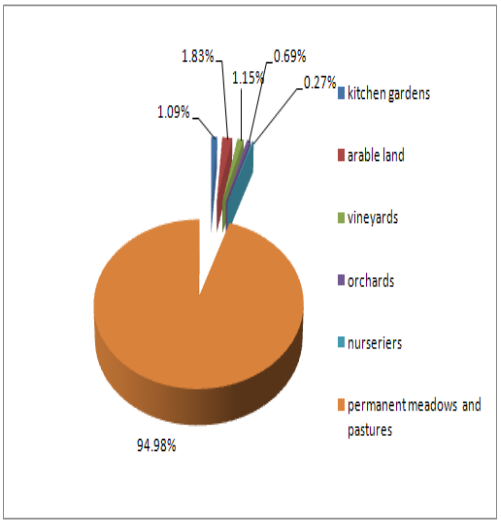


Chart 4. Utilised agricultural area by land use EU-28, 2013 (% share_of_ utilised_agricultural_area)



Source: MONSTAT

Chart 5. Structure of utilized agricultural land, 2010, in Montenegro

The census showed that perennial meadows and pastures comprise 95% of the total used agricultural land in Montenegro, while other categories of land such as gardens, fields, vineyards, orchards and hothouses make a little more than 5%.

All those data present the current situation in the area of agriculture in Montenegro and they are the basis for future annual statistical surveys in this area, which will serve also for the needs of Montenegro to access the European Union funds.

2 Methods of data collection in Agricultural Census in Montenegro

2.1 The Agricultural Census in the past

Statistical Office of Montenegro – Monstat conducted the Census of Agriculture, the first one in Montenegro after 50 years, from 7 to 21 June 2010. Previous censuses of agriculture on the territory of the former Yugoslavia referred mainly to the censuses of livestock, and were conducted together with the censuses of population. Within the period from 1945-2007 censuses of livestock were conducted in 1949, 1950, 1951, 1952, 1953, while the general Census of Agriculture was conducted in 1960 containing 111 questions on agriculture (previously general Census of Agriculture in 1931, but because of national revolutionary turmoil the data processing had been slowly conducted).

The data on agriculture were collected with the Census of Population, Dwellings, and Households, and the last one was conducted in 2003 having only 16 questions on agriculture. Still, for reasons of limited number of questions on agriculture, these data cannot provide complete and comparable data on Montenegro agricultural holding structure.

In accordance with the Law on Conducting the Census of Agriculture 2010 (Official Gazette of Montenegro 54/09 and 14/10), a comprehensive census of agriculture was conducted in Montenegro using the door-to-door method. As the basis for harmonization with the EU standards, new legal frameworks referred to the Census of Agriculture 2010 were used: Regulation (EC) No 1166/2008 of the European Parliament and of the Council of 19 November 2008 on farm structure surveys, and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88; Handbook on implementing FSS and SAPM definitions; Handbook for typology; and FAO Recommendations for AC 2010.[1]

2.2 Organization of the survey

The census data for family agricultural holdings were collected via interview method by authorized enumerators, while the data for business entities were collected by regular post. Preparation, organization and conducting of the Census of Agriculture was launched by the Statistical Office of Montenegro in 2008 when the professional statistical body was established under the name Bureau for Preparation, Organization and Conducting of the Census. The Bureau, consisting of 6 employees, prepared all census instruments. Statistical Office of Montenegro carried out certain census tasks through the work of 42 state instructors, nominated by the director of Statistical Office of Montenegro. The primary duty of state instructor was to perform tasks ordered by the Statistical Office of Montenegro in a timely, accurate, and efficient manner. State instructors conducted the training of municipal instructors and

[1] National Methodological Report.

participated in the training of enumerators. State instructors provided professional assistance to the bodies and participants of the census. Bodies for preparation, organization and conducting of the Census of Agriculture are:

- Statistical Office of Montenegro
- Committee for the Census of Agriculture.

Direct participants of the census are: Agency for Selection and Payment, instructors, supervisors, and enumerators.

The public tender under the MIDAS project was won by the German institution - ASA Institute (its partners in Montenegro are Praxis Montenegro and CDT). The main tasks of the Agency were: selection of participants in the Census (enumerators, municipal instructors, supervisors and persons for data entry), providing the premises (for training, premise for storage of the census material, premise for work of instructors, and premise for data enterers), and payment of census participants by criteria defined by the Statistical Office of Montenegro and according to the recommendations of the World Bank. According to the defined criteria of Statistical Office of Montenegro, the Agency elected 270 municipal instructors who performed control of the enumerators' work in the period from 7 to 21 June 2010 in accordance with the Methodological Guideline of Statistical Office of Montenegro. One municipal instructor was responsible for the work of 8 to 10 enumerators.

Enumerators also selected by the Agency according to the defined criteria of Statistical Office of Montenegro, 2 170 of them (including the reserve), carried out direct enumeration in the field in accordance with the guidelines of Statistical Office of Montenegro. In general, one enumerator was in charge of one enumeration area. Enumerators used map and description of the enumeration area(s) for every enumeration area they were responsible for. The enumeration data were entered manually in the Statistical Office of Montenegro. The data entry was performed by 30 persons engaged by the Agency through the previously drafted application. There was calculation and logical control.

2.3 The agricultural census in the future

2.3.1 Key methodological issues

The activities to be undertaken in relation to the next Census of Agriculture can be classified into three phases:

1. Preparation phase - This phase comprises the establishment of a legislative framework for the implementation of the census (Law or Decision); setting up of the Technical Working Group for the census organization.
2. Organizational phase - Development of project documentation (work plan, budget, all main and auxiliary instruments of research - methodology, forms); implementation of the trial survey in order to evaluate the main instruments to be used in the main census; evaluation of the trial survey (including the completion

of the main instruments). This phase includes the selection and training of instructors and enumerators both for trial and for final census.

3. Implementation phase - Implementation of the main census according to the established methodology; data entry and processing; publication of data.

Certainly, the technical working group will base its work on the recommendations given in the FAO World Program for 2020 Agriculture Census. The key methodological issue to be considered in planning and development of the census of agriculture is whether to undertake a “classical” census or a “modular” census. Existing sources of data should be fully evaluated before deciding what to collect in the census questionnaire. Registers, other administrative records and statistical sources can all provide valuable data. A good frame is critical to the success of the census. The frame can be compiled from existing sources or from a special listing exercise. The best solution is often a combination of frames using common concepts. Sampling in the census provides a cost-effective solution, particularly if a modular census is to be undertaken. The loss of detailed information at subnational levels, and particularly for the smallest administrative units, has to be carefully considered when deciding on the sample design. The quality of the data is an important issue and a quality assurance plan should be prepared and implemented. New developments in data collection methods, including the use of technology, should be considered in planning the census[2].

It is also interesting to consider the following options due to the overlap of the population census and the census of agriculture. Previously, in the former Yugoslavia, data on agriculture were included in the population census, which is also in line with FAO WCA 2010 recommendations. Option of conducting two censuses as a joint action should also be considered. A separate questionnaire would be used for each census, but the data would be collected by an interviewer at the same time. This approach has several advantages that are reflected in reducing costs and lower burden on reporting units, but also in linking data from two censuses at the unit level and in an organizational term where one organizational team is engaged for both lists.

Registers and other administrative sources can be used for the agriculture census. In our case, the register of organic producers and rural development. It is also possible to combine administrative and statistical data.

Montenegro is a candidate country and our task is harmonization with EU standards. A new legal framework that is currently being prepared, and which has been presented in the Strategy for Agricultural Statistics for 2020 and beyond, has to be adopted as a basis for harmonization with the EU. It is the Framework Regulation for Integrated Farm Statistics (IFS). The IFS is based on the idea of having a limited core set of variables to be surveyed as a census in 2020 and as a sample survey in 2023 and 2026, several modules to be surveyed at different frequencies than the core

[2] FAO, World Programme for the Census of Agriculture 2020

variables and with lower quality requirements, and satellite lists that would be quite flexible and easier to change, but also carried out at different frequencies and with even lower quality requirements. The IFS legal architecture would consist of the main regulation including the core variables, population, frequency and quality criteria. The modules, satellites and definitions would be in delegated/implementing acts. This framework regulation will replace the following statistical regulations:

- Farm Structure Surveys (1166/2008)
- Permanent crop statistics (Orchards and Vineyards surveys) (1337/2011)[3].

In addition, parts of Agro-Environmental statistics (presently not under legislation), where data should be collected at farm level (such as irrigation, manure, nutrient use and livestock management), will be integrated into this framework regulation.

2.3.2 Methods of enumeration and future plans

Strategic goals are defined in the Development Strategy of Official Statistics 2014 – 2018. Specifically, the Strategy determines the long-term goals based on the current state of affairs, needs and future development, and they are:

1. Modernization of official statistics data collecting
2. The use of administrative data for statistical purposes

Modernization of data collecting of official statistics in predetermined period will include introduction of CAWI, CAPI and CATI methods for data collection. Centralized collection system coupled with the new methods of data collecting (phone, web etc.), and better organization of field work will contribute to improvement of quality of overall statistical system.

Statistical Office of Montenegro has used increasingly administrative data sources for statistical surveys. During last eight years, 17 agreements on cooperation have been signed with the institutions from different statistical areas.

Advantages of using administrative sources are:

- Reducing the burden on reporting units
- Reduction of costs
- Higher quality data
- Reducing the time of data collection

Activities of official statistics are based on the Program that is in compliance with the Development Strategy adopted for the five-year period. The Program defines general objectives of development activities allocated by domains.

Two general objectives of development activities which cannot be allocated by domains are:

1. Modernization of official statistics data collecting
    - CAWI (Computer-assisted web interviewing)
    - CAPI (Computer-assisted personal interviewing)
    - CATI (Computer-assisted telephone interviewing)

[3] Eurostat, Strategy for agricultural statistics for 2020 and beyond

2. The increase in use of administrative data for statistical purposes
    - Using administrative databases / registers
    - Integration and standardization of statistical processes
    - Development of statistical databases that allow multidimensional analysis

In order to introduce CATI method it is necessary to provide space, call centre, hardware and software. To that end, the Statistical Office of Montenegro already conducted certain activities (CAPI method - Annual Survey Livestock Production 2015 and Survey ICT in 2016 and CAWI method - Survey on arrivals and overnight stays of tourists in 2016). Advantages of using CATI method for data collection are:

- Implementation of a large number of interviews in a short period of time
- Lower costs
- Simultaneous input and control data
- Control of interviewer

Paper questionnaire for data collection (PAPI method) is still used for a large number of surveys. In the future, Statistical Office of Montenegro plans to increase the number of surveys in which CAWI, CAPI, CATI method or administrative sources will be used.

The introduction of new methods in official statistics will shorten the time of data collection and processing and will also improve the quality of data.

2.3.3 Quality assurance

The definition of quality covers relevance, accuracy, reliability, timeliness and punctuality, accessibility and clarity, comparability and coherence. It is important to have a quality assurance plan in place for the census to ensure confidence in the data and to help the users understand the quality issues associated with the data. Post Enumeration Survey (PES) is an essential component of the quality assurance framework and should be included in the census plan and budget.

3 CONCLUSIONS

Agricultural statistics of MONSTAT has recently started the harmonisation process with EU legal requirements. The 2010 agricultural census was a major milestone. It paved the way for the creation of the Statistical Register of Agricultural Holdings, known as “Statistical Farm Register” (SFR), the framework for all agricultural (sample) surveys and statistics. After 2010 Agricultural Census, Monstat carried out Farm Structure Survey (FSS) in 2016. As the basis for harmonization with the EU standards, new legal frameworks referred to the 2010 Census of Agriculture were used: Regulation (EC) No 1166/2008 of the European Parliament and of the Council of 19 November 2008 on farm structure surveys, and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88.

The backbone of agricultural statistics is the decennial Agricultural Census, also required by the FAO, and the related Farm Structure Surveys (FSS). In line with the

Eurostat s Agricultural Statistics Strategy for 2020 and beyond, Scenario 4 foresees two Steps to Integration of Agricultural Statistic.
This scenario protects the continuation and modernization of structural statistics on agriculture by gradually introducing two new legal frameworks: Integrated Farming Statistics (IFS) to be established before the end of 2018 to ensure the census of 2020 and the second framework for agricultural data statistics / (SAIO) to be adopted and established before 2022. The IFS is based on the idea of having a limited core set of variables to be surveyed as a census in 2020. This framework regulation will replace the statistical regulation for Farm Structure Surveys (1166/2008).[4]
MONSTAT planned to conduct Agricultural census in the period from 2020 to 2022 according to the new framework regulation IFS. Previously MONSTAT planned to conduct Pilot survey to test all instruments for the implementation of the main survey. This Pilot survey should also be conducted according to the new regulation.

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