



A possible definition of household and hobby farmer Late evidences based on Italian sample and census data

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Abstract

“Small” farmers play an important role because they are crucial to local economies and food systems, fostering a closer connection between consumers and their food sources. They are often identified using subjective size threshold based on amount of land, livestock, or revenues. FAO proposed the definition of “Small-scale food producer”, as well as the concept of “Household farm”. In the European Union, a discussion just started on whether or not to include household farms in the observation field of the next agricultural census of 2030. Therefore, it is necessary to adopt a clear and shared definition of what household farms are. In this framework, we propose a methodology for classifying agricultural units based on their market orientation degree. The non-market farms cluster can closely approximate the rural concept of “small” farm. Non-market farms may operate as household farms, or as hobby farmers. The classification methodology uses twelve indicators currently picked up in the frame of agriculture structural surveys managed by ISTAT (IFS). In Italy, in 2023 the share of non-market farms was 14,1% (159 thousand). Among them, household farms accounted for 8,7% of the total, while hobby farmers were the 5,4%. Non-market farms are decreasing compared to 2020, when their relative share was 16,6%.

Keywords: agricultural holding, hobby farmer, household, revenues, utilized agricultural area.

1. Introduction¹

At the international level, an agricultural holding is: “*An economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size. Single management may be exercised by an individual or household, or by a juridical person such as a corporation, cooperative or government agency*” [1]. The definition provided here is largely consistent with that utilized in the most recent agricultural censuses carried out in the European Union (EU). The term “holding” encompasses a wide range of meanings and may refer to both genuine entrepreneurial ventures engaged in market activities and to the management of land and/or livestock that is not intended for the sale of products, such as in the case of subsistence farming or other labor-intensive rural pursuits.

The ongoing debate on the preparation of the next agriculture census – referring to 2030 – includes discussions on emerging farming systems, the financial situation of farms, bio-economy, digitalization, factors affecting farmers' income, investments, as well as the need to include

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subsistence farms – broadly speaking, non-market farms – beyond market-oriented farms. In the EU framework, EUROSTAT and the EU countries are evaluating if “household farms” should belong to the next census observation field or not. Household refers to entities where it is impossible to identify a primary activity for the subsistence activities. If the household engages in undifferentiated subsistence goods-producing activities, among which hunting and gathering, farming, the production of shelter and clothing and other goods produced for its own subsistence, it may fall into the broad definition of “household farm”. However, it is not always simple to distinguish among the holdings’ main purposes (market activities, non-market for subsistence, hobby farming). The specific problem that is still not fully resolved and deserves attention concerns the distinction between true “farms” and “non-farms”. Based on the FAO definition, agricultural holdings can be genuine *true* businesses, as well as operational units that manage land and/or livestock without any real entrepreneurial activity. Therefore, these last units often lack investments, innovations, and modernization skills. While some countries, such as certain Northern European states, predominantly have market farms, non-market agricultural activities still hold significance in countries like Italy. These activities are conducted by both non-market farms and farmers who engage in some kind of “hobby farming” during their free time. Potential answers to this issue must be based on a solid theoretical background as well as on indicators at the single unit level (microdata) that are able to quantify how the agricultural holdings differ from each other based on their operational purposes. In numerous instances, there exists a trade-off between two distinct methodologies: the first prioritizes the theoretical framework underpinning certain classification criteria, while the second delineates strata of holdings based on regularities observed within socio-economic phenomena and subsequently interprets these findings through a theoretical lens. An operational balance should be achieved, particularly when classifications derive from data obtained through comprehensive agriculture structural surveys.

One of the first works that highlighted the coexistence, in Italy, of real agricultural enterprises and agricultural units that are scarcely or not at all entrepreneurial – defined as “non-enterprises” – is given by [2]. The authors proposed a methodology based on the 2010 agricultural census results. They highlighted how the majority of Italian agricultural units are not “businesses” in a strict sense, but pseudo-family entities with low economic size. The authors considered altimetry, technical-economic orientation, self-consumed production, days of work, sub-contracting, age and education of the farm manager, other gainful activities beyond agricultural production, and share of direct payments from the EU on revenues. In this context, we propose a methodology for splitting any starting set of farms into two broad clusters: market and non-market farms. Within the non-market, the further cluster of hobby farmers can be identified as well. After a brief literature review (section 2), we described the basic features of the last sample agriculture structural survey carried out in Italy (section 3) and its relationship with the census. This source provides useful information in order to classify the agricultural holdings based on their entrepreneurial degree (section 4). The main results achieved are analyzed in section 5 and discussed in section 6. Section 7 contains perspective conclusions for further research on this field. Throughout the paper, the term “holding” will indicate a generic agricultural unit.

2. Short literature review

The United Nations' Food and Agriculture Organization (FAO) provided basic guidelines on farm typology to help countries define the typology concept frame within their specific context [3].

These dimensions are a priority: 1) household versus non-household distinction (farm profile); 2) farm size (physical or economic); 3) market integration (access to the market); 4) commodity specialization (main agricultural production); 5) non-farm employment (diversification of income) or other economic activity of the farm (diversification of activities). In this framework, FAO focuses on two major classification criteria. The first one is based on the concept of *family farming* (FF). A family farm [4] is an agricultural holding managed and operated by a household and where 50% or more of the labor force is provided by family workers. A more detailed division can be made between those farms where labor is provided exclusively by the family (farms with only family workers) and those where 50% or more (but not 100%) of the labor force were family workers. Family farms are by far the most common type of farm in the European Union: among the 9,1 million farms in the EU in 2020, an estimated 93% are family farms based on the FAO definition. The second criterion is based on the concept of *small-scale food producer* (SSF). According to [5], SSFs are producers who manage an amount of land and livestock falling in the bottom 40 percent of their cumulative distributions and obtain an annual economic revenue from agricultural activities falling in the bottom 40 percent of the revenue cumulative distribution. Moreover, SSFs earn a revenue lower than 34,387 purchasing power parity dollars per year. As well as the FF criterion, the SSF criterion often leads to an overestimation of “poor” farmers. Gismondi [6] showed that in Italy SSFs would be the not so realistic 69% of the active farms and proposed alternative techniques in order to estimate the number of SSFs even in non-census years. An important implication of the FAO proposals is that the trade/off between *small* and *big* farms - as well as between family/household farms and market-oriented farms - should be based on a set of indicators concerned with size, labor force and revenues. Additional farm’s features may be useful as well. This conceptual outcome represents an important progress with respect to the important household farming definition proposed in [7]: in a very “broad” way, an agricultural household may be a farm that derives any income from agriculture or contributed some labor input to agricultural production. Starting from this too broad coverage, a relatively straightforward approach would be to apply a “narrow” definition and include only those households that are mainly dependent on farming for their livelihoods that is where they derived half or more of their total income from self-employment in agriculture. The basis of this classification is compatible with the complete allocation of all households into socio-professional groups, of which agricultural households could form one. Boncinelli [8] provided an insight of the main methods and approaches so to identify the options, issues and implications of statistically defining the agricultural household. The author underlined how the aforementioned broad approach may be preferred because even households with little agricultural activity have some influence on important aspects such as the environment, landscape or land use, aspects that agricultural policies take into account as objectives and priorities. Lowder *et al.* [9] remarked the importance of not referring to family farms and small farms interchangeably. The stark difference among family farms, in terms of size, their share in farmland distribution, and their patterns across income groups and regions, make clear the importance of properly defining different types of farms and distinguishing their peculiarities when engaging in decision-making concerning agriculture sustainability. Dhillon and Moncur [10] underlined the important role played by small-scale farmers in ensuring world food security providing numerous other direct and indirect environmental, social, cultural, and economic benefits by improving crop diversification, job security, and self-sufficiency. However, there are many barriers to the opportunities that advanced technologies may offer to small-scale farmers: economics, marketing, climate change, lack of awareness, educational resources,

infrastructure, information, and technology are the major challenges to small-scale farming. Rosenberg [11] underlined that there has been little discussion of trends among farm operators who do not sell any agricultural products. Based on the United States census of agriculture data referred to in 2012, the author showed that "zero-sales farmers" represented 22% of the farming population. Women and minority farmers were disproportionately likely to be zero-sales operators: at least 30 percent of women, Native Americans, and black farmers reported no sales in 2012. In order to reduce the effect of zero-sales farmers on many census indicators, the author proposed introducing a zero-sales category in the census results.

As regards hobby farming, Gennai-Schott *et al.* [12] highlighted that the underestimation of hobby farming derives above all from the fact that normally the measurement of the agricultural surface does not consider the type of use of the surfaces but rather the figure of the owner. The main objective was to define the profile and motivations of the hobby farmers, i.e. subjects external to agricultural activity who dedicate their free time to the cultivation of agricultural land. Song *et al.* [13] showed that hobby and part-time farming have become important elements of agricultural development in peri-urban areas of developed countries. Although there has been renewed interest recently in examining the characteristics of this farming, studies have rarely attempted to consider its role in transitional multifunctional landscapes. Focused on South Australia, they used surveys and semi-structured interviews to examine the contributions of hobby and part-time farmers to an evolving multifunctionality.

3. Materials

In the first half of 2024 ISTAT carried out the Integrated Farm Statistics survey (IFS), referred to 2023. This survey is harmonized at the EU level and had the purpose of updating the 2020 agriculture census data. Its regulatory basis is given by the Regulation (EU) 2018/1091 of the European Parliament and of the Council of 18 July 2018. All the EU Member States, according to criteria and methods as specified in the Regulation, carried out the survey. Comparability of data among UE Countries is fully guaranteed. The date of reference of data collected was 1 October 2023, even though livestock referred to 31 December. The questionnaire included two kinds of questions: 1) mandatory questions, derived from the above-mentioned Regulation. 2) Additional questions, due to the need of investigating specific issues that are relevant in the Italian context. The first ones are mainly quantitative questions (as agricultural surfaces, livestock units, employment) as well as qualitative (educational training of the farm manager, organic farming); the others are mainly qualitative (the farm has or does not have some feature) aimed at measuring the degree of modernization and integration of farms with respect to the market. Some examples are: the farm introduced innovations along the last three years, is associated with other farms of businesses, and promotes food security labels, introduced precision/4.0 agriculture. Approximately 81% of the units in the theoretical sample (which included approximately 110 thousand units) replied to the questionnaire and approximately 72% (78.444) declared to be active farm (the remaining 9% includes farms closed down, temporarily inactive, out of target). ISTAT disseminated the results between February and June 2026, even though EUROSTAT already released the IFS results in the last quarter of 2025. Survey microdata can be used to classify active farms based on their degree of entrepreneurial management. The main difference compared to a census (as in 2020) is that using a sample survey allows identifying the specific typology only for the responding units. However, using sample data allows estimating the total number of units (and

their main characteristics) that fall into each typology class in the entire reference population. Beyond the IFS 2023 data, the 2020 census data were necessary as well, for three main reasons. 1) To estimate the standard output of farms (the average monetary value of the agricultural output at farm-gate price) in 2023, which was not yet available at the time of processing. 2) To integrate or correct some missing or uncertain data collected with IFS 2023. 3) To calculate the weights needed to expand the IFS sample data to the universe.

4. Methodology

The main goal is assessing the main orientation of each active farm, connected to the basic purpose of the holding management. The methodology proposed is founded on three main pillars.

1. It is implemented using data collected by a very large survey, whose sample represents all the existing kinds of farm operating in a Country. Most of the applications discussed in the literature are based on small samples that quite always represent only specific subsets of the entire population of existing farms (those for which data are available).
2. Data quality is guaranteed by the direct measurement of the indicators through a skilled data collection network and the use of additional administrative data – and/or past surveys data – for the integration of some missing values.
3. The indicators used are constructed according to a dichotomous perspective (possession or not of a specific feature), thus being very simple and reducing information asymmetries due to the strong positive skewness of the original variables' density curves.

The basic rationale consists of distinguishing between market farms (MA) and non-market farms (NM). Within MA a further breakdown between “strictly market farms” (SM) and “other market farms” (OM) can be achieved, as well as NM farms will be split between household farms (Hou) and hobby farmers (Hob). Each unit will belong to one and only one cluster. The logical steps and the statistical indicators used are provided in the Table 1. The starting population is given by the 75.680 farms that filled in the survey questionnaire.

Table 1 – Logical steps and indicators used for identifying the farms’ types

Step	Type of farm	From	The farm must have
0	Total		
1	NM	Total	Revenues = 0 and non-family workers = 0
(1)	MA	Total	Revenues > 0 and/or non-family workers > 0
2	SM	MA	Payment of social security contributions
(2)	OM	MA	No payment of social security contributions
3	Hou	NM	At least one of these requisites: labor force beyond the farm manager, certain other gainful activities, promoting food security labels, organic farming (converted or in conversion), associated with other farms or businesses, introduced innovations along the period 2021-2023, introduced precision agriculture and/or 4.0 agriculture, utilized agricultural area > 2 hectares, livestock adult units > 2
(3)	Hob	NM	No one among the previous requisites

Steps in brackets (x) are implicit consequences of the same step x without brackets.

Step 1. Farms with revenues = zero and non-family workers = zero are classified as NM farms. The first indicator (revenues) is not enough in order to identify NM farms because even market

farms may have no revenues in some particular years. In addition, if a farm uses non-family workers it should be a market farm, while if not it should be a non-market farms. The implicit consequence of the step 1 is the identification of sample units classified as market farms (MA) that are all those sample units not classified as NM. MA farms have revenues > 0 and/or non-family workers > 0 .

Step 2. Within the MA farms, those that pay social security contributions are the strictly market farms (SM). Payment of contributions for the farm manager, family workers or the employees is a strong signal, because the farm must necessarily have sufficient economic resources to pay the contributions and almost certainly, it is not an occasional market farm. Some farms may pay contributions even though they do not declare revenues (but they must have family workers). The implicit consequence of the step 2 is the identification of sample units classified as other market farms (OM), that are all those sample market farms not classified as SM.

Step 3. This step leads to the identification of household farms (Hou). This cluster includes all the non-market sample units that have at least one among these features. a) Labor force beyond the farm manager. b) Certain other gainful activities. c) Promoting food security labels. d) Organic farmers (converted or in conversion). e) Associated with other farms or businesses. f) Introduced innovations along the period 2021-2023. g) Introduced precision agriculture and/or 4.0 agriculture. h) Utilized agricultural area > 2 hectares. i) Livestock adult units > 2 . The implicit consequence of the step 3 is the identification of sample units classified as hobby farmers (Hob) that are all those sample non-market farms not classified as Hou. All indicators from a) to i) are signals found when some entrepreneurial activity is carried out and are not present when a kind of hobby farming is managed. In particular, organic farming avoids or greatly reduces synthetic chemical inputs such as fertilizers, pesticides, additives, and medicinal products. Organic farms must make significant initial investments to reclaim the land and renew the production systems. The specific other gainful activities taken into account are agro-tourism, educational or social farming, production of energy from renewable sources (wind, biomass, solar, hydro energy, other renewable sources), third party activities. Hobby farmers are a residual share. These units do not generate any revenue. Do not pay social security contributions. Do not engage in any other profitable activities apart from first processing of agricultural products, transformation of vegetable or animal products, wood processing and cutting, and other unspecified activities. Rely solely on the hours worked by the farm manager. Are not organic. Did not introduce innovations or precision agriculture. Are not associated with other farms or businesses. These are “small” farms based on the agricultural land and/or livestock only.

After classifying the sample units into the various typological clusters, the estimate of the number of agricultural units belonging to the individual clusters in the entire reference population follows straightforward. If C indicates the generic cluster (C may be SM, OM, Hou, and Hob) and C includes n_h sample units, the estimate of the number of units belonging to C in the entire population of agricultural units is given by the sum of the sampling weights associated with each of the n_h sample units classified in C . Similarly, the estimate of the total of a generic indicator x referred to the entire population of Italian agricultural holdings classified in the cluster C (for example, surfaces, livestock, number of working days) is given by the sum of the products between the x level observed on each sample unit classified in C by its sampling weights. The analysis did not include common lands, because they are not standard agricultural units.

5. Main results

Based on the methodology described in section 4, the agricultural holdings have been classified according to their degree of openness to the market. Table 2 summarizes the main results. In 2023, 85,9 units out of 100 were market farms (more than 968 thousand). Strictly market farms were 31,8% (359 thousand), while non-market units were 14,1% (159 thousand). Among them, 98 thousand were household farms, accounting for 8,7% of the total, while 61 thousand were hobby farmers, accounting for 5,4% of the total. In addition to the number of units belonging to each type, it is important to evaluate their relative weight. The first finding is that market farms manage 96,5% of the utilized agricultural area, 99,3% of the livestock (calculated as standard livestock units based on recommendations by EUROSTAT), are managed with 96,6% of the annual working units (also calculated based on EUROSTAT standards), and determine 97,9% of the standard output (average monetary value of the agricultural output at farm-gate price). Their relative weight is therefore overwhelming. The relative weight of non-market farms, although very low (3,5% of cultivated areas and 0,7% of livestock units), exceeds the 2% threshold that EUROSTAT has so far considered as the maximum relative weight of agricultural units that may be excluded from the scope of structural surveys conducted within the EU. On the other hand, hobby farms account for only 0,5% of total cultivated areas: in theory, if it were possible to identify them before the survey, they could be excluded from the field of observation. In addition to managing a negligible share of cultivated areas, they do not have significant livestock units, employ less than one working unit on 100, and account for only 0,5% of the virtual value of final production (standard output).

Table 2 – Percent weight of each farms’ typology on the total for some indicators - 2023

Types of farms	Number	Total area	Cultivated area	Livestock units	Working units	Standard output
Market (M)	85,9	96,6	96,5	99,3	96,6	97,9
<i>Strictly market (SM)</i>	<i>31,8</i>	<i>51,2</i>	<i>51,6</i>	<i>82,4</i>	<i>67,9</i>	<i>74,0</i>
<i>Other market (OM)</i>	<i>54,0</i>	<i>45,4</i>	<i>44,9</i>	<i>17,0</i>	<i>28,8</i>	<i>23,9</i>
Non market (NM)	14,1	3,4	3,5	0,7	3,4	2,1
<i>Household (Hou)</i>	<i>8,7</i>	<i>2,9</i>	<i>3,0</i>	<i>0,6</i>	<i>2,5</i>	<i>1,7</i>
<i>Hobby (Hob)</i>	<i>5,4</i>	<i>0,5</i>	<i>0,5</i>	<i>0,0</i>	<i>0,9</i>	<i>0,5</i>
Total	100,0	100,0	100,0	100,0	100,0	100,0

The figures in Table 3 confirm the significant differences between the average farm sizes of agricultural units classified into various types. In 2023, the average total agricultural area per farm in Italy was 13,1 hectares. This average reflects highly diverse farm profiles. Indeed, it ranges from the average of 21 hectares for strictly market farms to 11 hectares for other market farms, and from 4,4 hectares for household farms to 1,2 hectares for hobby farms. Very strong differences in levels also characterize the other indicators examined: livestock, working units and standard output. By the way, it is worthwhile noting that the average standard output level of the non-market farms is 7.577 euros per year, that is lower than the 8.000-euro threshold used in the Farm Accountancy Data Network survey (FADN) carried out in Italy annually on behalf of the Ministry of Agriculture². In the Italian FADN the agricultural units beyond this threshold are not observed. However, 20,5% of non-market farms have a standard output above this threshold.

² <https://www.crea.gov.it/en/web/politiche-e-bioeconomia/-/fadn-farm-accountancy-data-network>.

Table 3 – Average level of some indicators by types of farms - 2023

Types of farms	Total area	Cultivated area	Livestock	Working units	Standard production
Market (M)	14,7	11,8	9,1	0,8	57.479
<i>Strictly market (SM)</i>	<i>21,0</i>	<i>17,0</i>	<i>20,3</i>	<i>1,5</i>	<i>117.199</i>
<i>Other market (OM)</i>	<i>11,0</i>	<i>8,7</i>	<i>2,5</i>	<i>0,4</i>	<i>22.301</i>
Non market (NM)	3,2	2,6	0,4	0,2	7.577
<i>Household (Hou)</i>	<i>4,4</i>	<i>3,6</i>	<i>0,6</i>	<i>0,2</i>	<i>9.636</i>
<i>Hobby (Hob)</i>	<i>1,2</i>	<i>1,0</i>	<i>0,0</i>	<i>0,1</i>	<i>4.246</i>
Total	13,1	10,5	7,9	0,7	50.426

Table 4 shows how the 12 indicators used for classification characterize the profile of the different farm types. The table shows the percentages of agricultural units owning a certain characteristic, compared to the total number of farms of that type. Cells with levels equal to 0% or 100% are direct consequences of the selection procedure described in Section 3. The percentages of farms owning each of the 12 characteristics considered decrease as they move from strictly market farms to hobby farms. Specifically, the payment of social security contributions, the use of labour beyond the farm manager, the presence of specific other gainful activities, innovations, and the presence of at least two standard livestock units are peculiar to strictly market farms. On the other hand, organic farming, associationism, the use of 4.0 agriculture tools, and a farm area of at least two hectares are common behaviours even among household farms.

Table 4 – Percent share of farms with certain characteristics, by type of farm - 2023

INDICATORS / TYPE OF FARM	TOTAL	SM	OM	Hou	Hob
TOTAL NUMBER OF FARMS	100,0	100,0	100,0	100,0	100,0
Labour force					
Payment of social security contributions	40,5	100,0	16,1	0,0	0,0
Labor force beyond the farm manager	35,1	54,2	29,1	24,2	0,0
Non-family workers	18,9	46,3	7,7	0,0	0,0
Sources of revenues					
With revenues > 0	84,6	100,0	97,7	0,0	0,0
With certain other gainful activities	6,0	15,4	1,9	1,1	0,0
Environment and food security					
Promoting food security labels	11,2	21,8	7,6	1,9	0,0
Organic farming (converted or in conversion)	9,7	14,1	8,8	5,3	0,0
Associated with other farms or businesses	49,5	62,7	47,8	42,6	0,0
Innovations					
Introduced innovations along the period 2021-2023	5,6	14,0	2,0	0,8	0,0
Introduced precision agriculture and/or 4.0 agriculture	15,0	31,6	8,4	4,3	0,0
Size					
Cultivated agricultural area > 2 hectares	70,5	87,1	70,2	54,9	0,0
Standard livestock adult units > 2	12,1	22,1	8,6	4,8	0,0

Some features of the farm manager influence the farms' typology (Table 5). Farm managers of the

strictly market farms are younger than average (55,9 years against 62). Are mainly males (74,3% against 67,1%). Have a high-school degree (40,2% against 36,4%). Participated to training activities in the last 3 years (58,5% against 33,5). Are quite less engaged in other businesses beyond agriculture (7,5% against 15,2%). Manage farms using crop rotation and recycling of production refusals more than average (32,1% and 9,8% respectively against 23,2% and 5,9%). A quite different profile characterizes hobby farmers, who are the oldest on average (66,9 years).

Table 5 – Average profile of farms, by type of farm - 2023

INDICATORS / TYPE OF FARM	TOTAL	SM	OM	Hou	Hob
Average age of farm managers (years)	62,0	55,9	64,4	66,7	66,9
Male farm managers (%)	67,1	74,3	64,6	58,4	64,7
Farm managers with high-school degree (%)	36,4	40,2	35,5	32,1	30,7
Farm managers participating to trainings (%)	33,5	58,5	24,3	14,3	8,0
Farm managers more engaged in other businesses (%)	15,2	7,5	18,2	19,8	22,7
Farms using crop rotation systems (%)	23,2	32,1	22,6	7,6	1,8
Farms recycling production refusals (%)	5,9	9,8	4,5	3,3	1,1

6. Discussion

We used twelve indicators in order to classify agricultural holdings according to their degree of market orientation (standard methodology). These indicators are binary variables, indicating whether a specific feature is present in the farm or not. Consequently, they are relatively easy to calculate and understand. The main limitation of the standard methodology is that the set of statistical indicators are available from censuses or structural multi-annual surveys, so they are not available every year. However, indicators as revenues, payment of social-security contributions, family workers, organic farming, and amount of land or livestock are often available from administrative sources. These are the most influential indicators among the twelve selected. It is, however, important to evaluate the possibility of using a simplified calculation methodology, even based on a lower number of indicators, available annually. To this end, we simulated an alternative procedure, based only on the size indicator given by the utilized agricultural area (one of the twelve indicators used in the standard methodology), available annually (Table 6).

Table 6 – % misclassification error (market vs non-market), number of farm and agricultural area under certain land size thresholds - 2023

Size threshold (hectares)	Miss-classification error (%) (1)	Market farms below threshold		Agricultural area below threshold	
		Number	% (2)	Hectares	% (2)
1,1	10,3	171.634	15,2	122.674	1,04
1,0	8,9	151.070	13,4	100.886	0,85
0,5	2,2	39.847	3,5	13.874	0,12
0,2	0,4	6.234	0,6	611	0,01
0,1	0,2	2.746	0,2	43	0,00

(1) Percentage share of the number of market farms classified as non-market (under threshold).

(2) Calculated with respect to the total number of farms (1.128.019) and total agricultural area (11,9 million hectares).

We also supposed that we knew the breakdown between market farms and non-market farms

obtained with the standard procedure. The simulation indicates that, for example, classifying all farms with more than 1,1 hectares as market farms would result in a 10,3% misclassification, which is the percentage of market farms incorrectly classified as non-market. This percentage drops to 8,9% when applying the 1-hectare threshold, and to 0,2% with a 0,1-hectare threshold, with only 2.746 market farms falling below this threshold. The limitation of this alternative procedure is that it does not correctly identify other types of units, particularly household and hobby farms.

Another potential limitation of the standard methodology is that the indicators are not "weighted", but contribute to the classification process in the same arithmetic way. This is because the methodology is based on the logical role that each indicator plays in the classification process. Moreover, the degree of linear correlation among the indicators is quite low, because the average correlation between each pair of indicators is 0,19.

An alternative methodology is based on the use of administrative data, such as farmers' income and social security contributions. In Italy, such data are available annually. This approach allows for a less detailed classification of farms than the methodology based on data collected by the IFS survey. Indeed, with reference to 2023, the use of administrative data leads to an estimate of the percentage of "agricultural enterprises" out of the total of 30,1%, very similar to the 31,8% of strictly market farms derived from Table 2. However, it is not possible to proceed with the classification of the remaining agricultural units into other market and non-market.

To verify the stability of the results obtained and their comparability over time, the procedure was applied to the data collected with the 2020 agricultural census. In 2020, only one of the twelve indicators listed in section 3 was unavailable (precision agriculture). Overall, the results obtained for 2020 are comparable with those of 2023 (Table 7). In 2020, market farms accounted for 83,4% of the total. So, over the following three years their relative importance was estimated to have increased by two, 5-percentage points, while the corresponding agricultural area remained stable. At the same time, non-market farms, and in particular hobby farms, decreased (from 7,8% to 5,4% of the total).

Table 7 – Comparison between 2023 and 2020

Types of farms	2023		2020		Difference 2023-2020	
	Number	Total area	Number	Total area	Number	Total area
Market (M)	85,9	96,6	83,4	96,3	2,5	0,3
<i>Strictly market (SM)</i>	31,8	51,2	33,2	52,8	-1,4	-1,6
<i>Other market (OM)</i>	54,0	45,4	50,2	43,5	3,8	1,9
Non market (NM)	14,1	3,4	16,6	3,7	-2,5	-0,3
<i>Household (Hou)</i>	8,7	2,9	8,8	2,9	-0,1	0,0
<i>Hobby (Hob)</i>	5,4	0,5	7,8	0,7	-2,4	-0,2
Total	100,0	100,0	100,0	100,0	-	-

It's worthwhile noting how in the previous research [2] the authors – based on the 2010 Italian agriculture census data – tried to distinguish between “business farms” and “non-business farms”. The authors showed that in 2010, 80,1% of agricultural units were "non-businesses". Even though with a certain approximation, given that the methodologies adopted are different, we can compare this share with the 83,4% and the 85,9% estimated for 2020 and 2023 respectively, as shown in Table 7. It is reasonable to suppose that the strong concentration and reorganization process that



characterized Italian agriculture in the last years led to a significant reduction in the number of "non-businesses", which could be quantified as 5, 8 percentage points less compared to 2010.

7. Perspectives

The work proposes a methodology for classifying agricultural holdings based on their ability to generate revenues from specific market activities. This methodology relies on the availability of appropriate statistical indicators at the individual farm level. Typically, these data derive from agriculture censuses, which are carried out every ten years in the EU. However, the classification procedure can be implemented when agriculture sample structural surveys data are available as well. In each EU country a structural sample survey (IFS) has been carried out with reference year 2023 and will be replied as reference year 2026.

The proposed methodology is simple as it is based on whether the agricultural holdings possess one or more of the requirements described by the twelve indicators taken into consideration. We did not use more complex algorithms such as cluster analysis, factor analysis, or other multidimensional modeling techniques. These approaches, although methodologically robust, often do not start from *ex-ante* logical assumptions, but produce *ex-post* stratifications of units that are not always easy to interpret and trace back to clear and defined behavioral models. We believe that the classification of agricultural holdings can have true cognitive and operational power if it allows us to understand with maximum clarity why a unit is classified in one cluster or another, i.e., what requirements are missing to be able to pass, for example, from a hobby farm to a market farm. The methodology does not claim to be final or to establish a logical classification model that cannot be changed and improved. The twelve indicators taken into account cover various behaviors of holdings that are more or less connected to the degree of openness to the market. There may be other indicators that have not been considered, even though they are often used to classify agricultural holdings, such as legal status, type of crops cultivated, irrigation tools and systems, livestock housing, and third-party activities. These indicators may be related to the market orientation of farms as well. However, their influence on market orientation is uncertain or is often implied by other indicators. For example, as regards legal status, both individual entrepreneurs and partnerships characterize market farms (72,1%) and non-market holdings (27,9%). The external work supplied by third-party operators can be requested by market farms (in 32,1% of cases) as well as by hobby farmers (16,0%).

Future work should address three main goals.

- 1) To review the methodology proposed in this context, evaluating the possibility of excluding or including other measurable indicators. In particular, to improve the potential usefulness of important administrative sources, such as the IACS authority data (concerning the subsidies that farms receive from the EU) and the social security data. At this stage, these sources do not cover all existing farms and are not always easy to link with the statistical farm register.
- 1) To assess the measures to be taken in order to obtain the required data for classification at more frequent time intervals. In particular, to plan targeted surveys that enable to gain a better understanding of the activities and motivations behind non-market holdings, and to track their evolution over time.
- 2) To increase cooperation between the national statistical institutes and other agriculture research institutions, in order to share data sources and methodologies.

References

- [1] FAO. *World programme for the census of agriculture 2020. Programme, concepts and definitions*. 2017. Available from: <https://www.fao.org/3/i4913e/i4913e.pdf>.
- [2] Arzeni A., Sotte F.. *Agricoltura e territorio: dove sono le imprese agricole? QA Rivista dell'Associazione Rossi-Doria*. 2014; 1:75-100. [DOI 10.3280/QU2014-001003](https://doi.org/10.3280/QU2014-001003).
- [3] FAO. *Guidelines for development of a classification system related to Farm Typology*. 2018. Available from: <https://openknowledge.fao.org/server/api/core/bitstreams/84c6e0c5-4edf-4fc7-9d14-2c612557f57f/content>.
- [4] FAO. Identifying the “family farm”. An informal discussion of the concepts and definitions. *ESA Working Paper*. 2014; 14-10. Available from: <https://openknowledge.fao.org/server/api/core/bitstreams/359cf3cd-e4fb-41b2-a3a6-238b5a77c4ca/content>.
- [5] FAO. *Methodology for computing and monitoring the Sustainable Development Goal indicators 2.3.1 and 2.3.2*. 2019. Available from: <https://www.fao.org/3/ca3043en/CA3043EN.pdf>.
- [6] Gismondi R.. Who are small-scale food producers in Italy? Comparisons among different approaches. *Statistical Journal of the IAOS*. 2024; 40:289–298. [DOI 10.3233/SJI-230085](https://doi.org/10.3233/SJI-230085).
- [7] United Nations. *The agricultural household: concepts and definitions*. 2005. Available from: <https://digitallibrary.un.org/record/546955?v=pdf>.
- [8] Boncinelli F.. Who are the agricultural households? Insight into concepts and definitions. *Int. Journal of Agricultural Statistical Sciences*. 2015; 11(2): 313-321. Available from: <https://www.academia.edu/20102694>.
- [9] Lowder S.K., Sánchez M.V., Bertini R.. Farms, family farms, farmland distribution and farm labour: What do we know today? *FAO Agricultural Development Economics Working Paper*. 2019; 19-08. Available from: <https://ageconsearch.umn.edu/record/301283>.
- [10] Dhillon R., Moncur Q.. Small-scale farming: a review of challenges and potential opportunities offered by technological advancements. *Sustainability*. 2023; 15: 15478. <https://doi.org/10.3390/su152115478>.
- [11] Rosenberg N.. Farmers who don't farm: the curious rise of the zero-sales farmer. *Journal of Agriculture, Food Systems, and Community Development*. 2017; 7(4):149–157. <https://doi.org/10.5304/jafscd.2017.074.005>.
- [12] Gennai-Schott S., Sabbatini T., Rizzo D., Marraccini E.. Who remains when professional farmers give up? Some insights on hobby farming in an olive groves-oriented terraced Mediterranean area. *Land*. 2020; 9(5), 168. <https://doi.org/10.3390/land9050168>.
- [13] Song B., Robinson G.M., Bardsley D.K.. Hobby and part-time farmers in a multifunctional landscape: environmentalism, lifestyles, and amenity. *Geographical Research*. 2022; Volume 60: 480-497. [DOI: 10.1111/1745-5871.12541](https://doi.org/10.1111/1745-5871.12541).
- [14] European Union Commission. *Regulation (EU) 2018/1091 of European Parliament and of the Council on integrated farm statistics*. 2018. Available from: <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32018R1091&from=FI>.
- [15] Italian National Statistical Institute (ISTAT). *Seventh general census of agriculture. First results*. 2022. <https://www.istat.it/it/archivio/272404>.