

Land Inequality in Interwar Italy: A Provincial Analysis

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Abstract

This study reconstructs the distribution of land inequality in Italy in the 1930s using data from the Agricultural Census (1930) and the *Catasto Agrario* 1929, a statistical source compiled at the provincial level. Five indicators of land inequality were derived and initially assessed using the univariate analysis. A multivariate approach was adopted to construct a composite index that captures the multidimensional nature of land concentration. Based on this index, provinces were grouped into homogeneous clusters reflecting different degrees of land ownership concentration. The empirical results show a significant correlation between land inequality and both territorial configurations and institutional land management regimes. This classification provides a framework for understanding regional disparities in agrarian structures in Italy during the interwar period¹.

Keywords: Land Inequality, Italy, Multivariate Approach.

1. Introduction

A considerable corpus of economic and historical-economic literature has demonstrated a prominent level of interest in land inequality, which has been identified as a fundamental factor for a number of social problems, including varying literacy rates, as well as institutional efficiency in promoting a country's development process².

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² M.R. Carter, "Identification of the inverse relationship between farm size and productiv-

The objective of this study is to construct a comprehensive measure of Italy's land inequality during the 1930s by using a multivariate approach and bearing in mind the existence of a large-scale mapping of the phenomenon, based on the 1929 *Catasto Agrario* and the subsequent 1930 Agricultural Census³. Indeed, the opportunity to reconstruct the concept of land inequality in a period such as the 1930s is essential for advancing studies on the conditions of wellbeing in the Italian countryside. These sources are of immense value for research purposes, as they facilitate a comprehensive reconstruction of the size of landholdings and the corporate structure throughout the Italian peninsula.

The general hypothesis is that new quantitative techniques, complementary to historical economic analysis, can enable researchers to investigate territorial disparities, with the aim of identifying areas with similar characteristics. This approach is particularly advantageous for conducting an in-depth analysis of aspects related to Italian socio-economic development at the territorial level.

The research also adopts a historical-spatial perspective, illuminating hitherto unexplored aspects of the Italian provinces. In order to obtain a more complete and thorough analysis, the study has been conducted at provincial level, allowing for the inclusion of a broader set of variables in the construction of the proposed land inequality indicators.

The study is also significant as it develops a multidimensional measure of land inequality which, according to the first survey conducted by ISTAT, takes into account various aspects related to the phenomenon. With the exception of

ity: an empirical analysis of peasant agricultural production", *Oxford Economic Papers*, 36.1, 1984, pp. 131-145; Stanley L. Engerman, Kenneth L. Sokoloff, "Factor endowments, inequality, and paths of development among new world economics", UCLA, 2002; O. Galor, O. Moav, D. Vollrath, "Inequality in Landownership, the emergences of human capital promoting institutions and the great divergence", *Review of economic studies*, vol. 76, n. 1, 2003, pp. 143-179; L. Erickson, D. Vollrath, "Dimension of land inequality and economic development", IMF Working Papers, 2004, pp. 44-158; C. Barret, M.F. Bellemare, J.Y. Hou, "Reconsidering Conventional Explanations of the Inverse Productivity-Size Relationship", *World Development*, vol. 38, n. 1, 2010, pp. 88-97; E. Frankema, "The colonial roots of land inequality: geography, factor endowments, or institutions?", *The Economic History Review*, 63.2, 2010, pp. 418-451; D. Acemoglu, J. Robinson, *Why nations fail: The origins of power, prosperity and poverty* (London 2012).

³ Istituto Centrale di Statistica (ISTAT), *Censimento Generale dell'agricoltura. 19 marzo 1930 - VIII* (Rome 1930); Id, *Catasto Agrario 1929* (Rome 1934), specifically, the provincial records.

Percoco's studies⁴, the majority of existing research relies on subsequent data sources or employs different methodologies⁵. The present study aims to make a contribution to the existing scholarship on agriculture during the Fascist period by introducing a new variable, analysed at the provincial level, with a view to facilitating research on socio-economic imbalances in rural Italy⁶.

The research is presented as a methodological contribution, offering quantitative elements to facilitate the observation of land inequality during the initial large-scale survey. The second objective is to re-study micro dimensions in order to attempt to explain macro phenomena, such as inequalities.

This study is intended as a methodological contribution, with the objective of providing scholars with new quantitative tools to analyse the phenomenon of land inequality using the first large-scale dataset.

The contribution is structured as follows: an overview of international and national literature on land inequality; a contextualisation of the conditions of Italian agriculture during the Fascist period; a presentation of the variables used to construct the indicator; a subsequent focus on the multivariate analysis and the land inequality index; a historical interpretation of the results obtained; and, finally, the conclusions.

2. Literature review

In recent years, inequality has attracted increasing attention from historians, sociologists, and economists, particularly when considered as an exogenous variable, in efforts to explain the growth and development processes of nations. Many scholars argue that land inequality hinders the expansion of agricultural production, promotes inefficiency, and consequently impedes large-scale development.

This research topic has generated considerable interest across different regions of the world, and global-scale analyses must equally be taken into ac-

⁴ M. Percoco, "Entrepreneurship, Family Ties and land inequality: evidence from Italy", *Growth and Change*, vol. 3, 2015, pp. 443-457.

⁵ P. Martinelli, "Latifundia revisited. Market power, land inequality and agricultural efficiency. Evidence from interwar Italian agriculture", *Explorations in Economic History*, n. 54, 2014, pp. 79-106; Id, "Land Inequality in Italy 1940. The new picture", *Rivista di Storia Economica*, n. 3, 2016, pp. 303-350.

⁶ G. Zanibelli, V. Ricci, "Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis", *Rivista di Storia Economica*, 38.2, 2022, pp. 185-210.

count⁷. In North America, several studies have documented the distribution of land inequality⁸. In South America, historiography has analysed the presence of inequality⁹. As for Africa, historians have emphasised problems regarding the quality of the sources¹⁰ and despite these difficulties, it has been possible to start a reconstruction of the phenomenon¹¹. A similar analysis of the same topic has also begun in parts of Asia¹².

As for Europe, a number of recent contributions have examined the effects of inequality (in a broad sense) on wellbeing¹³.

⁷ L. Bauluz, Y. Govind, F. Novokmet, “Global land inequality”, in WID. world *Working Paper*, n. 2020/10.

⁸ L. Soltow, “Land inequality on the Frontier: The distribution of land in East Tennessee at the beginning of the nineteenth century”, *Social Science History*, 5 (3), 1981, pp. 275-291; T. Piketty, G. Postel-Vinay, J.L. Rosenthal, “Wealth concentration in a developing economy: Paris and France, 1807-1994”, *Am. Econ. Rev.*, n. 96, 2006, pp. 236-256; L. Di Matteo, “Land and inequality in Canada 1870-1930”, *Scandinavian Economic History Review*, 60 (3), 2012, pp. 309-334.

⁹ E. Frankema, *Has Latin America always been unequal? A comparative study of asset and income inequality in the long twentieth century (vol. 3)* (Leida 2009). For a specific analysis of regional inequalities in Latin America, see: J. Gelman, D. Santilli, “Crecimiento económico, divergencia regional y distribución de la riqueza: Córdoba y Buenos Aires después de la Independencia”, *Latin American Research Review*, 45.1, 2022, pp. 121-147.

¹⁰ S. Galli, K. Rönnbäck, “Land distribution and inequality in a black settler colony: the case of Sierra Leone, 1792-1831”, *The Economic History Review*, 74 (1), 2021, pp. 115-137.

¹¹ D.G. Clarke, “Land inequality and income distribution in Rhodesia”, *African Studies Review*, 18 (1), 1971, pp. 1-7; G. Alfani, F. Tadei, “Income inequality in colonial Africa: Building social tables for pre-independence Central African Republic, Ivory Coast, and Senegal”, in *African Economic History Working Paper*, 33, 2019.

¹² Y.D. Wei, “Geography of inequality in Asia”, *Geographical Review*, 107 (2), 2017, pp. 263-275.

¹³ J.L. Van Zanden, “Tracing the beginning of the Kuznets Curve: Western Europe during the early modern period”, *The Economic History Review*, vol. 48, 1995, pp. 643-664; C. Santiago Caballero, “Income inequality in central Spain, 1690-1800”, *Explorations in Economic History*, n. 48.1, 2011, pp. 83-96; G. Alfani, W. Ryckbosch, “Growing apart in early modern Europe? A comparison of inequality trends in Italy and the low the Low Countries, 1500-1800”, *Explorations in Economic History*, n. 62, 2016, pp. 143-153; G. Alfani, F. Ammannati, “Long trends in economic inequality: the case of Florentine state, c. 1300-1800”, *The Economic History Review*, vol. 70, n. 4, 2017, pp. 1072-1102; E. Bengtsson, A. Missiaia, M. Olsson, P. Svensson, “Wealth inequality in Sweden, 1750-1900”, *The Economic History Review*, 71 (3), 2018, pp. 772-794; Id, “Aristocratic wealth and inequality in a changing society: Sweden, 1750-1900”, *Scandinavian Journal of History*, 44 (1), 2019, pp. 27-52; E. Nicolini, F. Ramos Palencia, “Comparing income and wealth inequality in pre-industrial

Land inequality has also been frequently associated to literacy rates, with many studies arguing that it hindered the development of human capital in rural European areas¹⁴.

In the context of Italy, many economic historians have attempted to reconstruct the phenomenon in geographically limited areas, particularly relating to the modern period¹⁵. This is because, even after the unification process, the Liberal State did not see the need to conduct a homogeneous, large-scale land survey. Only in recent years has land inequality attracted renewed attention among contemporary scholars, who have drawn partly on 1929 data and partly on other sources from INEA¹⁶ relating to the subsequent period¹⁷.

The 1929 *Catasto Agrario* has recently been analysed to assess the effects of land inequality on the literacy process¹⁸. The results revealed findings consistent with those emerging from other European studies, which highlighted the importance of employing a multivariate analysis to provide new analytical tools for measuring the efficiency of agriculture and rural institutions in the 1930s.

economies: the case of Castile (Spain) in the eighteenth century”, *European Review of Economic History*, n. 25, 2021, pp. 680-702; G. Alfani, S. Sardone, “Long-term trends in income and wealth inequality in southern Italy. The Kingdom of Naples (Apulia), sixteenth to eighteenth centuries”, *Explorations in Economic History*, 95, 2025, 101646.

¹⁴ F. Cinnirella, E. Hornung, “Landownership concentration and the expansion of education”, *Journal of Development Economics*, vol. 121, 2016, pp. 135-152; F.J. Beltrán Tapia, J.M. Martineza Gallaraga, “Inequality and education in pre-industrial economies: evidence from Spain”, *Explorations in Economic History*, 69, 2018, pp. 81-101; T. Lemontzoglou, “Access to land, the agriculture trap, and literacy: Evidence from late nineteenth-century Greece”, *The Journal of European Economic History*, 49 (3), 2021, pp. 11-53; G. Zanibelli, V. Ricci, “Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis”, *Rivista di Storia Economica*, 38.2, 2022, pp. 185-210.

¹⁵ G. Alfani, “Economic Inequality in Northwestern Italy: a Long-Term View (Fourteenth to Eighteenth Centuries)”, *Journal of Economic History*, vol. 75, n. 4, 2015, pp. 1058-1096; G. Alfani, W. Ryckbosch, “Growing apart in early modern Europe” ... cit.; G. Alfani, M. Di Tullio, *The lion's share. Inequality and the rise of fiscal state in preindustrial Europe* (Cambridge 2019); Alfani, S. Sardone, “Long-term trends in income and wealth inequality in southern Italy” ... cit.

¹⁶ G. Medici, *La distribuzione della proprietà fondiaria in Italia* (Rome 1948).

¹⁷ M. Percoco, “Entrepreneurship, Family Ties and land inequality” ... cit.; P. Martinelli, “Land Inequality in Italy 1940” ... cit.; G. Zanibelli, V. Ricci, “Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis” ... cit.

¹⁸ G. Zanibelli, V. Ricci, “Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis” ... cit.

The Italian case is particularly relevant in light of the seminal studies by Felice, Vecchi, Daniele and Malanima, Sbrana and Lepore, which illuminated the economic divergences between Northern and Southern Italy¹⁹; studies conducted in the agricultural sector have opened up new avenues of research²⁰, with a particular focus on the *Mezzogiorno* region²¹. Following this approach, the present study seeks to provide a meaningful contribution to the understanding of land inequality during the 1930s and, consequently, offers a robust framework to correlate this variable with other socio-economic indicators.

3. Historical Context

The topic of land inequality is undoubtedly one of the most compelling issues within the history of Italian agriculture. As highlighted by the literature, providing a clear summary of the concept of the “latifundium” based solely on its territorial extension is not straightforward. Furthermore, there are discrepancies among authors regarding its minimum size: Piero Bevilacqua classifies properties of 250 hectares or more within this category²², whereas other schol-

¹⁹ E. Felice, *Divari regionali e intervento pubblico: per una rilettura dello sviluppo in Italia* (Bologna 2007); G. Vecchi, *In ricchezza e in povertà: il benessere degli italiani dall’Unità a oggi* (Bologna 2011); V. Daniele, P. Malanima, *Il divario Nord-Sud in Italia: 1861-2011* (Soveria Mannelli 2011); E. Felice, *Perché il Sud è rimasto indietro* (Bologna 2013); A. Lepore, “Il divario Nord-Sud dalle origini a oggi. Evoluzione storica e profili economici”, *Rivista economica del Mezzogiorno*, vol. 26, n. 3, 2012, pp. 389-410; V. Daniele, P. Malanima, “Perché il Sud è rimasto indietro? Il Mezzogiorno tra storia e pubblicistica”, *Rivista di storia economica*, XXX, n. 1, 2014, pp. 3-36; A. Lepore, “L’evoluzione del divario tra il Nord e il Sud dal dopoguerra a oggi”, *Estudios Históricos*, vol. 12, n. 23, 2020, pp. 2-63; F. Sbrana, *Nord contro Sud. La grande frattura dell’Italia repubblicana* (Rome 2023); V. Daniele, A. Lepore, *Divari regionali, politiche di sviluppo e impatti economici nel Mezzogiorno. Una nuova prospettiva di lungo periodo (1950-2024)* (Soveria Mannelli 2025).

²⁰ G. Federico, “Le nuove stime della produzione agricola italiana, 1860-1910: primi risultati e implicazioni”, *Rivista di storia economica*, XIX, n. 3, 2003, pp. 359-381.

²¹ Id., “Ma l’agricoltura meridionale era davvero arretrata?”, *Rivista di politica economica*, 97 (3/4), 2007, pp. 317-340.

²² P. Bevilacqua, “Tra Europa e Mediterraneo. L’organizzazione dei sistemi agrari nell’Italia contemporanea”, in P. Bevilacqua (ed.), *Storia dell’agricoltura italiana in età contemporanea* (Venezia 1989), pp. 5-36.

ars have identified various classifications (including minor ones)²³. Therefore, for a comprehensive understanding of the phenomenon, it is necessary to move beyond mere land measurements and acknowledge that the term also encompasses socio-economic implications linked to the specific agrarian context²⁴.

In this context, the 1929 *Catasto Agrario* is a key source because it provides the first municipal-level picture of land distribution whereas the earlier 1910 *Catasto Agrario* was never fully processed²⁵, and does not reconstruct productive units. Valenti helped launch a broader inquiry into land-tenure arrangements, but his work covers only crop distribution²⁶. Before the publication of the *Catasto* – apart from local, archive-based micro-studies – researchers could not reliably reconstruct the size of landholdings, especially corporate estates.

In the attempt to draft an international comparison by only using the Gini's coefficient, it can be noticed that Ewut Frankema²⁷ reports a Gini Land for Italy of 71.5, one the highest in Europe for the 1930s; Belgium only reports a slightly higher value (75.9), confirming that Italy can be considered a good study case on land inequality, in particular during the 1930s.

As historiography reveals, the years following World War I witnessed notable activity in the land market, leading to land fragmentation in certain regions of the country. Even Arrigo Serpieri²⁸ notes that, in the period following the Great War and reaching up to 1924-25, accurately assessing the distribution of rural properties was a challenge, as official statistics did not distinguish between buildings and land alienation. Despite these difficulties, Serpieri highlights that from 1914-15 to 1924-25 there was a marked increase in land market activity.

This trend can be explained considering several factors: the currency devaluation, which made agricultural income comparatively more attractive than other activities requiring monetary investment as well as the rise in agricultural product prices, which made purchasing land a profitable venture.

²³ G. Coppola, *La proprietà della terra, i percettori dei prodotti e della rendita*, in *Storia dell'Agricoltura Italiana. L'età contemporanea* (Firenze 2001), pp. 217-284.

²⁴ P. Bevilacqua, *Latifondo. Enciclopedia delle Scienze Sociali* (Rome 1996).

²⁵ G. Zanibelli, *Mezzadria e trasformazioni economiche. La provincia di Siena e la Toscana meridionale tra Ottocento e Novecento* (Milano 2025).

²⁶ Ministero di Agricoltura, Industria e Commercio (MAIC), *Catasto Agrario del Regno d'Italia. Volume VI. Introduzione* (Rome 1912).

²⁷ E. Frankema, "The colonial roots of land inequality: geography" ... cit.

²⁸ A. Serpieri, *Guerra e le classi rurali italiane* (Rome 1930).

To track the land market between 1924-25 and 1930-31, we reconstruct the number of land sales (Figure 1) using state finance data²⁹. Sales rose by about 10% in seven years, confirming Serpieri's view that land transactions increased in the early Fascist period and in the immediate aftermath of the 1929 crisis. The growing share of landholders among agricultural workers supports this trend³⁰: it rose from 18% in 1911³¹, to 32% in 1921³² and 36% in 1931. Most land sales occurred in the northern part of Italy, involving about 6% of the Italian arable land³³ though redistribution also affected parts of the South, especially Puglia and Sicily.

Studying land distribution using the first survey conducted under fascism is paramount to acquire a new variable capable of measuring regional and sub-regional imbalances in a particularly significant period for Italian agriculture.

Having the opportunity to observe a stabilised situation by 1930 allows for the construction of a more homogeneous and detailed overall framework, enabling the development of synthetic indicators that can, in future studies, measure how land imbalance influenced key agricultural projects promoted during the fascist period.

Fascism rose to power when, following the "Biennio Rosso" agriculture was experiencing a substantial expansion and policies were launched to support the primary sector, which was regarded as complementary to the industrial sector. One of the main objectives was to reduce the number of day labourers and promote the emergence of a small landowning class, without causing excessive urban migration or, simultaneously, depopulation of rural areas. Because agri-

²⁹ Istituto Centrale di Statistica (ISTAT), *Annuario Statistico Italiano anno 1928* (Rome, 1928); Id, *Annuario Statistico Italiano anno 1929* (Rome, 1929); *Annuario Statistico Italiano anno 1930* (Rome, 1930); Id, *Annuario Statistico Italiano anno 1931* (Rome, 1931); Id, *Annuario Statistico Italiano anno 1932* (Rome, 1932); Id, *Annuario Statistico Italiano anno 1933* (Rome, 1933).

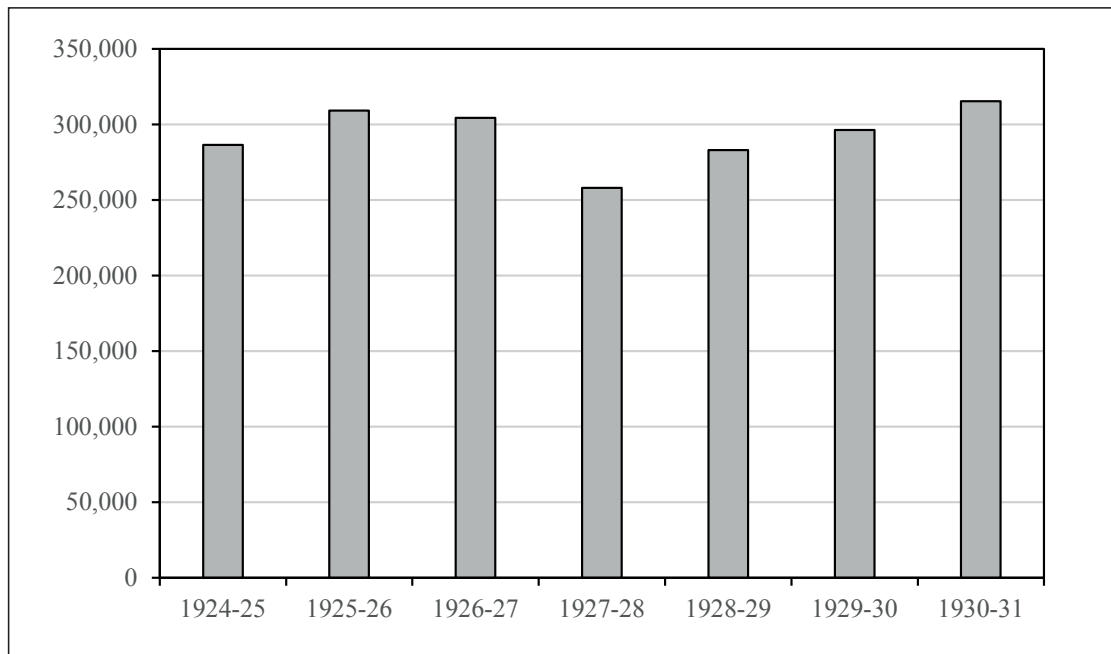
³⁰ O. Vitali, "Censimenti e composizione sociale dell'agricoltura italiana", in P. Bevilacqua (ed.), *Storia dell'agricoltura italiana in età contemporanea. Volume Secondo* (Venezia 1990), pp. 377-414.

³¹ Istituto Centrale di Statistica (ISTAT), *Censimento della popolazione del Regno d'Italia al 10 giugno 1911, Volume V* (Rome 1935).

³² Istituto Centrale di Statistica (ISTAT), *Censimento della popolazione del Regno d'Italia al 1 dicembre 1921 Relazione Generale* (Rome 1928).

³³ V. Zamagni, *Dalla periferia al centro. La seconda rinascita economica dell'Italia (1861-1990)* (Bologna 1993); B. Farolfi, M. Fornasari, "Agricoltura e sviluppo economico: il caso italiano (secoli XVIII-XX)", *Quaderni - Working Paper DSE*, 756, 2011.

Figure 1. Land market in Italy 1924-1931 (number of land sales).



Source: own elaboration. Source: Our elaboration on data ISTAT, *Annuario Statistico Italiano*, 1928-1929-1930-1931-1932-1933.

culture still played a predominant role in Italy's GDP³⁴, it became necessary to continue investing in the sector, including through the adoption of new techniques to improve food production; science, therefore, became an essential pillar in supporting agriculture, particularly during the wheat campaign³⁵ and this led to the establishment in 1923 of the Institute of Agrarian Economics and Statistics whose primary task was studying potential interventions to promote agricultural development.

The Land Reclamation and the Wheat Battle became essential elements to thoroughly understand the ideas that Fascist technicians had regarding how to support agriculture. Despite some resistance from landowners the Integral Reclamation campaign led to significant investments aimed at recovering arable lands, made possible also by a reorganisation of agrarian credit. On the

³⁴ E. Felice, *Ascesa e declino. Storia economica d'Italia* (Bologna, 2008).

³⁵ G. Zanibelli, "Scienza e sviluppo in agricoltura durante il fascismo", *Physis*, n. 1, 2017, pp. 223-236; Id, *Mezzadria e trasformazioni economiche...* cit.

other hand, the Wheat Battle, as historians have observed, shifted the production focus toward cereal cultivation, which in turn led to a certain imbalance in the trade balance (decrease in wheat imports)³⁶. Nevertheless, there were significant investments in agriculture directed to experimenting with new wheat varieties capable of guaranteeing high productivity, especially thanks to the work of Nazareno Strampelli, who also sought to overcome climate-related challenges affecting seed ripening³⁷.

Following the 1929 economic crisis, a contraction was observed in the primary sector, leading, as elsewhere in the world, to a decline in GDP. This was further compounded by a sharper drop in export prices – particularly for olive oil and wine – compared to the more moderate decline in prices for goods destined for the domestic market³⁸. Italy could have benefited from a comparative advantage for these products on the international stage. In this context, there was a decrease in the proportion of landowners working their own land compared to the total number of agrarian workers, as well as a re-evaluation of the sharecropping system.

The 1920s were particularly dynamic in terms of a revival of agricultural studies, leading to an increase in the number of publications and significant, valuable research, including the 1929 *Catasto Agrario*, which, on a municipal scale, provides a comprehensive overview of the Italian agricultural situation, enabling a comparison between the periods 1923-28 and 1929. The *Catasto* is a useful tool for examining the effects of fascist policies on the diverse agricultural systems existing across Italy. In particular, it allows verification of the efficiency of certain systems, such as sharecropping³⁹, and whether comparisons between different land tenure systems are valid, or if it is more appropriate to

³⁶ J.S. Cohen, “Fascism and agriculture in Italy: policies and consequences”, *The Economic History Review*, 32 (1), pp. 70-87.

³⁷ G. Zanibelli, “Scienza e sviluppo in agricoltura durante il fascismo” ... cit.

³⁸ A. Nützenadel, “Economic Crisis and Agriculture in Fascist Italy, 1927-1935. Some New Considerations”, *Rivista di Storia Economica*, 3, 2001, pp. 289-312.

³⁹ F.L. Galassi, “Stasi e sviluppo nell’agricoltura toscana 1870-1914: primi risultati di uno studio aziendale”, *Rivista di storia economica*, 3 (3), 1986, pp. 304-337; G. Biagioli, *Il modello del proprietario imprenditore nella Toscana dell’Ottocento: Bettino Ricasoli, Il patrimonio, le fattorie* (Firenze 2000); G. Zanibelli, “Sharecropping in Southern Tuscany: a micro-analysis of the ‘Fattoria’ production system (1858-1889)”, in *Historia Agraria*, 92, 2004, pp. 35-59; Id., *Mezzadria e trasformazioni economiche. La provincia di Siena e la Toscana meridionale tra Ottocento e Novecento* (Milano 2025).

investigate the divergences between similar territories. In central Italy, where sharecropping was the predominant form of land management, there was a concentration of large estates organized under a *fattoria* system⁴⁰. These estates featured a productive structure centred around the owner's villa, surrounded by a series of smaller units (*poderi*), each entrusted to a sharecropper. This study also aims to provide new indicators to better understand the productive system and the efficiency of the sharecropping model in Tuscany, a region featuring a high concentration of big estates.

These analyses necessarily require a detailed understanding of the concept of land inequality, conceived as a synthesis of different socio-economic indicators, which could enable us to address analogies and differences, even among homogeneous territories in terms of land tenure systems.

4. Data and methodology

The sources used for the present research include the 1929 *Catasto Agrario*, the 1930 Agricultural Census, and the 1931 General Population Census⁴¹ chosen because together they are the first comprehensive municipal-scale survey of the entire Italian Peninsula, encompassing also the dimension of corporate property.

In addition, they also provide particularly valuable data, as the 1931 Population Census introduced provincial reports for the first time, which allow for the acquisition of significant territorial-scale data. The appointment of Corrado Gini as president of ISTAT marked a turning point for the institute, ushering in a large-scale research process focused on the various productive sectors of the country.

The data contained in these two sources has been used to measure land inequality from a multidimensional perspective by using a set of five indicators, which represent distinct aspects of the phenomenon: some of these aspects are based on the corporations' agricultural surface; some others, instead, on the number of owners or corporations. Table 1 presents the list of the used variables; in addition to the land inequality measures, it also reports the incidence

⁴⁰ P. Albertario, "Le fattorie dell'Italia centrale", *Studi di statistica agraria ed economica*, serie VII, vol. 3, 1939, pp. 99-191.

⁴¹ Istituto Centrale di Statistica (ISTAT), *VII Censimento Generale della Popolazione. 21 aprile 1931 - IX. Volume III. Fascicoli Provinciali* (Rome 1933).

of the rural population on the total one, the farm conduction typology (latifundium, high farming, sharecropping) and the three macro-areas in which the Italian Peninsula is divided (North, Centre, and South).

Table 1. List of variables and description.

Abbreviation	Description
LandOwn	Complement to share of landowner on rural population
Gini	Agrarian surface Gini index
AgrPopFarm	Rural population per farm
BigFarm	Share of farms with an agrarian surface > 100 hectares
AvgAgrSurf	Farm's mean agrarian surface
ShareAgrPop	Share of rural population on total population
Management	Agrarian management type
Macroarea	Italian main geographical areas

Source: elaboration on data ISTAT, Catasto Agrario 1929, Censimento Generale dell'Agricoltura 1930, Censimento generale della popolazione 1931.

The first proposed indicator is the Gini's concentration index; it measures the degree of inequality on the distribution of the agricultural surface for the agricultural company. It varies from 0 indicating fair distribution (absence of inequality) and 1 for maximum concentration (maximum inequality, that is, when only one agricultural corporation enters in possession of the whole surface in a given geographical ambit). The Gini's formula is:

$$\text{Gini} = \frac{\sum_{i=1}^{n-1} (P_i - Q_i)}{\sum_{i=1}^{n-1} P_i}$$

Where n represents the number of companies, Q_i are the cumulative percentages of the agricultural surface, and P_i are the cumulative percentages of the companies. This indicator has the advantage of relating the distribution of landowners to the distribution of land plots; it is one of the main indicators used in the literature to measure inequality. Unfortunately, data regarding the distribution of agricultural holdings by size classes presented in the 1929

Catasto is only available grouped into classes, which may reduce the precision of the measure compared to calculations based on individual data. Nevertheless, this index is sufficiently simple to be used for comparisons between different geographical aggregates and is easily interpretable. The second measure is also based on the agricultural area and evaluates the incidence of large farms (in this case, those with an area larger than 100 hectares) on the total number of farms. The formula is as follows.

$$\text{BigFarm} = \frac{\text{Number of farm with a surface} > 100 \text{ hectares}}{\text{Total number of farms}}$$

Such an indicator is quite sensitive to the presence of large agricultural estates in the territory; it represents an extremely intuitive measure that focuses on the upper extreme of the distribution of agricultural holdings based on land size categories. The third measure consists of the average agricultural surface area per farming enterprise.

$$\text{AvgAgrSurf} = \frac{\text{Agrarian surface}}{\text{Total number of farms}}$$

It represents an indirect measure of concentration, in contrast to the first two indicators; with the prevalence of farms having a large agricultural surface, the average surface area increases. Using the *Catasto* data, the calculation of this index is relatively straightforward. The fourth measure was introduced by two researchers from the International Monetary Fund⁴² and is defined as the ratio between the agricultural population and the number of holdings; this means that a larger population per holding corresponds to a higher level of land inequality. The formula for the indicator is as follows:

$$\text{AgrPopFarm} = \frac{\text{Rural population}}{\text{Number of farms}}$$

⁴² L. Erickson, D. Vollrath, “Dimension of land inequality and economic development”... cit.

The index aims to illustrate the wide distribution of the agricultural population. It is easily interpretable, much like the average number of people working in a single enterprise; its calculation is straightforward, especially when processed using the *Catasto* information.

The final indicator measures land equality by calculating the proportion of landowners relative to the total rural population, subtracted from 1. A higher share of landowners signals a more equal distribution of land, since greater ownership diffusion across a territory corresponds to lower land concentration. The formula is as follows:

$$\text{LandOwn} = 1 - \frac{\text{Number of land owners}}{\text{Rural population}}$$

This indicator may seem less intuitive than the previous ones⁴³; however, some authors have employed it⁴⁴ in different temporal and geographical contexts (Spain, 19th century) to measure land inequality, yielding sufficiently meaningful results and especially capturing effects that other indicators failed to consider.

These measures are positively related to land inequality and highlight distinct aspects of the phenomenon; their combined use allows for a more accurate and comprehensive assessment. The indicators can be grouped into two categories: the first three focus on land inequality based on land distribution, while the last two consider the “human component”, from the perspective of both active workers and landowners. Initially, the indicators have been used individually for univariate analyses; subsequently, a multidimensional approach was applied by creating a synthetic land inequality index using the principal component analysis. Following this, a cluster analysis was also performed to identify common traits among the different provinces.

⁴³ G. Zanibelli, V. Ricci, “Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis”... cit.

⁴⁴ F.J. Beltrán Tapia, J. Martínez Gallaraga, “Inequality and education in pre-industrial economies: evidence from Spain”... cit.

5. Empirical analysis: univariate perspective

Data was analysed at a provincial level for a total of 94 observations (North 43; Centre 20; South 31). In the cartographic representations and the statistical analyses, the provincial datum has been preserved, whilst for the tables we favoured the use of aggregation at a compartment level and, in some cases, also the macro-areas (North; Centre; South). Table 2 reports the summary statistics of the variables, while Table 3 shows the average values of land inequality indicators at a geographical level.

Table 2. Summary statistics.

Variables	N.	Mean	Median	St. Dev.	Min	Q1	Q3	Max
LandOwn	94	74.01	78.86	16.87	16.71	66.77	86.64	93.27
Gini	94	0.73	0.72	0.09	0.48	0.67	0.81	0.89
AgrPopFarm	94	3.37	3.26	1.55	0.73	1.99	4.58	7.32
BigFarm	94	0.51	0.33	0.63	0.00	0.15	0.60	4.28
AvgAgrSurf	94	8.06	7.05	4.61	1.30	5.13	9.78	29.10
ShareAgrPop	94	38.00	34.83	19.03	5.54	21.09	55.02	75.34

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Table 3. Indicators proposed to measure land inequality in the Kingdom of Italy in 1930.

Region	Rural population per farm	Gini index agrarian surface	Complementary share of land owners on rural population	Share of farms with agrarian surface > 100 hectares	Mean agrarian surface
Abruzzi e Molise	4.0	0.685	72.7	0.177	6.8
Calabria	4.6	0.848	88.9	0.671	6.8
Campania	4.5	0.700	82.2	0.201	4.6
Emilia	4.9	0.616	83.9	0.234	9.2
Lazio	4.4	0.829	83.0	0.791	7.6
Liguria	2.8	0.727	68.6	0.175	5.0
Lombardia	2.7	0.717	82.3	0.337	4.4
Lucania	1.9	0.768	64.8	1.043	12.5
Marche	3.5	0.592	81.0	0.128	8.2

Region	Rural population per farm	Gini index agrarian surface	Complementary share of land owners on rural population	Share of farms with agrarian surface > 100 hectares	Mean agrarian surface
Piemonte	3.2	0.701	63.8	0.249	6.0
Puglia	2.5	0.747	80.9	0.804	7.0
Sardegna	3.1	0.828	86.1	2.386	19.0
Sicilia	3.3	0.765	87.8	0.419	5.7
Toscana	2.7	0.718	82.5	0.538	9.0
Umbria	3.0	0.688	80.0	0.416	11.9
Veneto	3.1	0.721	76.8	0.186	5.3
Venezia Giulia	2.2	0.741	47.8	0.330	9.3
Venezia Tridentina	1.8	0.831	35.0	0.914	15.5
Northern	3.1	0.709	73.8	0.284	6.3
Centre	3.4	0.730	82.2	0.538	8.7
South	3.6	0.756	83.0	0.623	7.4
ITALY	3.3	0.730	78.9	0.452	7.1

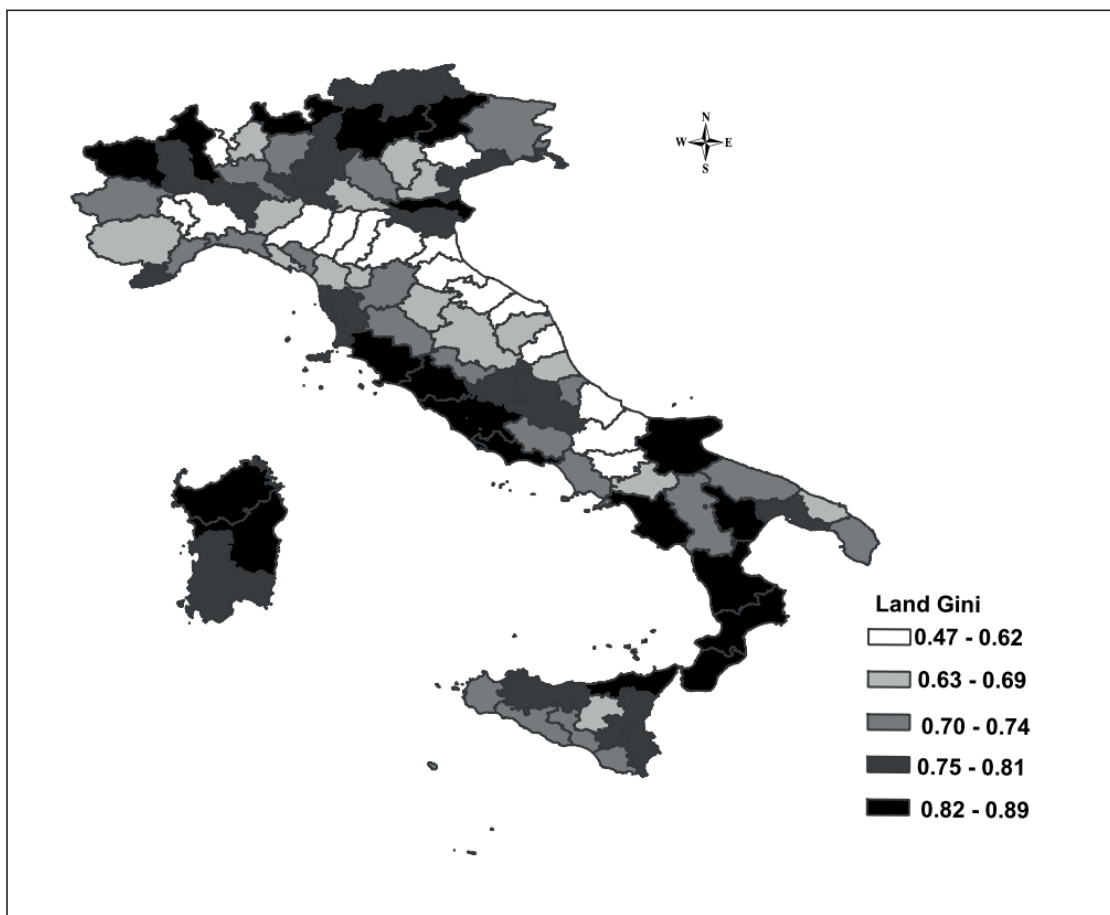
Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

As for the rural population per holding, the table does not show particular divergences on a macro-areas level, with an average national value of 3.3, with values ranging from a minimum of 1.8 in the Venezia Tridentina, to a maximum of 4.9 for Emilia. Far more complex is the situation for the Gini's Index; the table highlights a bigger North-South divergence (0.709 vs 0.756), with the highest concentration in Sardinia (0.828) and the lowest one in Marche (0.592). A reflection can be made for the complement: given a medium rate of 78.9%, the maximum value of 88.9% refers to Calabria whereas the minimum one – 35% – relates to Venezia Tridentina. The rate of large farms at the Italian level is 0.452%, with oscillations spanning from 2.386% of Sardinia and 0.128% of Marche. The medium agrarian surface comprehensively amounts to 7.1 hectares, with a maximum of 19 in Sardinia and a minimum of 4.4 in Lombardy. Considering all the 5 land inequality measures, the highest values are always recorded in the South; as for the medium surface value, the highest rate refers to central Italy. Figures 2 to 7 report the

cartographic representation of land inequality indicators on a provincial level.

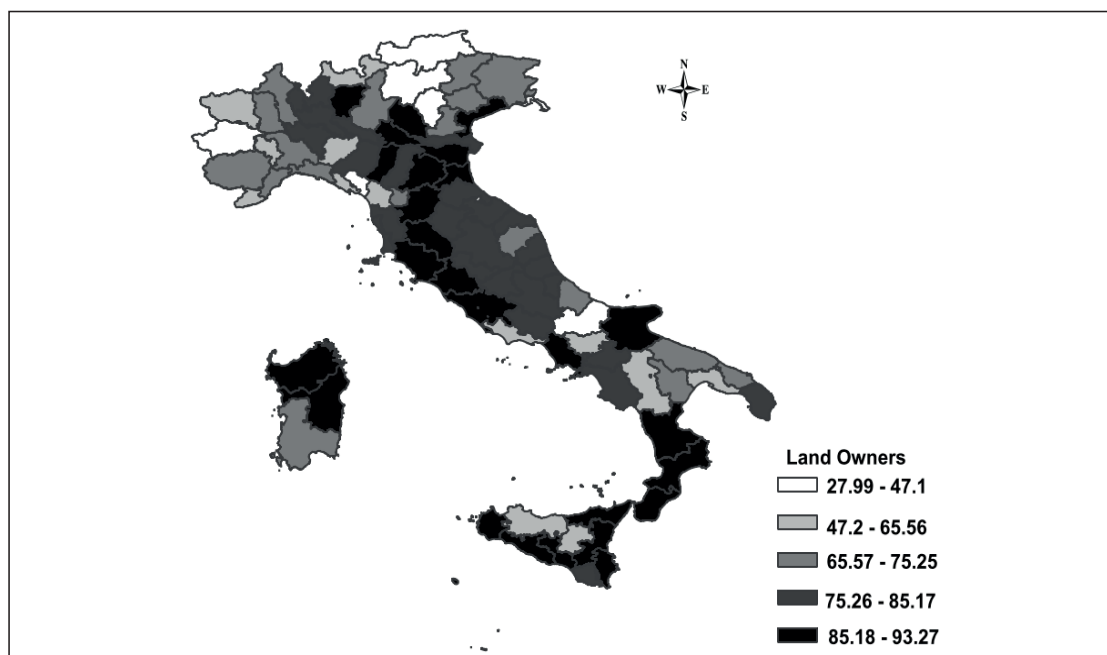
Table 4 reports the incidence of the agrarian population on the total, which constitutes a measure of the degree of dependence on the primary sector of the different provinces. Such an indicator presents a national average value of 34.6%, with considerable territorial variability spanning from 39.1% in the South to 31.1% in Central Italy. This indicator tends to grow towards the South, confirming how a significant part of the population still lived off agriculture, providing evidence that in those areas the process of industrialisation and urbanisation had not yet begun.

Figure 2. Gini's index of agrarian surface in Italian provinces.



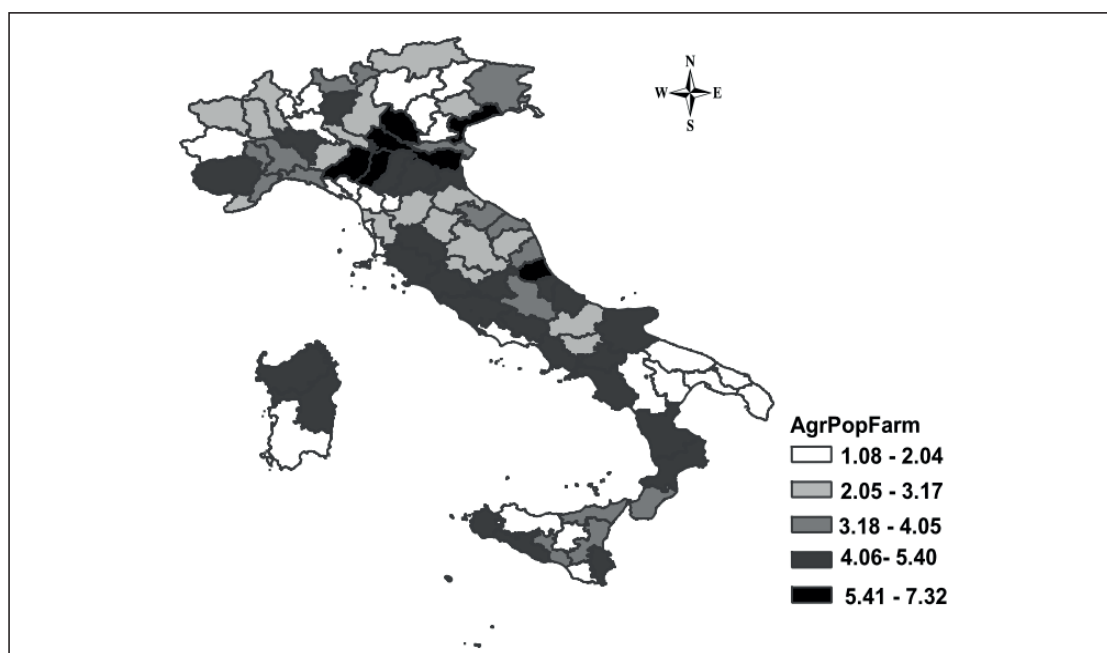
Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 3. Complement to share of landowner on rural population in Italian provinces.



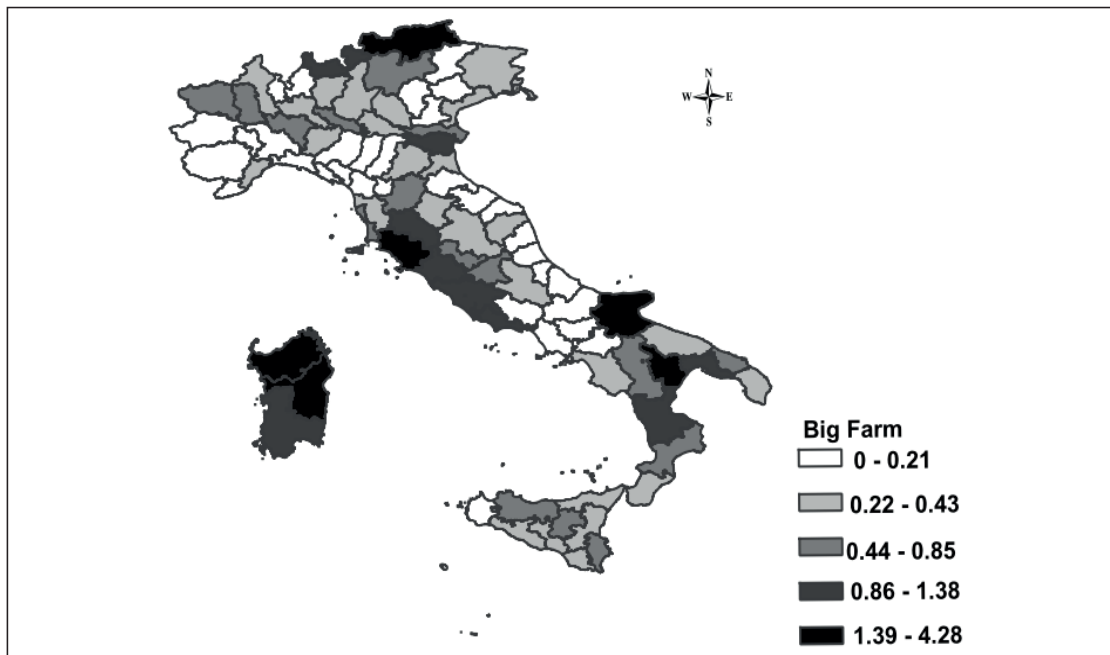
Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 4. Rural population per farm in Italian provinces.



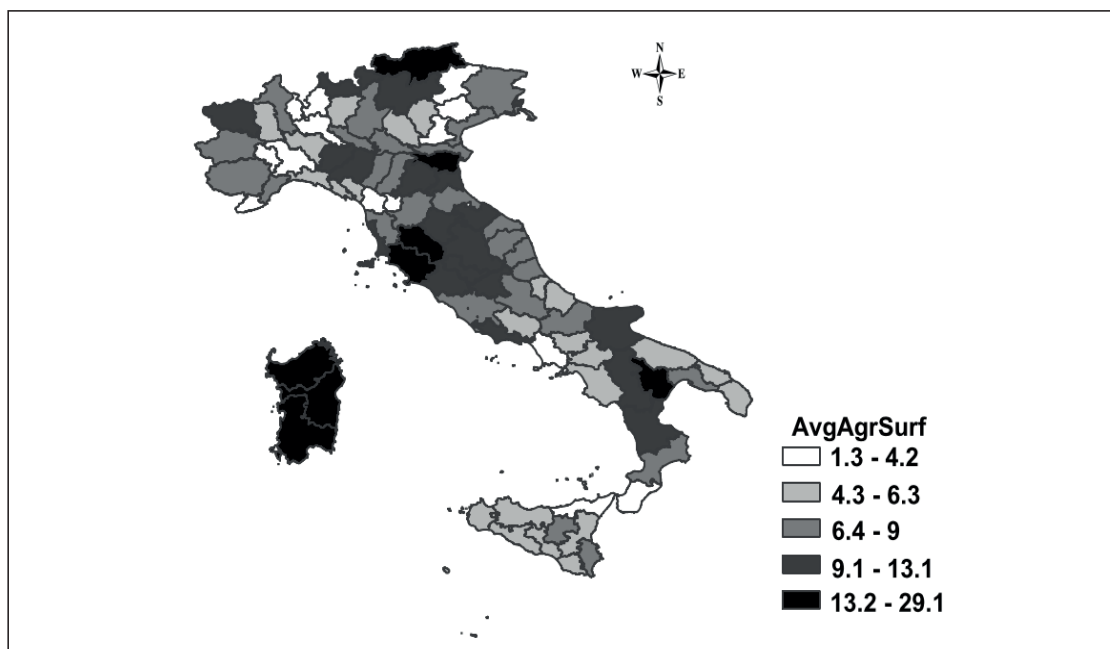
Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 5. Share of farms with an agrarian surface > 100 hectares in Italian provinces.



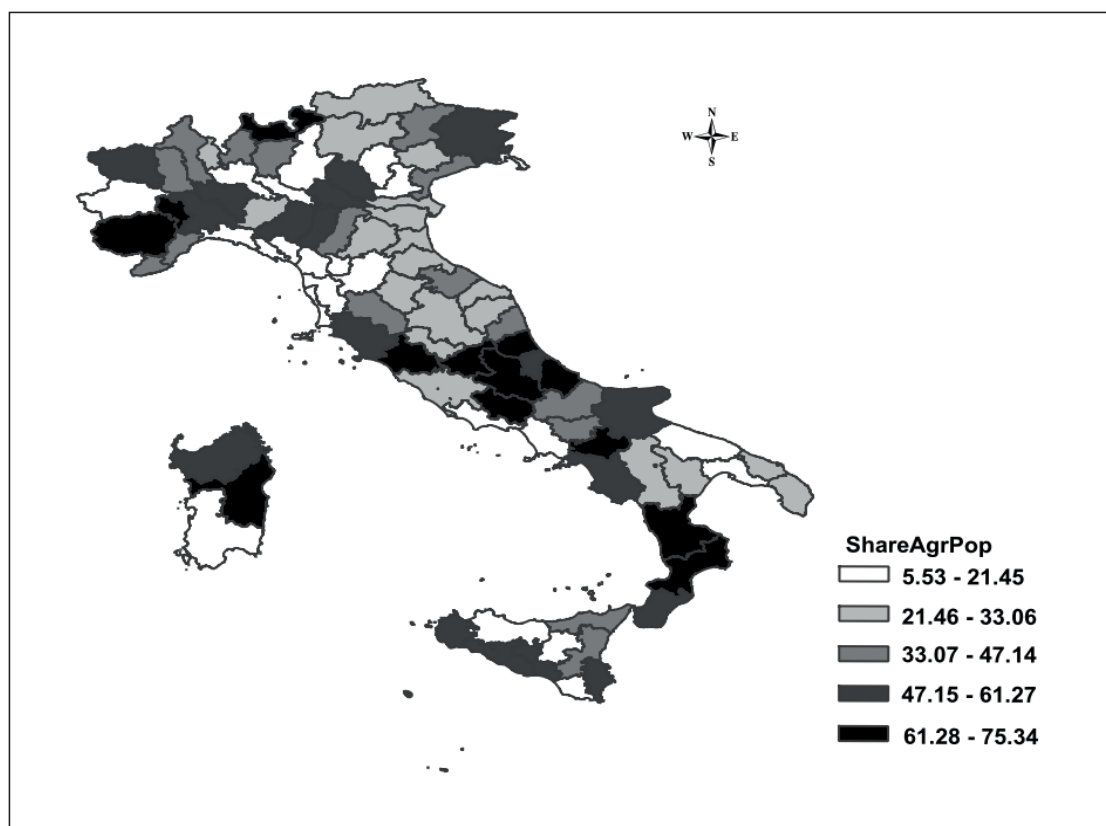
Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 6. Farm mean agrarian surface in Italian provinces.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 7. Share of rural population on total population in Italian provinces.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Table 4. Percentage of rural population on the total population in the Kingdom of Italy in 1930.

Region	Percentage of rural population on total population
Abruzzi e Molise	61.0
Calabria	61.5
Campania	31.8
Emilia	36.6
Lazio	38.3
Liguria	21.2
Lombardia	26.3
Lucania	30.1

Region	Percentage of rural population on total population
Marche	34.1
Piemonte	41.9
Puglia	26.5
Sardegna	40.4
Sicilia	38.0
Toscana	23.4
Umbria	30.9
Veneto	36.5
Venezia Giulia	21.2
Venezia Tridentina	23.9
North	32.4
Centre	31.1
South	39.1
ITALY	34.6

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

An important aspect that emerged in the study of spatial variables relates to spatial autocorrelation which measures the dependency link between the manifestations of a phenomenon and the territory in which it unfolds. It refers to positive spatial autocorrelation when high intensity of the characteristic in an area goes hand-in-hand with a high intensity in contiguous areas (and similarly for low intensity); conversely, it refers to negative autocorrelation when a low intensity in an area corresponds to high intensity in contiguous areas. If neither situation occurs, then spatial autocorrelation is absent. One of the indicators proposed in the literature for measuring spatial autocorrelation is Moran's I Index; it ranges from -1 (maximum negative autocorrelation) to +1 (maximum positive autocorrelation), with 0 indicating no autocorrelation. The closer I approach +/-1, the more it highlights the existence of spatial clustering of values. Table 5 reports the results of the Moran test to verify the presence of positive spatial autocorrelation among the examined variables. As observed, for the majority of variables the significance is strong; AgrPopFarm is significant at 5%, while *ShareAgrPop* is significant at 10%.

Table 5. Moran index.

Variable	Moran Index	p-value	Sig.
LandOwn	0.191	<0.001	***
Gini	0.156	<0.001	***
AgrPopFarm	0.079	0.013	*
BigFarm	0.202	<0.001	***
AvgAgrSurf	0.165	<0.001	***
ShareAgrPop	0.053	0.059	.

Source: Our elaboration on data ISTAT, Censimento dell'agricoltura 1930. Signif. codes: 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 '.' 1

Table 6. Indicators proposed to measure land inequality in the Kingdom of Italy in 1930 according to the management type.

Management	Rural population per farm	Gini index agrarian surface	Complementary share of land owners on rural population	Share of farms with agrarian surface > 100 hectares	Mean agrarian surface
High farming	2.9	0.721	71.5	0.291	5.9
Sharecrop	3.6	0.764	82.7	0.348	9.2
Latifundium	3.7	0.657	83.0	0.643	7.4
ITALY	3.3	0.730	78.9	0.452	7.1

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

In addition to an analysis on a geographical basis, it is surely interesting to integrate an analysis on the conduction forms, subdivided into latifundium (present mostly in southern and insular Italy), *Mezzadria* (sharecropping, widely spread in the central part of the Kingdom), and high farming (mainly present in the North). Table 6 shows the average values based on the conduction policy typologies.

The highest values of land inequality indicators are often correlated to the latifundium, with the exception of the Gini Index and the medium surface, where sharecropping prevails. This is confirmed by the fact that the largest land properties were concentrated in the areas of southern Tuscany and high

Latium⁴⁵. To assess whether significant statistical differences exist using the provincial data of the indicators, analyses were conducted at both the macro-area and conduction typology levels using the Kruskal-Wallis statistical test⁴⁶. This is a non-parametric method to evaluate for equality of medians across groups based on ranks, used here because the conditions for applying the parametric Analysis of Variance (ANOVA) were not satisfied. Table 7 reports the p-values of the test both according to macro-areas and conduction typologies.

The most pronounced differences in median values emerge when comparing conduction typologies: the indicators showing the highest significance (lowest p-values) are Gini, *LandOwn*, and *AvgPopSurf* (all at 0.1%), while *AgrPopFarm* is significant at 10%. Conversely, at the macro-area level, no significant differences appear, suggesting a certain territorial uniformity. Besides the land inequality measures, the test was also applied to *ShareAgrPop*, which proved significant at 5% for conduction typology, but not significant from a geographical standpoint.

Table 7. Kruskal-Wallis test p-value.

Variable	Management	Macro area
LandOwn	0.001	0.025
Gini	0.0005	0.297
AgrPopFarm	0.066	0.618
BigFarm	0.023	0.058
AvgAgrSurf	0.0055	0.091
ShareAgrPop	0.04	0.146

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

⁴⁵ G. Medici, *La distribuzione della proprietà fondiaria...* cit.; T. Detti, C. Pazzagli, “La struttura fondiaria del Granducato di Toscana alla fine dell'*ancien régime*. Un quadro d'insieme”, *Popolazione e storia*, n. 1, 2000, pp. 15-47; G. Zanibelli, *Mezzadria e trasformazioni economiche...* cit.

⁴⁶ W.H. Kruskal, A. Wallis, “Use of ranks in one-criterion variance analysis”, *Journal of the American Statistical Association*, 47, 1952, pp. 583-621.

Figure 8 presents the heatmap of land inequality indicators, appropriately standardised (Z-scores), across different Italian provinces.

A marked geographical polarisation along the North-South axis is evident. Northern provinces consistently show negative Z-score values, indicating a land structure characterised by high fragmentation, widespread small peasant ownership, and limited presence of large farms. This pattern is particularly evident in Piedmont, eastern Lombardy, and Veneto, where the agrarian system was based on small intensive properties and sharecropping arrangements that favoured productive investments and technological innovation. Conversely, southern, and insular provinces exhibit strongly positive Z-score values, with particular intensity in Sicily, Calabria, and southern Puglia. Here, the persistence of the latifundium system manifests through extreme values of the Big-Farm and AvgAgrSurf indicators, while the high AgrPopFarm ratio documents the presence of a substantial population of landless labourers. This structural configuration determined an accumulation model based on land rent rather than productive reinvestment.

Provinces with a prevalence of sharecropping (mainly Tuscany, Marche, Umbria, Emilia-Romagna) show intermediate Z-score values, positioned between the extremes of the North (small property) and the South (latifundium).

However, within geographical contexts, some exceptions emerge that are worth noticing; some are positive, such as those referring to the province of Naples, with relatively low inequality values despite its southern location, probably due to the effect of urban and peri-urban economy characterised by the presence of small intensive horticultural properties. Others are negative such as Ferrara showing higher values compared to the Emilian pattern due to the persistence of large estates derived from Estense land reclamation and capitalist but concentrated management; or the provinces of Grosseto and Viterbo, which present a “southern” pattern in a central context attributable to the presence of latifundia in the Maremma, incomplete land reclamation, and the persistence of some feudal relationships.

This initial exploratory analysis of the data has provided a preliminary overview of land inequality in Italy through a univariate approach, highlighting differences in the indicators that are more intricately linked to the conduction typology rather than to geographical location. The highest levels of land inequality, as logically expected, refer to extensive agriculture, widely practiced in the *Mezzogiorno*, and also present in some parts of central Italy, such as Latium. In the following section, we have used multivariate analysis techniques, par-

ticularly focusing on the construction of a composite land inequality index at the provincial level, based on the five proposed measures.

6. Data analysis: multivariate perspective

In this paragraph, a more refined composite indicator of land inequality (SI) is derived using Principal Component Analysis (PCA); this multivariate statistical technique simplifies data by reducing the number of variables describing it⁴⁷. Figure 9 illustrates the positioning of the provinces on the Cartesian plane defined by the first two principal components.

Figure 9. Scatterplot of PC – regions.

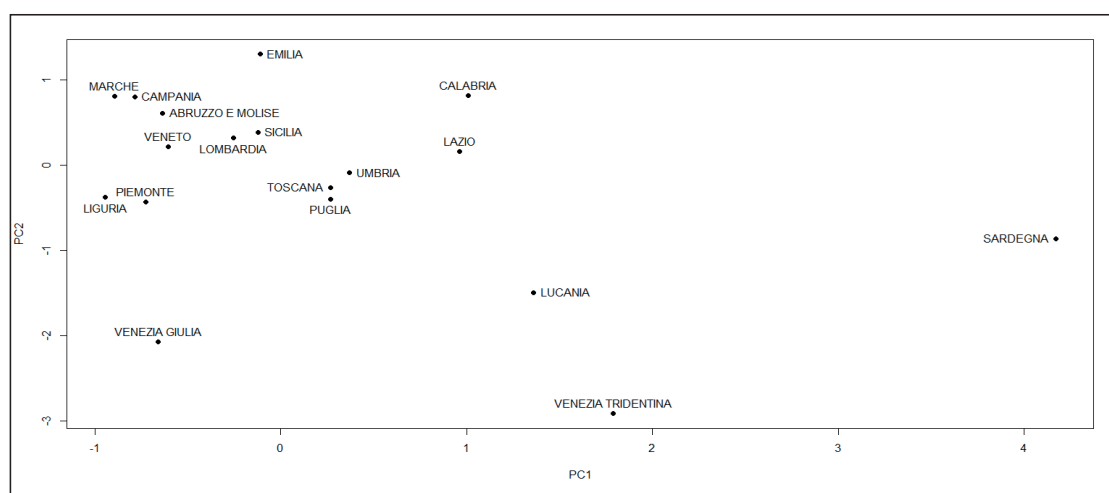


Figure 9 shows that the regions most distant from the others are those of Sardinia, characterized by a high PC1 value, indicating a prominent level of land inequality related to the agrarian surface, whilst Venezia Giulia and Venezia Tridentina feature a low level of land inequality connected to the number of landowners and farms. Venezia Giulia represents the compartment with the

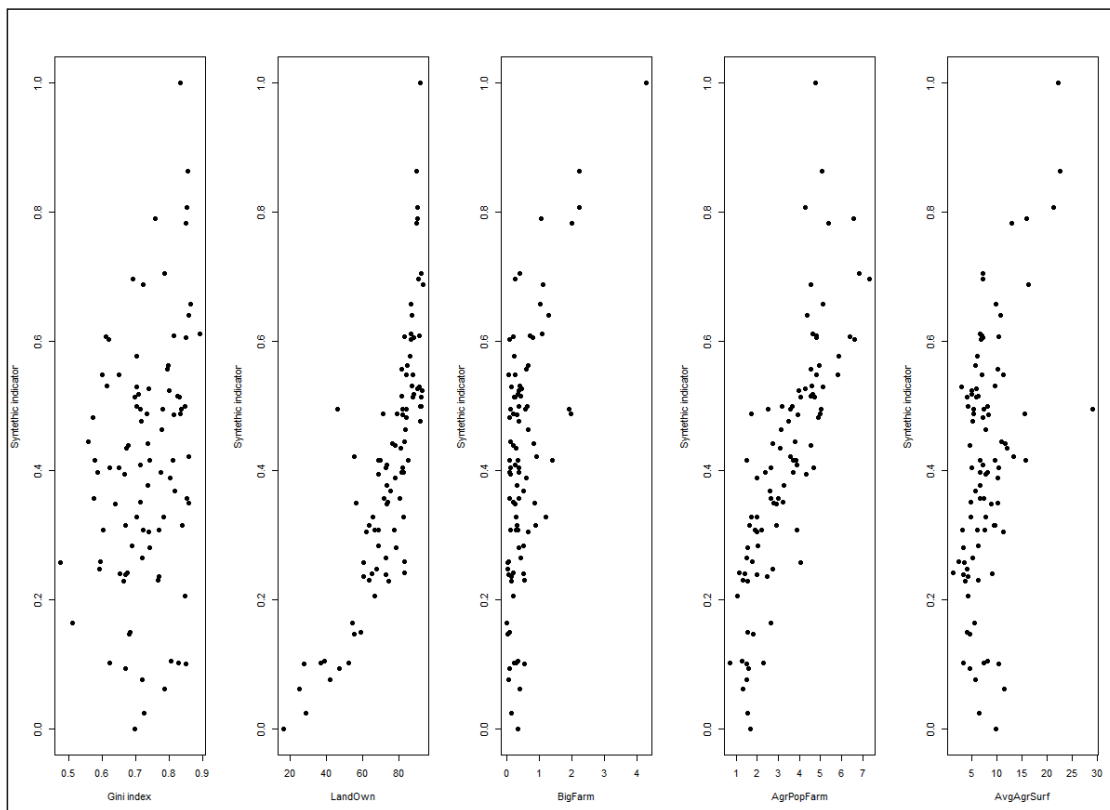
⁴⁷ I. Joliffe, *Principal Component Analysis* (Berlin 1979); K.V. Mardia, V. Kamti, J.T. Kent, J.M. Bibby, *Multivariate Analysis* (London, 1986); F. Delvecchio, *Scale di misura e indicatori sociali* (Bari 1995), pp. 164-169.

lowest land inequality on both components. Starting from the PCA results, we have constructed a more refined summary indicator than SI by summing the principal component scores for each province.

$$SI=PC1+PC2$$

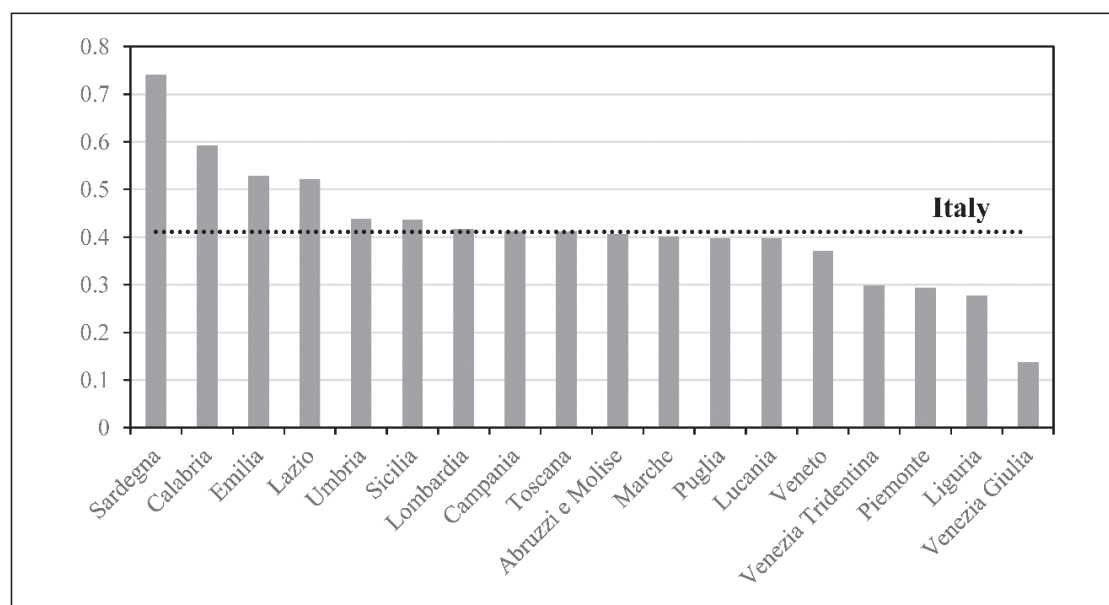
Later, this indicator has been standardised by subtracting the minimum value at a provincial level and dividing it by the range (maximum-minimum) in order to get an indicator, which, at a provincial level, varies from a minimum of 0 to a maximum of 1. Figure 10 reports the SI indicator's plot, together with the 5 variables of land inequality. A strong, positive bond between the summary indicator and the original variables can immediately be noticed. Figure 11 shows the mean values of SI for each compartment, categorised in a decreasing rank.

Figure 10. Synthetic indicator of land inequality SI vs measures of land inequality.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 11. Mean value of synthetic measure of land inequality SI by region.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 11 clearly indicates the regions having the highest level of land inequality which, according to the SI summary indicator, are, in order, Sardinia, Calabria, and Emilia; the first two are characterised by a prevailing extensive agriculture (Latifundium), whilst the third one by sharecropping. The lowest levels, instead, are registered for Venezia Giulia, Liguria, Piedmont, and Venezia Tridentina (Figure 12, Table 8), all included in the intensive agriculture typology (High farming). The average value of SI, according to the conduction of the farms, is 0.47 for the latifundium, 0.45 for the sharecropping and 0.32 for high farming.

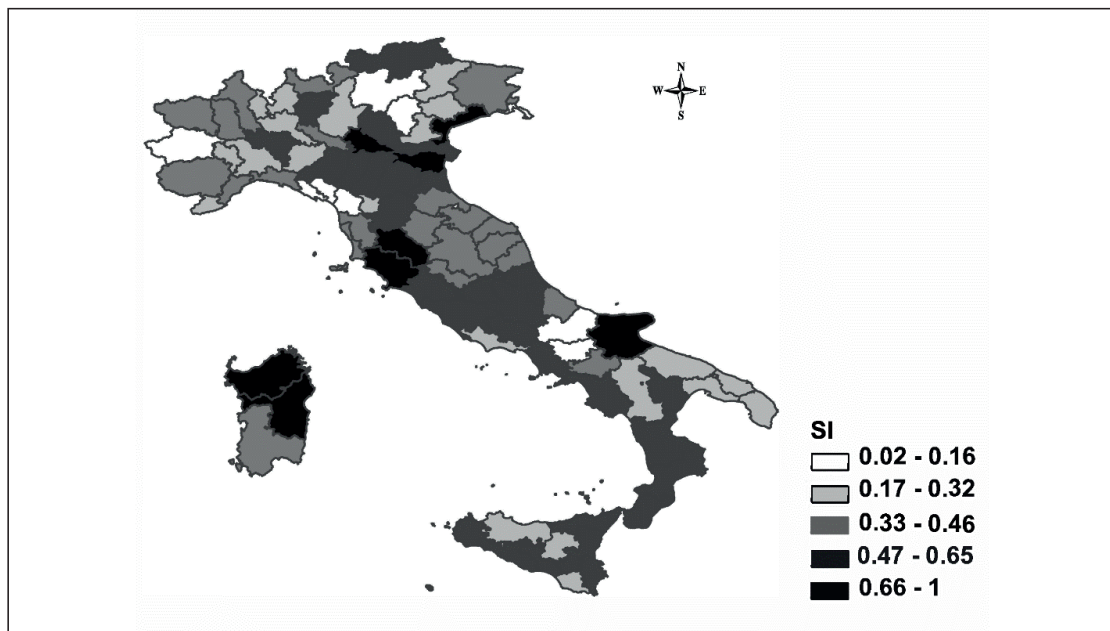
Table 8. Ranking of the synthetic measure according to the region.

Region	SI
Abruzzi e Molise	10
Calabria	2
Campania	8
Emilia	3

Region	SI
Lazio	4
Liguria	17
Lombardia	7
Lucania	13
Marche	11
Piemonte	16
Puglia	12
Sardegna	1
Sicilia	6
Toscana	9
Umbria	5
Veneto	14
Venezia Giulia	18
Venezia Trentina	15

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Figure 12. The Italian provinces according to SI.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Table 9. Comparison of synthetic measures among the management.

Management	SI
High Farming	0.319
Sharecrop	0.453
Latifundium	0.472
ITALY	0.411
Kruskal-Wallis test p-value	0.002
Significativity	**

Signif. codes: 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1

Table 9 presents the values of the synthetic indicator proposed to measure land inequality in relation to the forms of agricultural farm conduction. All the indicators show fairly consistent results, indicating that the highest level of land inequality corresponds to the latifundium, an intermediate level to the sharecropping system, and the lowest to high farming. The indicator evidences a great discrepancy between high farming and latifundium. According to the conduction form, the index exhibits greater discriminatory power. Therefore, we have applied the Kruskal-Wallis test to verify whether statistically significant differences existed in land inequality measures among the different conduction forms. For all three indicators, the Kruskal-Wallis test yielded significance at the 1% level, a sufficiently robust result. The level of land inequality is thus strongly influenced by the form of agricultural land conduction.

The other multivariate statistical analysis technique applied to the land inequality data is k-means clustering⁴⁸, a partitioning algorithm that subdivides a set of objects into a predetermined number of groups based on their characteristics. In this study, we use this clustering technique to create homogeneous groups of provinces according to their land inequality measures. We set the number of clusters to 5 (Table 10), and by applying the algorithm in R software, we obtain groups characterized by the following average values (centroids) of the land inequality indicators.

⁴⁸ J.B. Macqueen, "Some Methods for classification and Analysis of Multivariate Observations", *Proceedings of 5th Berkeley Symposium on Mathematical Statistics and Probability*, 1, 1967, pp. 281-297.

Table 10. Mean values of the clusters (centroids) with k-means.

Cluster	N.	Gini	AgrPopFarm	LandOwn	BigFarm	AvgAgrSurf	Land inequality level
1	27	0.70	3.62	81.84	0.30	7.14	High
2	13	0.72	2.24	58.07	0.36	6.88	Low
3	21	0.72	2.61	70.60	0.44	7.01	Medium
4	25	0.77	4.87	89.86	0.89	9.61	Very High
5	8	0.75	1.71	32.86	0.49	11.01	Very Low

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Through the examination of the centroids, a brief description for each cluster has been created, based on the level of land inequality. The group with an extremely high land inequality rate is the number 4 including 25 provinces: it is characterised by the presence of very few owners and by big-size farms, both in terms of covered surface and in number of operators.

Group number 1 features a high land inequality and includes 27 provinces (the most numerous cluster) characterised by a reduced number of landowners, although, unlike the previous cluster, the farms are not particularly numerous; group number 3 shows a concentration of the medium farm property, is formed by 21 provinces, presents a lower *LandOwn* average value and has a prevalence of medium-small farms.

The cluster number 2 is the one with a low rate of land inequality and includes 13 provinces, whilst group number 5, the least numerous with only 8 provinces, is the one with an extremely low land inequality rate, with many landowners and big-size farms. Table 11 reports the distribution of the Italian province number according to each belonging cluster and the geographic macro-area, whilst in the following Table 12 the distribution is according to the prevailing conduction typology within the farms.

Table 11. Distributions of provinces according to k-means cluster and geographical macro areas.

Macro areas	Cluster					Total
	1	2	3	4	5	
Northern Italy	10	8	12	7	6	43
Central Italy	10	2	2	5	1	20
Mezzogiorno	7	3	7	13	1	31
Total	27	13	21	25	8	94

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

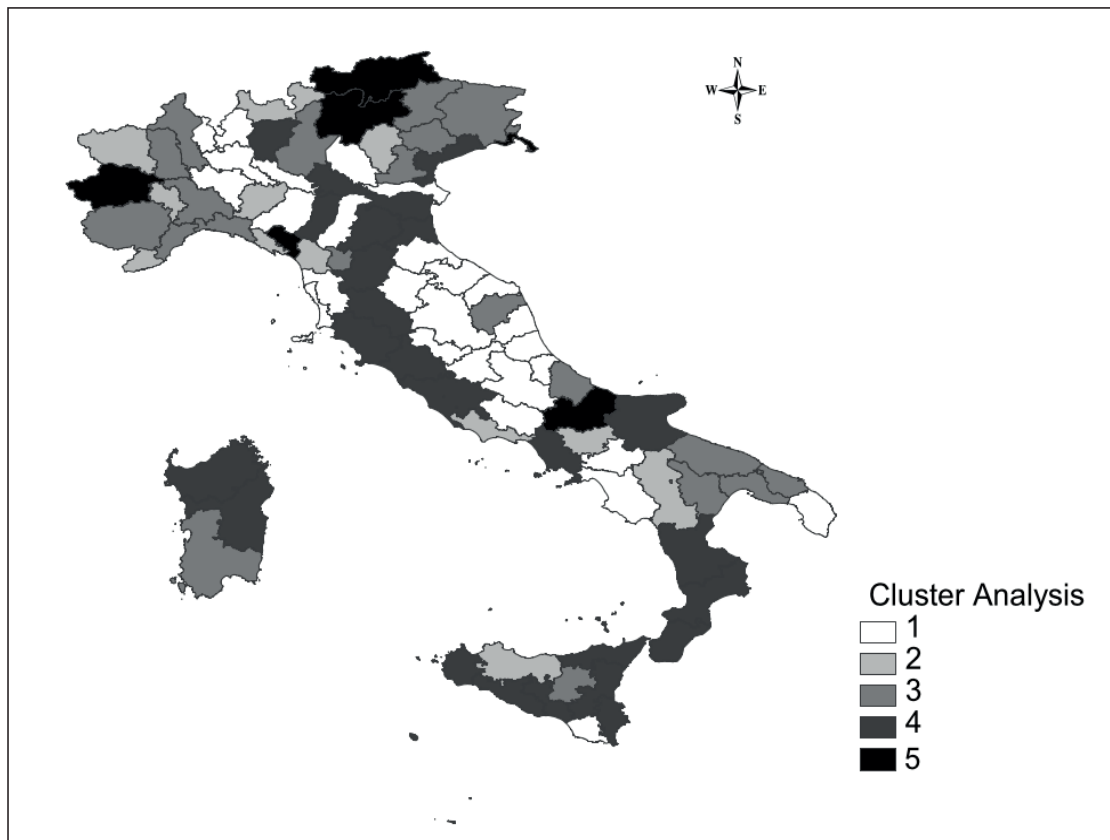
Table 12. Distributions of provinces according to k-means cluster and type of management.

Management	Cluster					Total
	1	2	3	4	5	
High Farming	7	7	12	3	6	35
Sharecrop	11	2	2	7	1	23
Latifundium	9	4	7	15	1	36
Total	27	13	21	25	8	94

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

Cluster number 1 is characterised by the substantial presence of central and northern Italian provinces, where the predominant form of land conduction is sharecropping; clusters 2 and 3 show the greatest presence of northern provinces, characterized by high farming, differing mainly in the incidence of land-owners (58% vs. 70%). Cluster number 4 is marked by the predominance of southern provinces and latifundium, while cluster number 5 consists mainly of northern provinces (Figure 13).

Figure 13. Cluster of Italian provinces obtained by k-means.



Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

7. An analysis of the results

The PCA analysis made it possible to summarise the available data and reconstruct land inequality at the provincial level, capturing all the distinctive features already highlighted by Bevilacqua⁴⁹. First, it is important to emphasise that our findings highlight the importance of analysing inequality in relation to different agricultural management systems.

⁴⁹ P. Bevilacqua, “Tra Europa e Mediterraneo. L’organizzazione dei sistemi agrari nell’Italia contemporanea”... cit.

It has been decided to observe in detail the ten mainly inequal provinces in order to retrieve those variables that could have an influence on the presence of high inequality rates (Table 13). This sample is highly indicative of the different land conduction system present in the Italian territory.

The efficiency of the cluster analysis with k-means is confirmed by the fact that all the provinces belong to cluster number 4 (very high level). Most of the provinces pertain to the south and the islands, in particular Calabria and Sardinia. The presence of central provinces is also significant, with some of them pertaining to a macro-area, like the one of Maremma. Particularly interesting is the datum of the Siena province, which lies at margins of the macro-area. The results provide confirmation that the Sienese territory could be a case study which merits to be analysed in depth, in order to study the relationship between land inequality and the good practices of agricultural administration of the sharecropping system. Although the common belief that land inequality is a symptom of a delay in the agrarian development, it has been demonstrated that this belief does not apply to the province of Siena⁵⁰. Regarding the high farming conduction areas, the data of Venice and Mantua are particularly meaningful.

Table 13. The ten provinces with greater land inequality.

N.	SI	Cluster
1	Sassari	4
2	Grosseto	4
3	Nuoro	4
4	Ferrara	4
5	Foggia	4
6	Venezia	4
7	Mantova	4
8	Siena	4
9	Cosenza	4
10	Viterbo	4

Source: Our elaboration on data ISTAT, *Censimento dell'agricoltura 1930*.

⁵⁰ F.L. Galassi, "Stasi e sviluppo nell'agricoltura toscana 1870-1914: primi risultati di uno studio aziendale" ... cit.; G. Zanibelli, *Mezzadria e trasformazioni economiche* ... cit.

As it was also mentioned in the previous literature on the topic, it is not possible to find only one indicator that could explain land inequality, in particular for the dimension question⁵¹. Such an interpretation assumes significant relevance in the Italian case. It is for this reason that it has been decided to relate the provinces featuring medium rates (in parentheses) of the following indicators: percentage of wheat cultivated surface (17%); rate of specialised cultivations (8.4%) on the agrarian and forest surfaces and the share of the *Catasto*'s units identifiable as commons on the total of every province (0.2%)⁵². Considering that the literature presents some ambiguities in terms of commons and inequality⁵³, this last variable is particularly significant in order to start research on the first effects of the 1927 reorganisation and commons' division. For sure collective good and inequality can become a characterising element of the latifundium in case this is not governed by specific sets of rules and safeguarded by the normative in a way that the private interest could not prevail on the public one⁵⁴. To these variables, it has been decided to also add the literacy rate (71.36%), identifying it as one of the possible explanatory variables of the socio/economic delay⁵⁵.

All the provinces, except those of Venice (76.35) and Mantua (90.20) present rates that are clearly below the average of the following indicator, in particular the southern provinces and the islands, where the discrepancy rate is extremely high. As for the central provinces, the divergence is lower, though still significant⁵⁶. This allows us to observe how literacy and latitude are correlated. The cases of Grosseto and Viterbo (being them part of the Maremma macro-area) show how the first reclamation interventions could have brought benefits in the improvement of the population's life conditions.

⁵¹ P. Bevilacqua, "Tra Europa e Mediterraneo. L'organizzazione dei sistemi agrari nell'Italia contemporanea" ... cit.

⁵² Istituto Centrale di Statistica (ISTAT), *Annuario Statistico dell'Agricoltura Italiana. 1936-1938* (Rome 1940).

⁵³ M. Olson, *The Logic of Collective Action* (Harvard 1965); S. Thapliyal, A. Murkherji, D. Malghan, "Economic inequality and loss of commons: Evidence from India", in *World Development*, 122, 2019, pp. 693-712.

⁵⁴ E. Ostrom, *Governing the commons: The evolution of institutions for collective action* (Cambridge 1990).

⁵⁵ Istituto Centrale di Statistica (ISTAT), *Catasto Agrario 1929* (Rome 1934).

⁵⁶ List of percentage values of the provinces: Cosenza (36.35), Catanzaro (36.64), Foggia (48.19), Sassari (60.68), Nuoro (60.74), Siena (64.48), Grosseto (71.22), Viterbo (72.02).

Shifting the attention to the other indicators, it can be noticed how Sassari presents a value which is below average in terms of specialised cultivations (2.4%) and a commons' value close to the national average (1.5%). Being the region with a greater land inequality, we would have expected to see much higher values of these variables. However, through the observation of the disaggregated data of the single indicators, a significant presence of large properties can be observed, which, combined with illiteracy, can explain the phenomenon. The province of Grosseto which is part of Maremma and participated in the reclamation system, is definitely an interesting example, also because it was the province with a prevalingly latifundium-oriented conduction system, characterised by a large presence of daily workers among the agrarian population. The share of wheat cultivations is slightly below average (13.90%), which is nonetheless a meaningful figure. Similarly, specialised cultivations record a relatively low value (2.5%), a result that can be partly explained by the fact that many territories were still in need of reclamation, which may therefore represent one of the key factors behind this pattern. The province of Nuoro, besides its high illiteracy rates, shows the presence of agrarian commons (0.31%) and a scarceness of specialised cultivations (0.21%). The marked land inequality of the province of Foggia is due to the strong incidence of the wheat cultivations (28.64%) and to the extensive unclaimed lands in the Capitanata region. As for specialised cultivations, the value is approximately the same as the national average. In the province of Ferrara, we notice a significant presence of commons (0.39%) and an average low rate for the specialised cultivations (1.3%). The presence of rich land property must also be added to this. The province of Cosenza is a case in point, as the indicators are all either above or below the national average. Possible explanations for this are the presence of large properties and of an elevated number of agrarian populations per hectare. The province of Venice shows one of the highest rates for the commons (0.48%) and for the incidence of the wheat surface (18.14); to this, it must also add the scarceness of specialised cultivations (5.1%), a peculiarity as far as high farming is concerned. The province of Viterbo shows a significant incidence of wheat cultivation (24.11%) and commons (0.28%). Even the province of Mantua shows significantly high values regarding the wheat cultivated surface (23.29%) and a scarceness in terms of specialised cultivations. The province of Siena is undoubtedly one of the most interesting cases, as, despite its specialisation in wine production, viticulture was still largely practiced within mixed cultivation systems, as confirmed by the low share of specialised cultivations

(0.7%). The presence of commons (0.32%) played a key role, but the explanation, in this case, is traceable back to the vast aristocratic property. However, as it has been previously mentioned, in this case land inequality was not a synonym of backwardness in the agrarian field. The province of Rome is characterised by an important presence of commons (0.41%). As for the province of Catanzaro, none of the used indicators seems to be adequate for explaining the phenomenon. Still in this case the presence of large properties is no doubt useful to understand the provincial rate.

The analysis has enabled to retrieve some interesting and useful aspects: the latifundium does not always correspond to backwardness, as in the Siense case, and southern agriculture merits further, in depth analyses⁵⁷. In addition, the commons, rights to use natural resources as forests and pastures⁵⁸, assume a relevant role in this analysis and the 1927 law on the retrieval and the reordering leads in the direction destined to the promotion of a better usage of these and, at the same time, to the changing in their perspective, from element of an increase discrepancies to possible tool for community growth. The results confirm how important it is to study the reorganisation of the commons to be able to examine in depth a significant aspect of the Italian agrarian structure, in particular in mountain areas. A study on the institutions' efficiency becomes essential, in order to be able to process analyses on land inequality during the fascism and after the war. The analysis has shown that the presence of unregulated civic uses favouring the private interest actually favours the increase of land inequality.

8. Conclusions

The research showed that the composite indicator should be understood as a relevant comparative tool for analysing different provincial contexts and revealing similarities and differences that would otherwise be difficult to identify.

⁵⁷ See: G. Federico, "Ma l'agricoltura meridionale era davvero arretrata?" ... cit.

⁵⁸ A. Bulgarelli Lukacs, "I beni comuni nell'Italia meridionale: le istituzioni per il loro management. Globale", in *Rivista molisana di storia e scienze sociali*, 9-10, pp. 119-137; G. Zanibelli, "Commons land management in Southern, post-unification Italy: New evidence from a micro analysis on Salerno province", *Rural History*, 36 (1), pp. 72-95.

This finding was reinforced by using the composite indicator, which enriched the reconstruction of productive structures by providing a multidimensional analysis of the phenomenon. Considering the preceding paragraphs' findings, we can summarise the key points of this study explaining the dynamics of land inequality in Italy during the 1930s.

One of the most important aspects emerging from this study is that the Italian case needs to be studied also under a micro-territorial dimension, in order to be able to understand the differences among the various realities. Analysing phenomena like the inequality and attempting a reconstruction of it through a synthetic indicator is certainly useful to fuel the debate on the Italian agrarian history.

The synthetic measure identifies an indicator that in addition to the size of the property also included other socio-economic variables, in particular the incidence of landowners. The variable was constructed differently from other examples in literature⁵⁹, but the results obtained confirm that this was also important for the previous period. This study demonstrated the importance of the geographic dimension, considering that this variable tends to influence the inequality values⁶⁰. The provincial analysis revealed that micro data allows us to observe the existence of significant divergences between realities located in the same macro area⁶¹. The results showed that the levels of inequality are linked not only to geographical factors, but also to different forms of land tenure. In particular, the significant relationship between inequality and forms of agrarian management enriches the scientific debate by offering new elements of analysis on the southern area of the Latifundium. In this study, we propose moving beyond Italian dualism by highlighting the existence of diverse types of business organisations within various regional contexts. Consider, for example, the Tuscan provinces of Grosseto, Livorno, Lucca, and Massa Carrara located in one of the key sharecropping regions in Italy and in Mediterranean Europe which were characterised by a prevalence of direct land management practices.

It is important to focus on the Tuscan case; the analysis made it possible to observe that the results of the observations made by Alfani and Ryckbosch re-

⁵⁹ P. Martinelli, "Land Inequality in Italy 1940. The new picture" ... cit.

⁶⁰ S.L. Engerman, K.L. Sokoloff, "Factor endowments, inequality, and paths of development among new world economics" ... cit.; D. Acemoglu, J. Robinson, *Why nations fail*... cit.

⁶¹ G. Zanibelli, V. Ricci, "Literacy and Land Inequality in Italy During Fascism. A Geographic-Historical Analysis" ... cit.

garding the region persisted even in the 1930s⁶². The case of Tuscany is important because it can be identified as one of the most unequal regions, in particular the provinces of Siena, Grosseto and the Maremma area. This contribution showed that the cluster of inequality of southern Tuscany identified by Detti-Pazzagli and Zanibelli did not change over time⁶³. The findings presented in this paper confirm what has been highlighted in the literature, particularly with regard to the case of Siena⁶⁴. The latter is emblematic of a similar trend because the persistence of large estates (*fattorie*) was combined with complex management structures, prompting reflection on the relationship between inequality, agricultural development, and production strategies.

The Cluster analysis reveals a particularly interesting picture; in Southern Italy there are areas with lower values of land inequality in zones characterised by a high incidence of wood crops (olive trees and grapevines). This is confirmed by the case of Puglia where the highest values of inequality are concentrated in the province of Foggia, an area characterised by the highest incidence of wheat cultivation in the region⁶⁵. Furthermore, it was possible to identify a nationally extensive cluster (number 4), which encompasses all the areas that would subsequently be subject to agrarian reform in Republican Italy. The results paint a picture that allows us to define inequality as a key factor in understanding the transformation of Italian agriculture in the second half of the 20th century.

In addition, this study opens new lines of research linking the composite indicator to variables indicative of territorial development, such as literacy, factor productivity, and migration, as well as to various environmental sustainability indicators, such as conservation of landscape heritage and common goods.

Finally, we lay the groundwork for future comparisons between the interwar period and subsequent Republican interventions to measure discontinuity in the processes of change in Italian agriculture.

⁶² G. Alfani, W. Ryckbosch, "Growing apart in early modern Europe? A comparison of inequality trends in Italy and the low the Low Countries, 1500-1800"... cit.

⁶³ T. Detti, C. Pazzagli, "La struttura fondiaria del Granducato di Toscana alla fine dell'ancien régime. Un quadro d'insieme"... cit.; G. Zanibelli, *Mezzadria e trasformazioni economiche*... cit.

⁶⁴ G. Zanibelli, *Mezzadria e trasformazioni economiche*... cit.

⁶⁵ V. Ricci, G. Zanibelli, "High farming, latifondo e mezzadria a confronto. Uno studio geospaziale sul Catasto Agrario del 1929 tra Lombardia, Toscana e Puglia", *Metodi e Analisi Statistiche* (Bari, 2019), pp. 21-66.

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