

Global structure of the land by analytical regions: Concentration and fragmentation

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Illustration: Juan David Botero

Global structure of the land by analytical regions:

Concentration and fragmentation.

On the eve of the Second International Conference on Agrarian Reform and Rural Development - ICARR+20, we thought it was important to provide analytical inputs on the state of the discussion around governance, access and inequality in access to land at the global level. As we will see later in greater depth, the discussion around the global structure of land ownership is not minor, from which other discussions derive such as the increase in inequality gaps, development models, the destruction of natural resources, corporate grabbing, the rights of vulnerable populations and global hunger.

In this text we will focus on what can be said with official and comparable sources about the structure of land ownership. We will analyze the geographical patterns and other relevant qualitative criteria between countries; seeking to understand the phenomena of both land concentration and fragmentation, using data from FAOSTAT agricultural censuses. As can be seen, one of the innovations of this exercise is to present an exercise of regionalization of the data corresponding to the agricultural censuses, aspiring to better observe the specificities of each set of information.

In our opinion, the empirical evaluation of any regionalizing framework of the world agrarian structure must start from two contrasting but interrelated facts in the recent scientific literature. On the one hand, there is a growing concentration of land ownership, where a small group of actors operates a disproportionate portion of agricultural land. On the other hand, the world's food production remains fundamentally dependent on the work and management of millions of smallholder farmers and family farms. The typology proposed in the original text must be judged by its ability to capture this central paradox.

Under the above context, the content of the text will be divided into four parts: first, a brief summary of the current state of the discussion; second, the overall presentation of FAOSTAT data to 2025; third, the classification according to 7 proposed analytical regions is shown; and fourth, the implications of the findings for the theory of agrarian structure, and for the formulation of rural policies, are discussed.



1.

THE STATE OF THE DISCUSSION.

Concentration in land tenure is not a residual problem of colonial or pre-modern history, but a central feature of contemporary nation states (Bauluz, Govind & Novokmet 2020).^[1] Traditionally, we have used a bimodal structure, known as latifundio-minifundio, to analyse the phenomenon of property concentration in many regions of the planet. However, a broad review of the literature in question shows us that the structure of global agrarian property is in a state

of profound transformation, characterized by a historical and growing concentration of land rights. This trend not only represents one of the most visible manifestations of global inequality but is also one of its main causes. The critical analysis of this phenomenon reveals a complex interplay between diverse conceptions and valuations of rural territories, neoliberal policies, appropriation of resources on a planetary scale, new forms of corporate power, and the resistance of marginalized rural actors (Meyfroid et al. 2021).^[2]

In the above context, we began to think about the following balance, thinking that although it was not exhaustive – that is not our primary goal – it could shed light on the following main questions: What does contemporary scientific evidence say about inequality in access to land? How reliable are the studies and measurements that we have traditionally used to study this phenomenon? What are the expressions of this structural matrix of inequality, or is it manifested in a homogeneous way?

Thus, and from the great diversity of approaches to the distribution of land worldwide, we choose to construct a look at this problem by means of 4 major approaches: i) qualitative studies of political economy; (ii) exercises that focus on the volume and concentration of commercial transactions to rural lands; iii) exercises focused on inequality analysis using agricultural surveys and, vi) quantitative work using FAOSTAT and world agricultural censuses.

1.1. Political economy

Analyses that use political economy as an interpretive framework analyze the dynamics of power, accumulation, and dispossession that explain the growing inequality in land

1 Bauluz, L.; Govind, Y.; & Novokmet, F. (2020). Global Land Inequality. International Land Coalition (ILC).
2 Meyfroid et al. (2021). Ten facts about land systems for sustainability. Perspective. Vol 119. No 7.



distribution (Bernstein 2017).^[3] “Critical agrarian studies”, ^[4]a branch that emerges from this analytical category, have been very relevant when it comes to analyzing the persistence of relations of domination and peasant poverty as a result of the increase in social gaps, deconstructing the notion of inherent incapacity promoted by orthodox neoclassical economics (Akram-Lodhi 2018).^[5]

Thus, political economy analysts have been concentrating on the one hand, on the changes in land use driven by corporate grabbing by transnational entities and the consequent process of peasant dispossession (Borras JR & Franco 2012)^[6]; while on the other hand, the focus is on understanding how decisions on land use are mediated by transnational actors, public policies, global markets and environmental interests (Meyfroidt et al. 2013).^[7]

1.2. Land grabbing through the land market.

Analysis of the structure of landed property methodologically focusing on the volume and concentration of commercial transactions to rural land intensified markedly after 2000, coinciding with an overall increase in agricultural land acquisition, often referred to as the “*global land grab*”, driven in part by the global food crisis of that period. (Davis, Rulli & D’Odorico 2015)^[8].

Africa has been at the epicentre of the debate on “big land hunting” by foreign investors, often in areas with low population density and weak land tenure systems. The volume of these transactions is significant, although difficult to quantify accurately due to the often-clandestine nature of many of them. (Castet 2024)^[9]. Another paradigmatic case is that of Latin America, where a structural situation of inequality in access to rural land has been deepening, promoted by an increase in private investments, both domestic and foreign, particularly in the case of Brazil. (Ma et al. 2024)^[10]

3 Bernstein, H. 2017. Journal of Sociology. Vol 17 No 1.

4 Edelman, M and Wolford, W (2017) ‘Critical Agrarian Studies in theory and practice’, Antipode.

5 Akram-Lodhi, H. (2018). What is Critical Agrarian Studies? In Review of African Political Economy – ROAPE.

6 Borras, S. & Franco, J. 2012. Global Land Grabbing and Trajectories of Agrarian Change: A Preliminary Analysis. IN Journal of Agrarian Change, Vol 12 no 1.

7 Meyfroidt, Patrick & Lambin, Eric & Erb, Karl-Heinz & Hertel, Thomas. (2013). Globalization of land use: Distant drivers of land change and geographic displacement of land use. Current Opinion in Environmental Sustainability. 5.

8 Davis, K; Rulli, M & D ‘Odorico. (2015). The global land rush and climate change. In Commentaries on Climate. Volume 3.

9 Castet, A. (2024). The impact of large-scale land acquisitions on child food insecurity in Africa. In World Development Vol 179.

10 Ma J, Tian L, Zhang Y, Yang X, Li Y, Liu Z, Zhou L, Wang Z, Ouyang W. Global property rights and land use efficiency. Nat Commun. 2024 Oct 2; 15(1).



The main methodological tool that has emerged to document and analyze this phenomenon is the global database known as the Land Matrix. This platform has become a de facto standard for compiling data on large land transactions, providing a centralized source of information that allows researchers to conduct globally comparable analyses. Recent studies confirm its use as a main reference; for example, Wang et al. (2025)^[11] used the Land Matrix database to analyze China's investment in cultivated land abroad, while Tian & Liu (2022)^[12] also used it to study Chinese investment in the Belt and Road countries. The relevance of Land Matrix lies in its ability to offer standardized data on purchase, lease, or other types of land transfer agreements, making it easier to analyze the volume and geography of these investments.

A fundamental aspect of the Land Matrix-based methodological paradigm is the operational definition of a "transaction". To manage the scale of the data, many studies adopt a minimum threshold to classify an acquisition as a "large transaction" or "land deal." A commonly cited measure is an area of 200 hectares or more. This definition is crucial because it delimits the universe of analysis for numerous studies, focusing on large-scale investments that generate greater economic and social impacts. However, this same definition introduces an important methodological limitation, as it excludes smaller transactions that may be equally significant at the local level or that are part of gradual consolidation strategies by large players. Therefore, any interpretation of the findings derived from these data must consider the bias inherent in the exclusion of investments below this threshold. The existence of this universal definition helps to ensure comparability between different studies, but it also forces researchers to be aware of its implications.

In addition to the Land Matrix, the literature mentions other sources of data, albeit often with nuances. For example, Burchfield et al. (2024)^[13] conducts a systematic review to map and compare various public and curated data sources on agricultural land systems, underscoring the importance of understanding the nature of each database before use. In some contexts, such as the US and the European Union, land registration systems are abundant and allow for an understanding of ownership and production trends, but socio-demographic data on owners or tenants are often "largely inaccessible to the public", presenting an obstacle to independent quantitative research.

We see then that there is a growing attention to rural rental markets, particularly in the

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- 11 Wang, Y; Zou, F; Wang, L; Huawang, J.; & Ma. L. 2025. Spatial distribution and influencing factors of China's overseas farmland investment projects under the background of food security. In *Frontiers in Sustainable Food Systems*. Vol 8.
 - 12 Tian, J. & Liu, Y. (2022). A study on agricultural investment along the Belt and Road. In *Frontiers in Sustainable Food Systems*. Vol 6.
 - 13 Burchfield et al. (2024). Towards a comprehensive analysis of agricultural land systems in the EU and US: A critical view on publicly available datasets. In *Land Use Policy*. December Vol 147.



Chinese context. The land leasing market in China has expanded considerably, and its impact on land distribution and productivity is an active area of research. Several studies (Jiang et al. 2022^[14] & Wang et al 2025^[15]), illustrate a trend towards the analysis of more fluid and dynamic land markets, where the volume of transactions can be measured not only by large-scale purchases but also by periodic lease agreements. On the other hand, the European cases show a concern about the monopoly of markets on the part of large corporations in a context where the concentration of ownership is already well advanced (Kay, Peuch & Franco 2015).^[16]

Finally, the work of a significant number of civil society organizations strives to dimension and update the scale of global agrarian counter-reformism. In this area, it is worth highlighting the report *The Lords of the Earth* (2025),^[17] which specifies the transnational entities that monopolize the most rural land in the world. According to this work, the 10 entities with the highest level of land grabbing own and control 40,445,718 ha (an area comparable to the size of Japan, Zimbabwe or Paraguay).

1.3. Analysis of inequality in access to land

Measures of inequality vary depending on the indicator used. Although the Gini coefficients based on the surface area of the properties offer an image of the concentration; according to the work of Bauluz, Govind, & Novokmet, (2020), these results can be misleading by obscuring the economic importance of land. Research that considers both the economic value of land and the situation of people without access to it (rural landless population) is able to reveal significant gaps.

The above perspective would be adopted by Bauluz, Govind, & Novokmet in their work *“Global Land Inequality”* (2020). This analysis better contextualizes the extent of the imbalance, showing that the concentration of wealth on land is much more severe when measured in terms of real economic power. To this end, both the area and the market value of the land are analyzed, recognizing that land is not a homogeneous asset. In addition, the “landless population” is included, defining it as those households where at least one member works in agriculture but does not own land.

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- 14 Jiang, X.; Lu, X.; & Gong, M. (2022). Assessing the effects of land transfer marketization on green total factor productivity from the perspective of resource allocation: Evidence from China. In *Frontiers in Environmental Science*. Vol 10.
 - 15 Wang, S.; Liu, Z.; & Rodriguez, S. (2025). Research on the Transfer of Rural Land Contracting Rights: Empirical Analysis Based on Shandong Province. *Rural Social Work and Social Perspectives of Sustainability*. Vol 17.
 - 16 Kay, S.; Peuch, J.; & Franco, J. (2015). Extent of farmland grabbing in the EU. European Parliament – Department of Agriculture and Rural Development.
 - 17 Rolón, L.; Seufert, P.; Monsalve, S.; Guttal, S. (2025). *The Lords of the Land: Transnational Landowners, Inequality, and the Imperative of Redistribution*. FIAN & FOCUS.



In terms of capturing the value of land, this work showed that the richest 10% of the rural population captures 60% of the total value of agricultural land, while the poorest 50% obtains only 3%. When applying the new methodologies that consider the value of land and the landless population, inequality is 41% higher than previously reported in the sample countries. (Bauluz et al., 2020).

The results showed that including the landless population significantly increases the calculated levels of inequality, especially in regions where this group is large, such as in the regions of South Asia and Latin America where there is the highest inequality in the world (the top 10% of landowners capture up to 75% of the value of agricultural land). In these same regions, landless households represent 38% and 37% of the agricultural population, respectively, in addition, the bottom 50% of the population owns only between 0% and 2% of the land. While China and Vietnam are the least unequal regions in relation to value, area and landless peasants^[18].

Another exercise in the same line of multidimensional analysis of inequality in access to land is that of Anseeuw and Baldinelli (2020).^[19] This exercise sought to examine “real control” and decision-making power over land, as well as the ability to appropriate its value, considering both vertical (between individuals) and horizontal (based on gender, ethnicity, and culture) inequality. They also found a historical pattern in the processes of concentration of world agrarian property; according to the latter, after a steady decline from the beginning of the twentieth century until 1980, inequality increased again; the global Gini coefficient went from 0.60 in 1982 to 0.62 in 2017. (2020:36).

A final study in this regard that is worth mentioning is that of Cabrera et al (2025) “*Measuring agricultural land inequality*” carried out by the FAO in Africa. One of the most important contributions of this work is its warning that focusing only on the size of rural properties is insufficient to understand the agrarian reality, since factors such as security of tenure and environmental quality are invisible determinants that deepen the inequality gap in the rural world.

In terms of legal security of tenure, the study found critical cases such as those of Benin, Niger, Senegal and Togo, in which none of the households in the bottom 40% of the distribution have legal documents or alienation rights over their land. The case of Nigeria is the most extreme, since 90% of the population there does not own land with documented or alienation rights. By adjusting the area according to its potential productivity (climate, soil and water), for the case studies in Africa it was clearly observed

18 “In China, only 3% of households involved in agriculture do not own land, while in Vietnam it is 12%.” Bauluz, Govind, & Novokmet (2020:15).

19 Anseeuw and Baldinelli (2020). Land inequality at the heart of unequal societies. International Land Coalition & Oxfam.



that in countries such as Nigeria, Tanzania and Ethiopia inequality increases because richer households own better quality land (2025:39).

1.4. The inverse relationship between ownership concentration and food production

There is a wide variety of referential studies that use quantitative approaches to the phenomenon of rural property structure (FAO 2014^[20], 2018^[21], 2025^[22]) and (Graeub et al 2016),^[23] which provide essential data that complement the critical analysis of political economy and allow us to dimension the paradoxes of the global agrarian system. However, for the purposes of this balance we have decided to focus on three reference documents.

The first is the study *“Which farms feed the world and has farmland become more concentrated?”* by Lowder, Scoet & Raney (2016)^[24] laid the empirical foundations for a new understanding of the global agricultural sector. Using data from national agricultural censuses from more than 130 countries. This study concluded that there are more than 608 million farms in the world, of which more than 90% are family farms. These family farms occupy between 70% and 80% of agricultural land and produce approximately 80% of the world’s food in value terms (Ibid).

The previous work was revolutionary because it dismantled the dominant narrative that large-scale industrial agriculture was the main supplier of food. However, the study made a crucial caveat: “family farm” should not be confused with “small farm.” Farms of less than two hectares account for 84% of the total farms but operate only 12% of the land and produce approximately 35% of the food. A subsequent work by Lowder, Sánchez & Bertini (2019)^[25] would find that the concentration of rural land is extreme, since the 1% of the largest farms operate more than 70% of the world’s agricultural land.

The second work is *“How much of the world’s food do smallholders produce?”* by Ricciardi et al. (2018), which represented a significant methodological advance by designing a

20 FAO. (2014). The state of food and agriculture 2014: Innovation in family farming. Rome.

21 FAO. (2018). World Programme for the Census of Agriculture 2020. Volume 2: Operational guidelines. FAO Statistical Development Series 16.

22 FAO. (2025). The State of Food and Agriculture 2025. Address land degradation at all tenure scales. Rome

23 Graeub, B. et al. (2016). The State of Family Farms in the World. World Development. Volume 87, November 2016.

24 Lowder, S. K., Scoet, J., & Raney, T. (2016). The number, size, and distribution of farms, smallholder farms, and family farms worldwide. World Development, 87, 16–29.

25 Lowder, S.K., Sánchez, M.V., and Bertini, R. (2019). Farms, family farms, farmland distribution and farm labour: What do we know today? FAO Agricultural Development Economics Working Paper 19-08. Rome, Italy: FAO.



spatially explicit and detailed taxonomy of agrarian systems based on the construction of subnational sectors by the average size of agricultural households. In this exercise, it was possible to observe both the diversity and type of crops used, as well as the specific role of smallholders for 55 countries.

The analysis by Ricciardi et al. showed that farms of less than 2 ha produce between 28% and 31% of total crop production and between 30% and 34% of the world's food supply, and that they also allocate a higher percentage (55-59%) of their production to food. They also observed that species richness decreased as the size of the farm increased. This study confirmed that almost 60% of the production of small producers is destined to food production.

Finally, the third article is "*Which farms feed the world, and how: A new investigation*" by Lowder, d'Errico & Gabriele (2021). This work analyzed temporal trends in the structure of global ownership, showing how land concentration increases as economies grow. This paper highlighted several remarkable methodological difficulties when analysing global comparative data: on the one hand, it is necessary for agricultural censuses to include non-household farms, such as agro-industrial enterprises, which are often excluded and whose omission can severely skew estimates downwards in terms of the actual concentration of land. It is also advisable to be careful with the quality and availability of the data, pointing out that the estimates are not free of bias.

Centrally, Lowder et al. (2021) argued that the category of "family farming" is problematic as it varies from country to country and, therefore, does not necessarily reflect smallholders. This distinction is fundamental and implies an important contradiction, depending on the census structure of each country: "family farm" cannot be confused with "small farm".

Thus, despite the fact that the work of Ricciardi et al (ibid.), suggests that farms of less than two hectares account for 84% of total farms, and operate only about 12% of all agricultural land; producing approximately 35% of the world's food. It should not be lost sight of that the category "family farming" covers a wide range of sizes, from precarious smallholdings to medium and large family farms that can be highly productive and capitalized.

As we will try to suggest later: one region may have a large number of small family farms without necessarily being a region of high social inequality, while another may have a bimodal latifundio-minifundio structure, as has historically been studied in Latin America.



2.

GLOBAL RURAL LAND STRUCTURE.

After this rapid review, it is clear that agrarian problems with respect to access to land are a topic of great global interest, not only because of their direct relationship with food dynamics but also because of their deep interweaving with the deepening of inequalities, territorial conflicts and agrarian justice.

Our work was carried out on a total of 3,065,823,827 hectares, which is equivalent to 589,965,141 farms/APUs. The dataset includes detailed information on the number of farms and the total area they

cover in 184 countries. Under the above scenario, we will seek to update the evidence around the regional structures of rural property. The intention will be to contribute to the problematization of the trends in the concentration and fragmentation of rural property from a regional perspective.

Temporary Coverage of Agricultural Censuses

It is important to note that the agricultural censuses compiled by FAO do not correspond to a single uniform period in time. Rather, this information reflects a continuous collection process that has developed over several decades, depending on the institutional capacity and statistical priorities of each country.

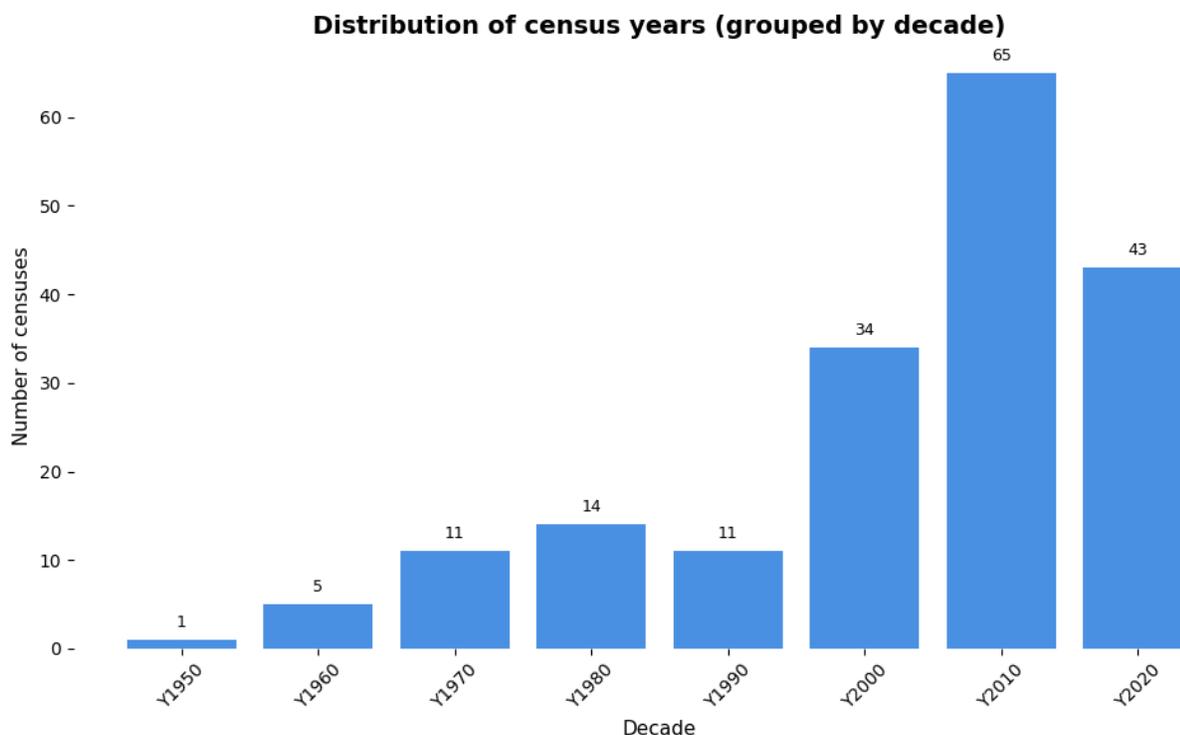
To facilitate their analysis, census years have been grouped into ten-year intervals, called census decades. For example, the Y1950 category corresponds to the period between 1950 and 1959, while Y2020 groups the censuses carried out between 2020 and 2025, although it is intended to group future censuses until 2029. It is essential to clarify that these intervals do not represent a single specific year, but a range of years in which the different countries managed to carry out their agricultural censuses.

Figure 1, entitled *Distribution of census years (grouped by decade)*, shows how censuses are distributed over time. It shows a progressive increase in the number of censuses carried out, reaching its peak in the decade 2010–2019. This increase reflects the consolidation of international regulatory frameworks and the strengthening of national statistical capacities, which have made it possible to expand the coverage and frequency of these census exercises.



This temporal diversity should be considered with particular attention when interpreting data, as differences in baseline years may influence the comparison of agricultural indicators across countries and regions.

Figure 1. Distribution of countries according to grouping by decades

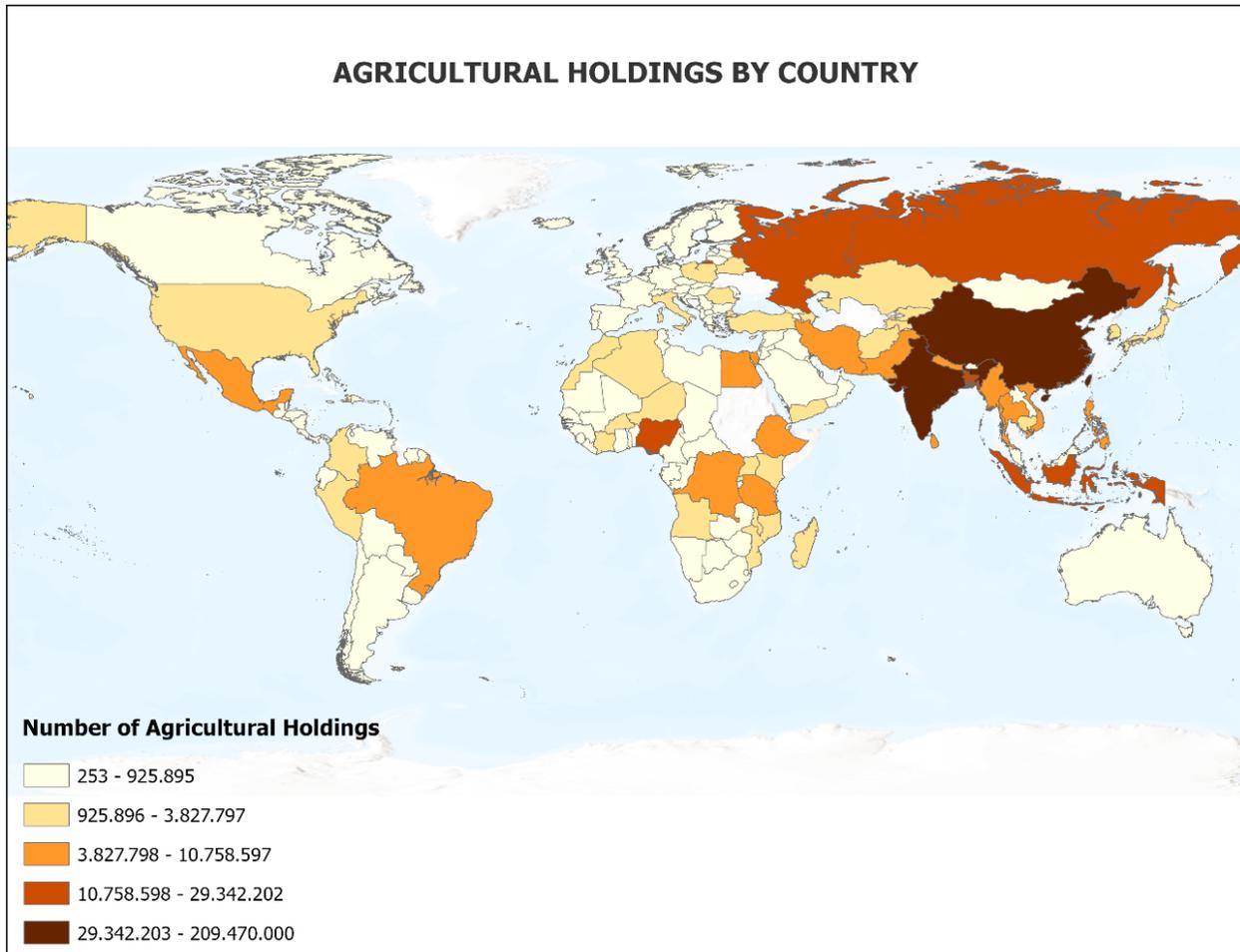


2.1. Number of Farms and Area in Hectares

The first type of analysis that can be done with the FAOSTAT global database is that of the concentration by number of farms in each country. This exercise can be seen in Figure 2, entitled *Number of farms by country*, which allows us to identify the nations with the largest number of farms. China and India are particularly noteworthy, with an extraordinary volume of small production units, reflecting both their high rural population and the fragmentation of agricultural property in their territories. This first glance is essential to measure the magnitude of agricultural activity and to understand the structural differences that characterize each country and region.



Figure 2 Number of farms by country

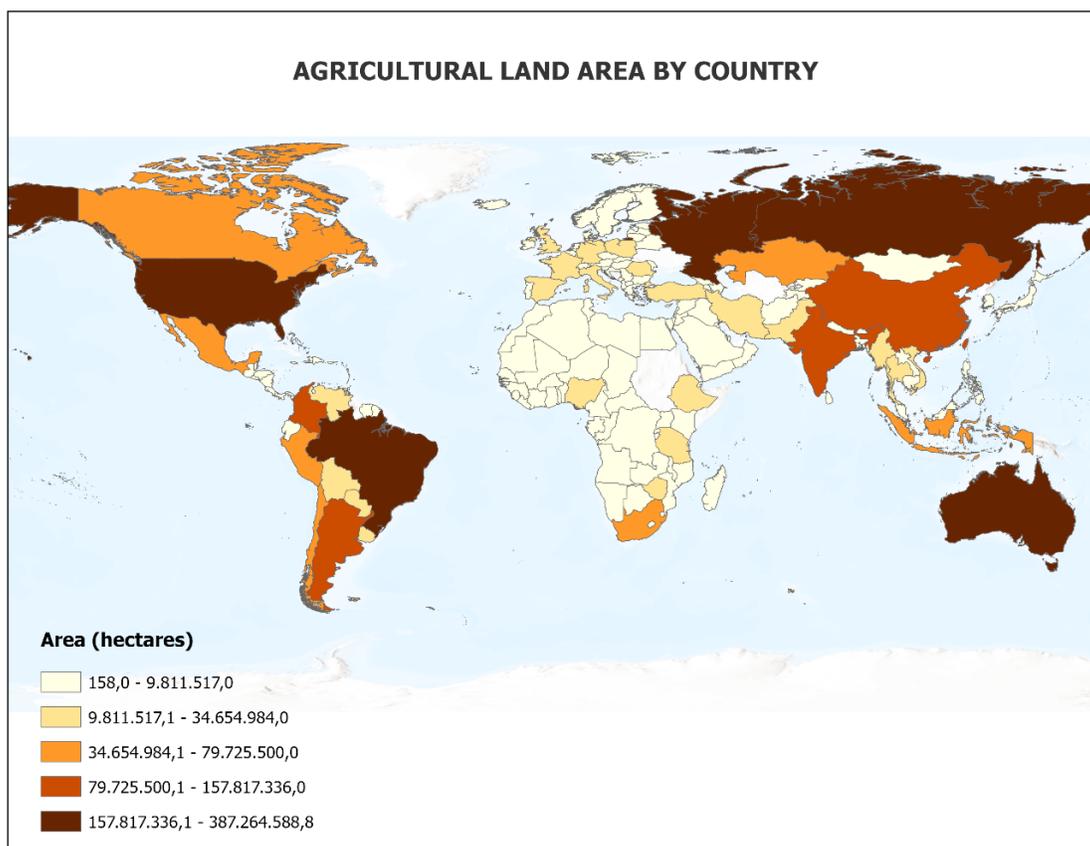


On the other hand, in Figures 3 and 4, a different pattern is evident. Figure 4 shows that the countries with the largest declared agricultural area are the United States, Brazil, Russia and Australia, which shows production models characterized by extensive exploitation units and, in many cases, oriented towards large-scale commercial production.

Figure 3 Statistical Description of Agricultural Holdings

Statistic	Number of agricultural holdings (No.)	Agricultural holdings area (ha)	Hectares per holding
count	184.0	184.0	184.0
Mean	3,206,332.3	16,662,086.0	59.5
STD	18,965,915.3	56,412,318.1	348.7
min	253.0	158.0	0.1
25%	28,449.5	139,813.8	1.5
50%	211,255.5	1,813,748.0	4.1
75%	1,043,202.2	6,174,822.4	15.8
max	209,470,000.0	387,264,588.8	4,430.8

Figure 4 Farm area by country





Descriptive statistics summarize the marked heterogeneity of these indicators at the global level:

- On average, each country reports approximately 3.28 million farms, which together cover 16.66 million hectares.
- However, these average values hide a huge dispersion. Some countries have only 253 farms and areas of 158 hectares, while others reach figures of 209 million farms and more than 387 million hectares.
- The indicator of hectares per farm is particularly illustrative of this diversity. The median is 4 hectares per unit, a value that reflects the predominance of small farms in many regions. However, the extremes are notable: in some countries, the average is less than 0.1 hectares per farm, while in others it exceeds 4400 hectares, which shows profoundly contrasting agricultural models in terms of land concentration and productive organization.

These pronounced differences constitute a key element of analysis, since they directly condition production dynamics, sustainability challenges and the design of public policies aimed at rural development. They also invite reflection on the impact that the agrarian structure has in terms of equity, productivity, and sustainable use of natural resources.



3.

ANALYSIS OF AGRICULTURAL HOLDINGS BY MEANS OF THE REGIONAL DISTRIBUTION CLASSES.

The classic concept of bimodal structure, latifundio-minifundio, remains an indispensable analytical tool, especially for regions such as Latin America, where colonial and postcolonial history has left an indelible mark on land distribution. However, the contemporary agrarian reality is much more nuanced. For this reason, with the above global data, we proceed to build an adequate lens to analyze the global database regionally. In this regard, we use several criteria: i) the average size of farms; (ii) average number of farm workers on a per-farm basis; (iii) mechanization in relation

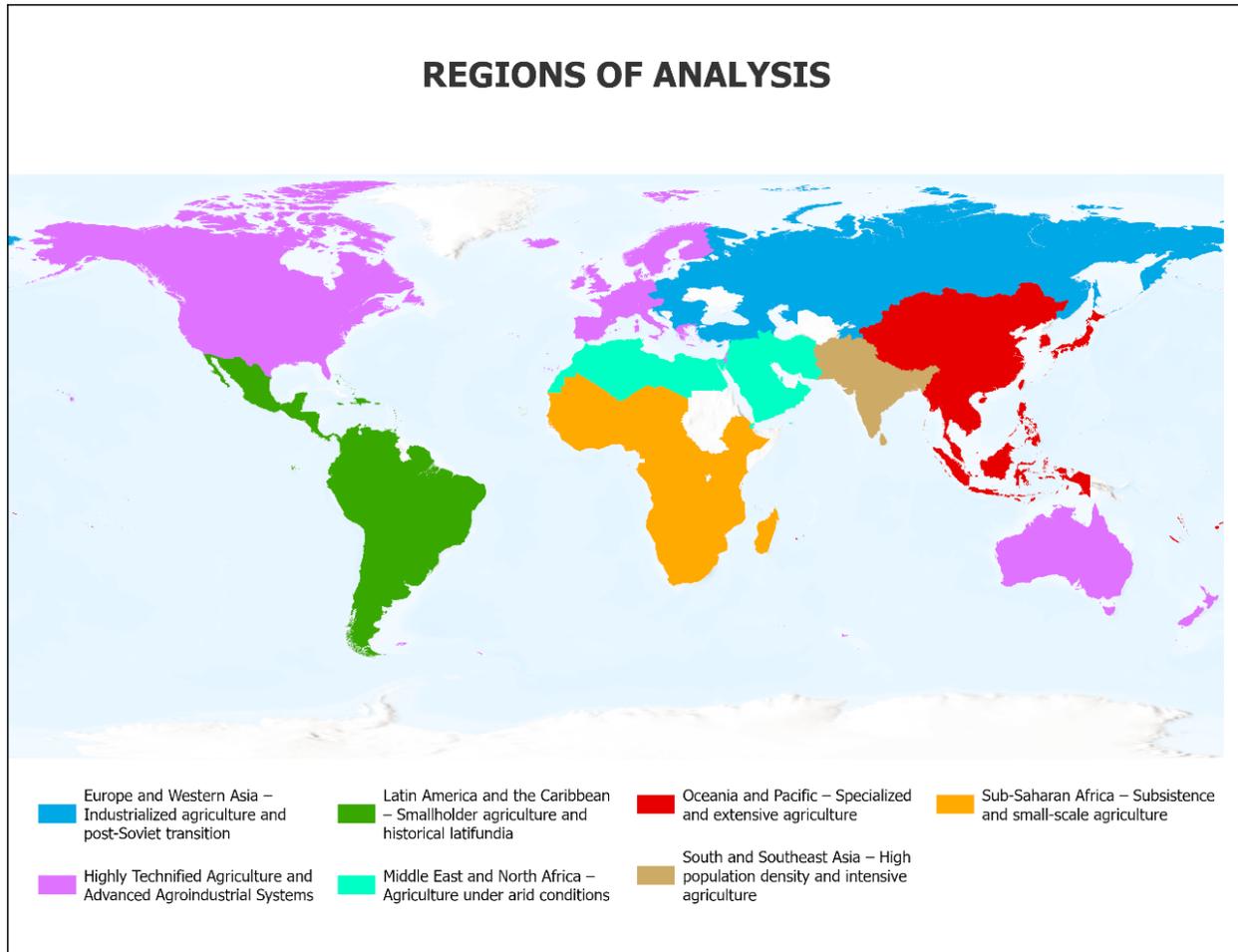
to the number of machineries in each country (data as of 2009); and iv) as well as a subjective criterion on agrarian history that mentions the socio-political nature of each country in relation to its rural development.

With these criteria, an indicator is constructed that allows determining the countries in the following 7 regions of analysis.

- a. **Europe and Western Asia** – Industrialized agriculture and post-Soviet transition
- b. **Latin America and the Caribbean** – Smallholder agriculture and historical latifundia
- c. **Highly Technified Agriculture and Advanced Agroindustrial Systems** - Agricultural structures linked to large estates and monoculture
- d. **Middle East and North Africa** – Agriculture under arid conditions
- e. **Oceania and Pacific** – Specialized and extensive agriculture
- f. **South and Southeast Asia** – High population density and intensive agriculture
- g. **Sub-Saharan Africa** – Subsistence and small-scale agriculture

This regionalization can be seen in Figure 5. It should be noted that the global coverage offered by this database represents a unique opportunity to carry out comparative analyses on the evolution of agriculture in different areas of the world. It is also a strategic input for understanding patterns of farm concentration or fragmentation, the availability of arable land, and structural trends in the agricultural sector.

Figure 5. Regions of analysis of rural land distribution

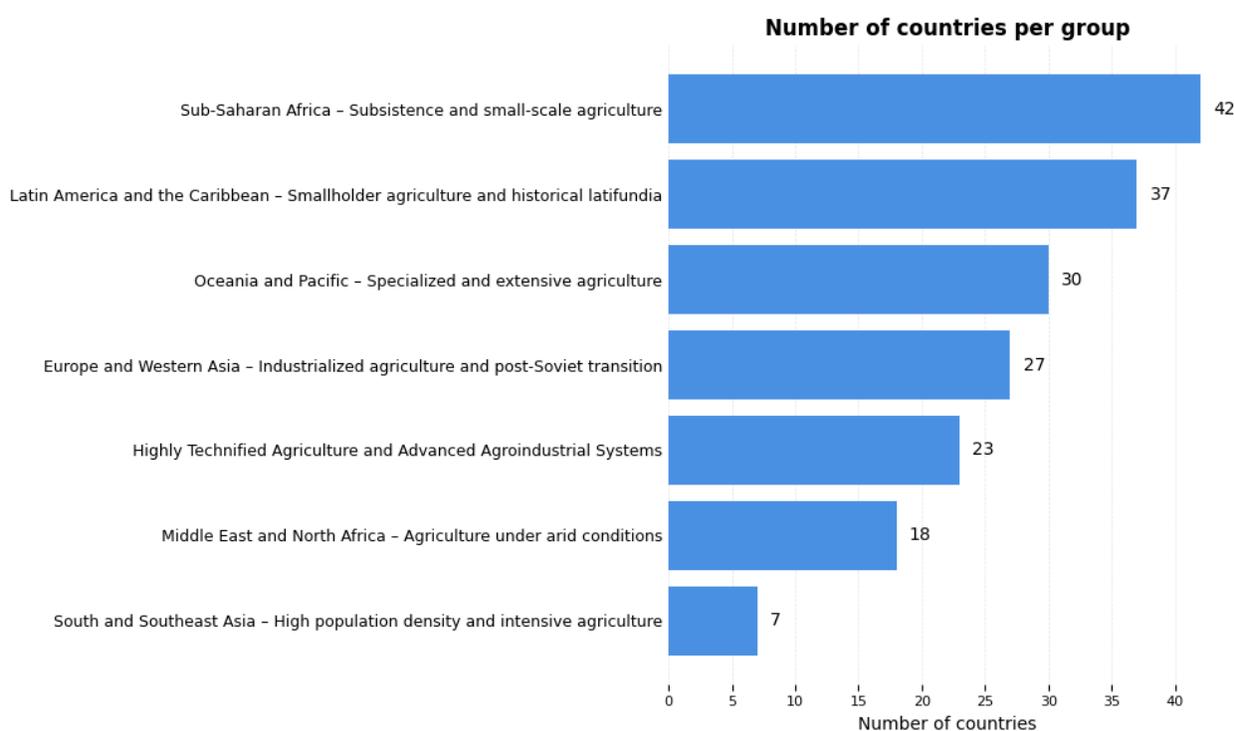


In the study that is proposed to be developed, this information will allow for a detailed exploration of regional and national differences, as well as the identification of gaps and opportunities that contribute to the design of public policies, rural development programs and food security strategies of international scope.

Figure 6 shows the distribution of countries by each of the 7 analytical classes. This Figure offers a first approximation of the territorial scope of the study and highlights those regions where census information is denser and, therefore, potentially more representative of regional agricultural dynamics.



Figure 6. Distribution of countries by region



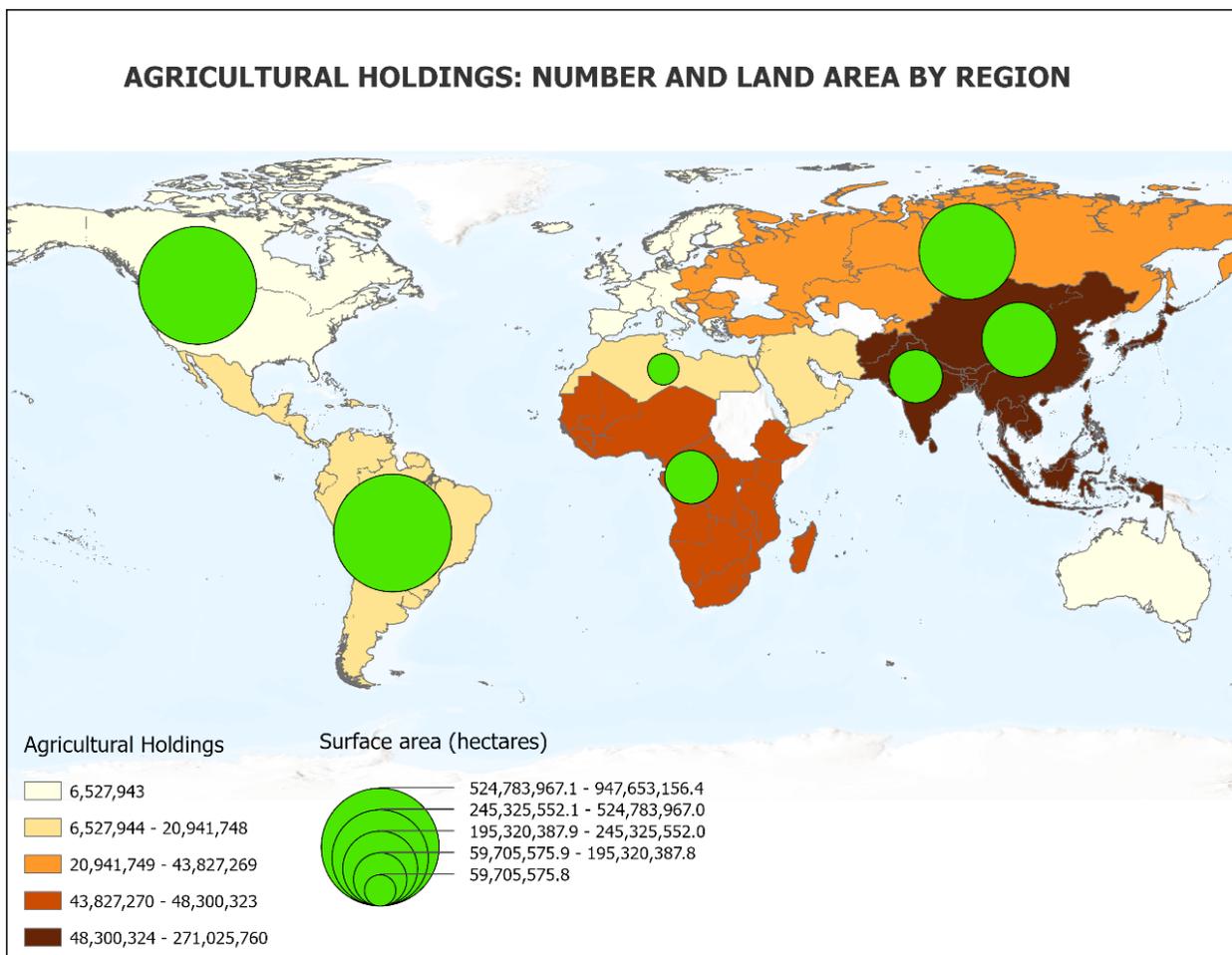
The distribution of the 184 countries included in the dataset shows an uneven concentration among the defined regional groups. The category with the highest number of countries is Sub-Saharan Africa, with 42 countries, followed by Latin America and the Caribbean, with 37, and Oceania and Pacific, with 30. These three regions account for more than half of the countries analysed.

For its part, Europe and Western Asia includes 27 countries, while the Highly Technified Agriculture and Advanced Agroindustrial Systems group brings together 23. Middle East and North Africa represents 18 countries, and finally, South and Southeast Asia has the lowest representation, with only 7 countries.

This configuration reflects both geographical diversity and variability in FAO's consolidated census coverage.



Figure 7 Farms: number and area by region



Figures 7 and 8 allow us to observe in a comparative way both the number of farms and the total extension of the area they occupy in each region.

Figure 8 Farms: number and area by region

Region	Number of countries	Total number of holdings	Total holding area (ha)	Average holding size (ha)
Europe and Western Asia – Industrialized agriculture and post-Soviet transition	27	43,827,269	524,783,967	11.97



Highly Technified Agriculture and Advanced Agroindustrial Systems	23	6,527,943	947,653,156	145.17
Latin America and the Caribbean – Smallholder agriculture and historical latifundia	37	20,941,748	908,086,152	43.36
Middle East and North Africa – Agriculture under arid conditions	18	16,151,962	59,705,576	3.7
Oceania and Pacific – Specialized and extensive agriculture	30	271,025,760	245,325,552	0.91
South and Southeast Asia – High population density and intensive agriculture	7	183,190,136	195,320,388	1.07
Sub-Saharan Africa – Subsistence and small-scale agriculture	42	48,300,323	184,949,036	3.83

The comparison between regions shows profound contrasts in the scale, structure and production model of agricultural holdings.

- *South and Southeast Asia* concentrates the largest number of holdings in the world, with more than 183 million units, but these are distributed over very small areas: the average size is only 1.07 hectares per farm. This pattern shows a strong fragmentation of the land and intensive forms of production, historically associated with family farming and high rural population density.
- At the opposite extreme, the region called *Highly Technified Agriculture and Advanced Agroindustrial Systems* has the largest average size, with more than 145 hectares per farm, despite having a much smaller number of units (6.5 million). This reveals a highly mechanized agricultural model, dominated by large companies and consolidated agro-industrial systems.
- *Europe and Western Asia – Industrialized agriculture and post-Soviet transition* combines a considerable number of farms (43.8 million) with a very large total area. Its average size, close to 12 hectares, reflects heterogeneous modernization processes, where advanced industrial systems coexist with agrarian structures in transition after Soviet disintegration.
- In *Latin America and the Caribbean*, the 20.9 million farms reach an average size of 43 hectares, suggesting the coexistence of predominant family farming along with historical remnants of large estates, especially in areas with a latifundia legacy.
- *Oceania and Pacific* stand out for the enormous number of registered farms (271 million), but with a very low average size of 0.91 hectares. This result can be associated with the presence of highly fragmented agricultural systems on



islands and dispersed rural territories, where extensive practices and small-scale family farms predominate.

- In *Sub-Saharan Africa*, where 48.3 million farms are counted, the average size is 3.83 hectares, an indicator consistent with mainly subsistence-oriented systems and limited access to productive land.
- Finally, *Middle East and North Africa* has one of the smallest average sizes, with 3.7 hectares per farm. This characteristic could respond to structural constraints related to the availability of arable land, arid climatic conditions, and population pressure on resources.

Taken together, this regional diversity evidences the coexistence of profoundly different agrarian models: from highly fragmented family farms to large-scale agro-industrial complexes, each conditioned by the history, geography and structural transformations of its region.

3.1. Contrast between the Number of Farms and the Area in Hectares by analytical regions

This section seeks to integrate previous findings and deepen the joint analysis of two key dimensions of the global agrarian structure: *the number of farms and the total area they occupy*. From this contrast, it is possible to identify patterns that help to understand how agricultural activity is distributed both at the country and regional levels, as well as the differences in production patterns and land concentration.



Figure 9. Farm-to-area ratio by country

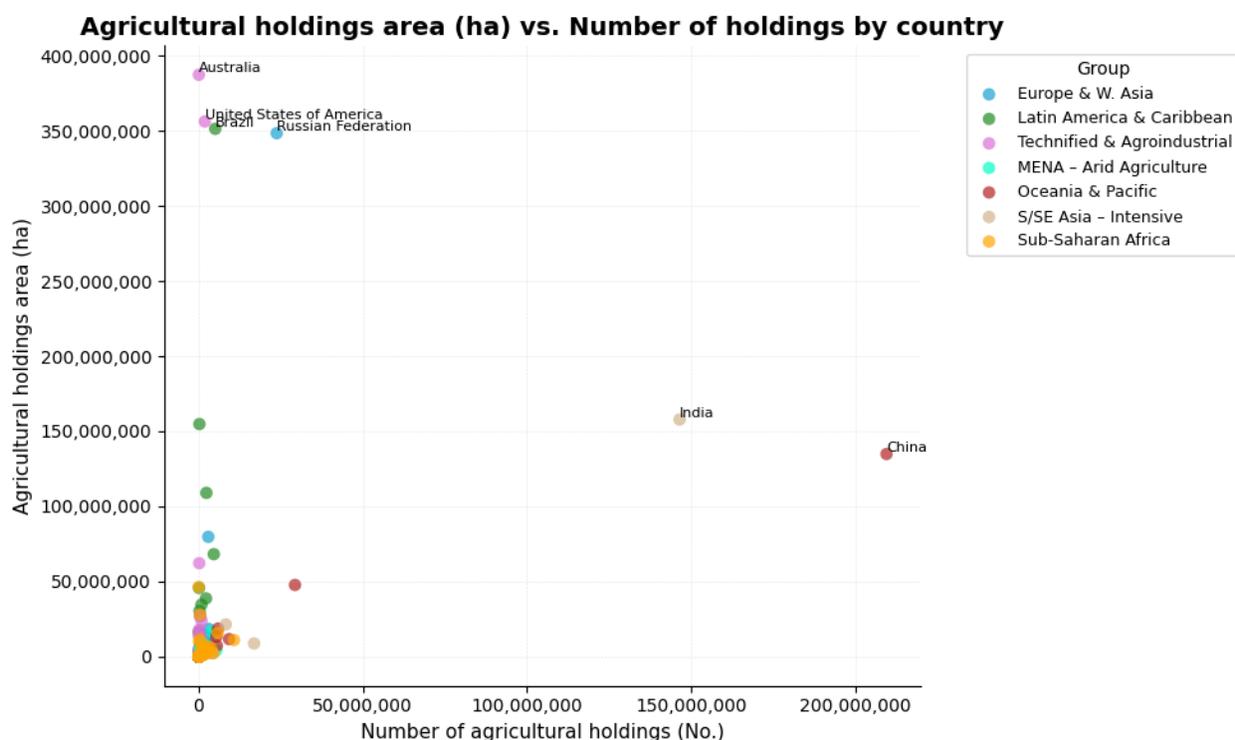
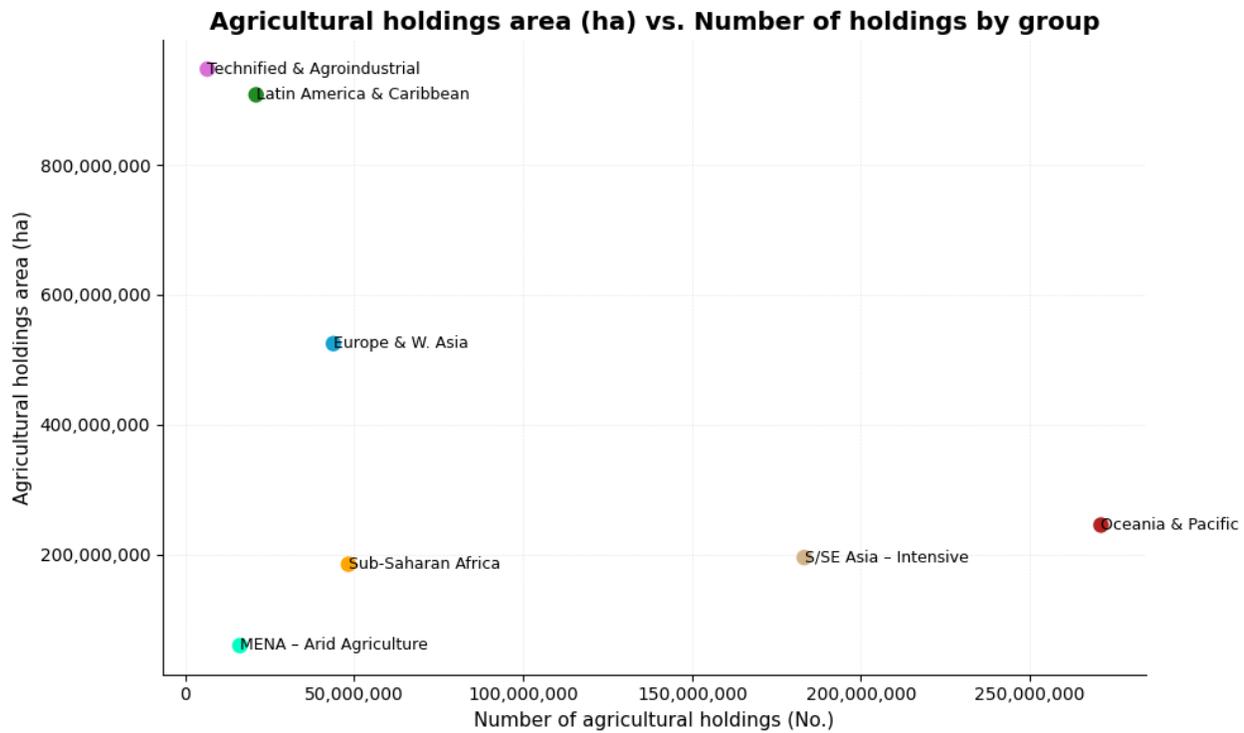


Figure 9 shows this relationship at the country level. The graph allows us to clearly observe extreme and contrasting cases:

- China and India stand out as the countries with the largest number of farms, exceeding 150 million units, although with more moderate total areas compared to other nations. This pattern reflects smallholder farming systems, characteristic of family and subsistence farming.
- In contrast, Australia, the United States, Brazil and Russia have total areas of more than 350 million hectares, despite having a relatively low number of farms. This behavior evidence extensive production models with high land concentration and less fragmentation of property.
- Most of the countries are grouped in the lower left quadrant of the graph, with moderate values of area and number of farms, confirming the high heterogeneity that characterizes the overall agricultural structure.



Figure 10. Farm-to-area ratio by analytical region



On the other hand, Figure 10 synthesizes the information at the regional level, highlighting differences that had already been anticipated in the previous sections:

- *South and Southeast Asia – High population density and intensive agriculture* is positioned as the group with the largest number of farms (more than 180 million), although with a relatively smaller total agricultural area. This pattern is indicative of the prevalence of microplots and intensive systems typical of family farming under high demographic pressure.
- *Oceania and Pacific – Specialized and extensive agriculture* represents the opposite case: it has the largest total agricultural area of the group (approximately 250 million hectares), but a much smaller number of farms, reflecting a structure based on large properties and extensive production models.
- *Europe and Western Asia – Industrialized agriculture and post-Soviet transition and Latin America and the Caribbean – Smallholder agriculture and historical latifundia* have intermediate positions both in number of farms and in total area. This suggests a high level of internal heterogeneity, where large-scale family, transitional and commercial farms coexist.



- *Highly Technified Agriculture and Advanced Agroindustrial Systems* groups countries with a limited number of farms but with high total areas, reflecting highly mechanized and concentrated agro-industrial models common in developed economies.
- *Sub-Saharan Africa – Subsistence and small-scale agriculture* stands out for its high number of farms (around 48 million), but with a moderate total area, which is consistent with production systems focused on subsistence and small-scale agriculture.
- Finally, *Middle East and North Africa – Agriculture under arid conditions* has the lowest figures both in terms of number of farms and total agricultural area, which is due to severe climatic constraints and the low availability of arable land, typical of an agricultural context in arid conditions.

3.2. Scope of analysis by farm size

For this study, a scheme of 13 size ranges was defined, from 0 to 1 ha to more than 1000 ha, in order to harmonize data from the 184 countries included in the FAOSTAT database. FAO does have information by size categories for many countries, but the original ranges vary widely between national censuses; some include extremely detailed ranges, others only report aggregated categories, and others do not report any disaggregated information at all.

In order to expand coverage, additional information from Lowder et al. (2021) was incorporated, who were able to reconstruct the distribution by ranges for 24 countries that, in the original FAO set, did not have visible or recoverable values for the size categories. These data made it possible to complete the information in cases where FAO showed gaps derived from methodological differences between national censuses.

Countries without data disaggregated by rank

Despite the above-mentioned recoveries, 22 countries were identified as completely lacking in data disaggregated by farm size. In these cases, neither FAOSTAT nor other statistical sources provide a verifiable distribution of the number of farms according to hectare ranges.

Because this analysis depends on such disaggregation, these 22 countries are excluded from comparisons that require ranged information, although they remain included in other components of the study where complete data are available.

Countries with internal inconsistencies

In addition to the cases without information, an additional group of 7 countries was identified in which the data presented internal inconsistencies. In these cases, when adding the number of farms reported in each size range, the resulting total does not match the official value of “Total Farms” that FAO reports for that same country.

Among the most notable examples are:

- Russian Federation, whose total number of farms according to FAO is 32,054, while various national sources estimate around 23 million, which reflects problems of updating or definitional incompatibilities.
- Vanuatu, where the sum of the agricultural area by ranges reaches 7,510 hectares, compared to national estimates close to 183,000 hectares, which suggests severe underreporting and lack of census harmonization.

Given the magnitude of these inconsistencies, these 7 countries are also not included in the comparative analysis by ranks until there is a more robust validation of their figures.

Final universe of analysis

The initial set comprises 184 countries. Of these, 24 countries had their data by ranks completed thanks to Lowder et al (ibid.). 22 countries have no disaggregated information at all and are excluded from the ranged analysis. 7 countries have internal inconsistencies between totals and sums by category, so they are also temporarily excluded.

The analysis of distribution by farm size is therefore carried out on the subset of countries that have complete, verifiable and consistent information. This approach ensures that international comparisons are based on sound and methodologically homogeneous data.

Country	Year (total data)	Year (size-class data)	Year (Lowder et al.)	Total productive units	Productive units by size-class	Productive units (Lowder)	Total area (ha)	Area by size-class (ha)	Area (Lowder) (ha)
Antigua and Barbuda	1984	1961	—	4,654	5,747	—	1,949	13,794	—
Congo	1986	2014	2014	143,235	264,774	267,419	141,705	334,708	422,431



Ecuador	1974	1999	—	519,111	842,882	—	7,949,403	12,355,831	—
Russian Federation	2016	2016	—	23,783,658	32,054	—	348,362,800	290,781,200	—
Palau	1989	2015	—	300	1,179	—	158	—	—
Tunisia	2005	2004	2001	515,850	—	3,076,650	5,391,800	—	18,434,822
Vanuatu	2007	2007	—	38,909	—	—	183,000	7,510	—

After defining the final universe of countries included in the analysis, the next step is to describe the procedure used to generate a homogeneous distribution of farms by range of land size. The original information comes from national censuses compiled by FAOSTAT and from reconstructions by Lowder et al. for countries with missing data. However,

countries report their size categories using very different schemes: some have very narrow and numerous ranges, while others report only two or three highly aggregated classes. This lack of standardization makes any direct comparison difficult.

To resolve this heterogeneity, a methodology of reduction and harmonization of ranges was applied, based on criteria of information preservation and statistical consistency. The main objective was to move from an initial set with more than 15 different categories (variable according to the country) to a single scheme of 13 standard ranges, thus allowing to maintain the essential structure of the size distribution without introducing biases derived from the fragmentation or excessive aggregation of classes.

The process consisted of identifying the most stable and frequent cut-off points in the national censuses, evaluating the loss of information associated with each group using criteria inspired by entropy measures. These criteria minimize the loss of informational variability associated with class consolidation, ensuring that the final ranges adequately capture the concentration or fragmentation of land in each country. The result is a standardized structure that maintains international comparability and avoids overweighting countries that report overly detailed categories (such as many in Europe or Asia) or underweighting those with more aggregated reporting.

The following is the correspondence between the initial ranges identified in the sources and the harmonized final ranges used in this report:

Figure 12. Assigning Initial Size Classes to Final Harmonized Categories

Initial size class	Final harmonized class
0–1 ha	0–1 ha



1–2 ha	1–2 ha
2–3 ha	2–3 ha
3–4 ha	3–4 ha
4–5 ha	4–5 ha
5–10 ha	5–10 ha
10–20 ha	10–20 ha
20–50 ha	20–50 ha
50–100 ha	50–100 ha
100–200 ha	100–200 ha
200–500 ha	200–500 ha
500–1000 ha	500–1000 ha
1000–2500 ha	>1000 ha
≥1000 ha	>1000 ha
≥2500 ha	>1000 ha

3.3. Analysis for each of the proposed analytical regions

Next, we will deepen the analysis for each of the 7 proposed analytical regions.

a. **Region 1 Europe and Western Asia** – Industrialized agriculture and post-Soviet transition

The result of this work reveals a central structural feature: *the profound asymmetry between the distribution of the number of farms (APUs) and the distribution of the agricultural area (ha)*. While most farms are concentrated in small ranges, mainly between 0–1 ha and 1–2 ha, agricultural area is dominated in many countries by large farms, especially in ranges above 100 ha and, in several cases, above 500 or 1000 ha.

“The dual structure observed – with millions of small family production units coexisting with large agro-industrial farms – is a direct legacy of post-Soviet decollectivization. As documented by Lerman, Csaki & Feder (2004), the post-Soviet agrarian sector is characterized by a division between large enterprises derived from former state farms and allocated family plots (*gospodarstva*), the persistence of which reflects not only



economic choices, but political decisions about ownership and access to credit.”^[26] This paper describes this process as a “silent corporatization,” where former state farms were transformed into agro-industrial enterprises with strong ties to the state, while family plots (*gospodarstva*) were maintained as a social safety net.

The countries of the Caucasus and Central Asia show the highest levels of property fragmentation.

- **Azerbaijan:** 98.9% of APUs are in the ranges of 0–1 ha.
- **Kyrgyzstan:** 85.3% in 0–1 ha.
- **Georgia:** 73.1% in 0–1 ha.
- **Armenia:** 59.6% in 0–1 ha.

These values reflect agrarian systems dominated by small family farms, mainly oriented towards subsistence or local markets.

In several European countries, the weight of small ranges also predominates, although with less intensity:

- **Albania:** 66.9% of APUs in 0–1 ha.
- **North Macedonia:** 63.5% in 0–1 ha.
- **Latvia:** 54.9% in 0–1 ha.
- **Armenia:** 59.6% in 0–1 ha.

Other countries in Central and Eastern Europe have more balanced structures:

- **Czechia:** only 24.1% in 0–1 ha, with a marked presence of medium and large ranges.
- **Slovakia:** 20.3% in 0–1 ha, combined with a strong participation of intermediate ranges.
- **Bulgaria:** 30.2% in 0–1 ha, but with relevant large and medium ranges.

Overall, the region exhibits a clear pattern: *APUs are overwhelmingly concentrated in the smaller ranges*, with marked internal differences between Balkan, Caucasian, and Central European countries.

26 Lerman, Z.; Csaki, C.; • Feder; G. (2004). Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries. World Bank Research Observer, p. 184



When the distribution of hectares is observed, the dynamics are reversed: the area is much more concentrated in the larger ranges.

- **Belarus:** 93.2% of the area in ranges greater than 100 ha.
- **Czechia:** 86.4% in large ranges, mainly 100–200 ha and >1000 ha.
- **Slovakia:** 88.6% in ranges greater than 50 ha.
- **Kazakhstan:** 77.8% in higher ranges, especially >500 ha.
- **Bulgaria:** 75.1% in high ranges.
- **Hungary:** 65% on farms larger than 50 ha.

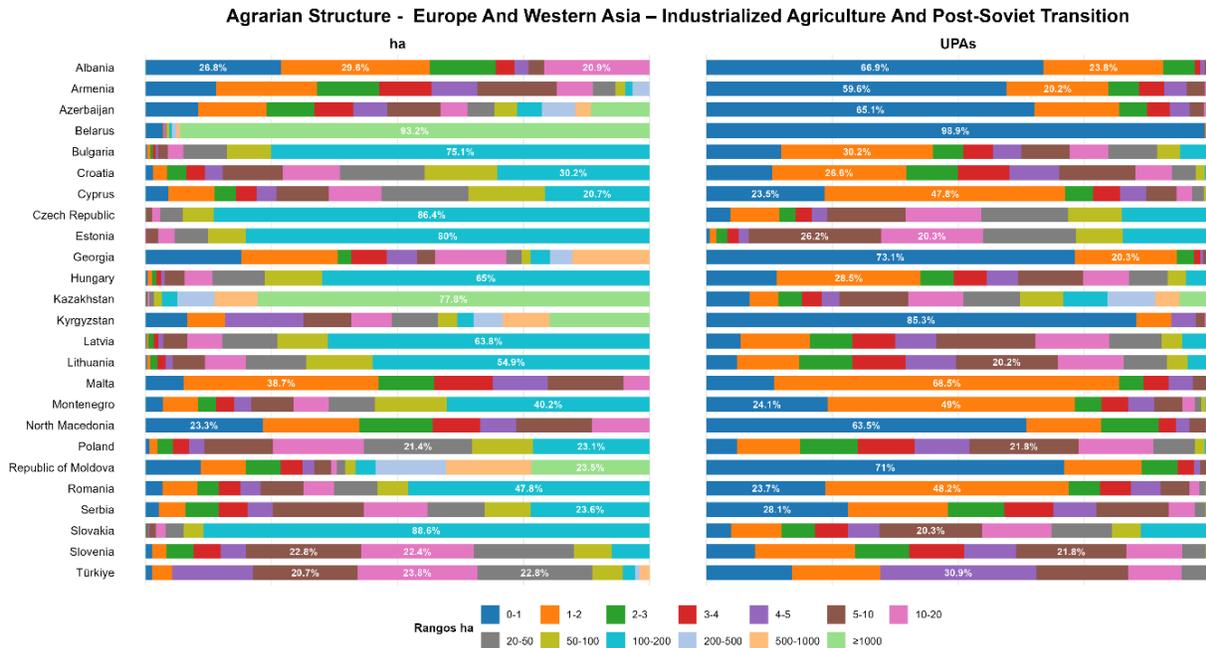
These percentages reflect agricultural systems with strong land consolidation, a dominant presence of large-scale production units, high mechanization, and agro-industrial organizations with significant control of agricultural territory. The general pattern of the region can be summarized as a strongly segmented agrarian structure:

- In terms of number of farms, small APUs (0–1 ha and 1–2 ha) overwhelmingly predominate.
- In terms of surface area, medium and large farms dominate, especially in Central Europe and in countries with a tradition of extensive agriculture inherited from collective or corporate models.

Figure 13 shows, for each country included in the region, the proportion of agricultural area (left panel) and productive units (right panel) distributed in the 13 standardized size ranges. The comparison between the two panels shows a highly fragmented agrarian structure in terms of the number of farms and, at the same time, a marked concentration of the area in the upper ranges, a pattern that consistently defines the territorial organization of these countries.



Figure 13. Agrarian structure of Europe and Western Asia – Distribution of agricultural holdings and agricultural land by standardized size classes



Although there is no public evidence of active land buying and selling markets in countries such as Belarus or Azerbaijan, where the state maintains strong control. However, in Ukraine and Kazakhstan, Land Matrix reports (2023) record long-term leases to foreign investors (mainly European and Chinese), especially in fertile areas. These transactions consolidate units of >1,000 ha, which explains the high concentration of surface area observed.

b. Region 2: Highly Technified Agriculture and Advanced Agroindustrial Systems

In this region, family farming coexists with highly technical corporate models. Studies such as those by Kay, Peuch & Franco (2015)^[27] highlight that, although many countries (France, the USA, Australia) promote the image of the “family farmer”, the real power lies with agri-food corporations that control supply chains, seeds and inputs. The

27 Kay, S.; Peuch, J.; & Franco, J. (2015). Extent of farmland grabbing in the EU. European Parliament.



concentration of land (e.g. 95.9% of the surface area in Australia at >100 ha) reflects a logic of industrial scale, not of peasant reproduction.

This region shows a structural pattern characteristic of highly technical agricultural economies: a clear separation between the distribution of the number of farms (APUs) and the distribution of agricultural area (ha). Although a large base of small and medium-sized farms persists in several countries, the total area is strongly concentrated in large-scale ranges, typical of industrialized and highly mechanized systems.

Most countries in the group have a relatively balanced structure in which small and medium-sized ranges (0–10 ha, 10–20 ha, and 20–50 ha) contain a significant share of APUs. However, patterns vary by subregion:

- In Western Europe, countries such as Germany, Belgium, France, the Netherlands, Italy and Ireland show diversified distributions, with a notable presence of APUs between 5–10 ha, 10–20 ha and 20–50 ha. For example:
 - **Ireland:** 38.7% of the APUs in 10–20 ha.
 - **France:** 31.9% in 10–20 ha.
 - **Italy:** 26.3% in 10–20 ha.
- In the Nordic and Alpine countries as a whole, such as Finland, Sweden, Norway and Switzerland, intermediate ranges are also relevant:
 - **Finland:** 31% of APUs are between 5–10 ha.
 - **Sweden:** 31.7% in 10–20 ha.
 - **Norway:** 32.4% in 20–50 ha.
- In the non-European countries of the group, mainly the United States, Canada, Australia, New Zealand and Israel, the structure changes significantly. Here we see a higher proportion of APUs in large ranges:
 - **Australia:** 28.4% in 100–200 ha and outstanding participation in >500 ha.
 - **Canada:** 20.2% in 50–100 ha and considerable weight in >500 ha.
 - **United States:** significant presence in ranges of 20–50 ha and more than 100 ha.
 - **Israel:** 34.4% of APUs in 0–1 ha, but also a notable share in high ranges, reflecting a mixed system between intensive family farming and large-scale commercial farms.



Overall, the number of APUs shows a less fragmented system than in regions such as Eastern Europe or the Caucasus, but with a clear coexistence between medium-sized family farms and larger business units.

When examining the distribution in hectares, the dominant pattern is the extreme concentration of the area in the higher ranges.

Some cases illustrate this trend:

- **Australia:** 95.9% of the area is located in farms larger than 100 ha, with a large weight in >500 ha and >1000 ha.
- **Iceland:** 98.6% of the area is also in the larger ranges.
- **New Zealand:** 51.7% in large-scale ranges, with a strong presence of >200 ha.
- **Canada:** 54.3% in >200 ha.
- **United States:** 44.2% in >200 ha, along with a significant proportion in >500 ha.
- **Israel:** 65.6% of the area in >100 ha, reflecting a predominance of business operations.

Even in more densely populated European countries with a tradition of family farming, the area shows significant levels of concentration:

- **United Kingdom:** 73.9% of the area in >100 ha.
- **Denmark:** 75.3% in >100 ha.
- **Holland (Netherlands):** 63.2% in >100 ha.
- **France:** 67.8% in >100 ha.
- **Sweden:** 62.8% in >100 ha.
- **Germany:** 61.7% in >100 ha.

The only countries with areas more distributed towards medium ranges are Luxembourg, Greece and partially Switzerland, but even so they maintain more than 25% of their area in higher ranges.

The structural pattern of this region can be summarised in three features:

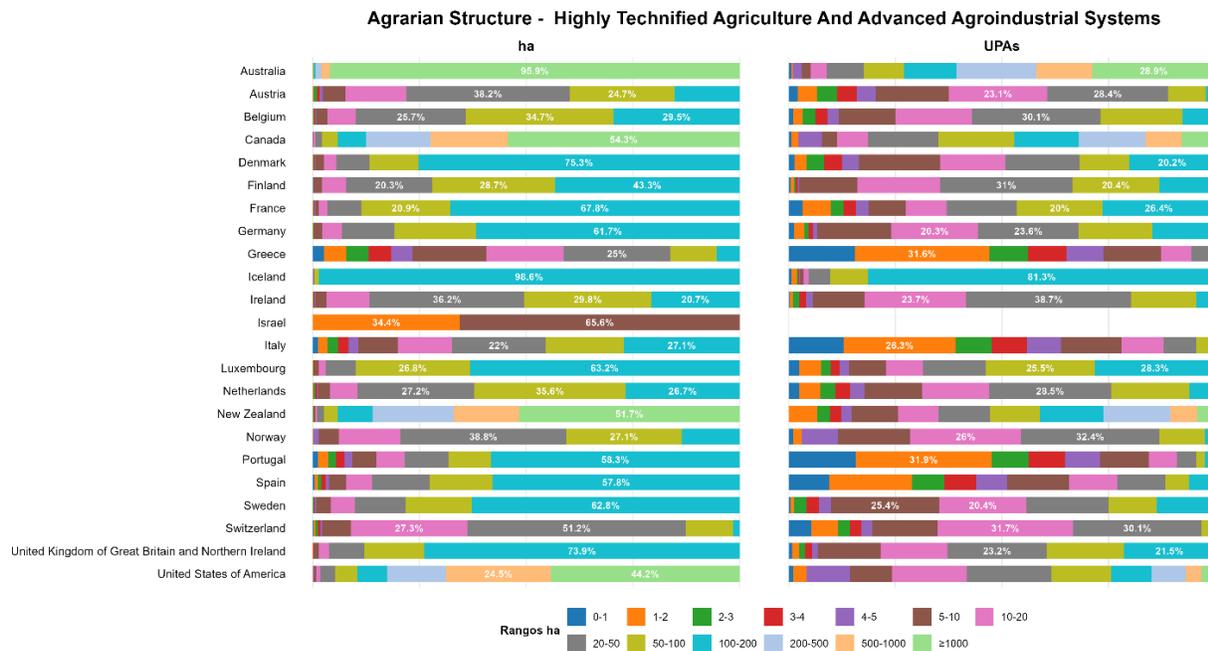
1. The APUs are widely distributed among small and medium-sized ranges, maintaining a significant base of family and semi-family farms in Western Europe.



2. Agricultural land is heavily concentrated on large farms, especially in Australia, New Zealand, Canada, the United States, Israel and the United Kingdom.
3. Technification and mechanization reinforce this configuration, allowing a relatively small number of farms to control most of the land without the need to substantially modify the existing family farm base.

Overall, and as can be seen in Figure 14, the region exhibits one of the most clearly agro-industrial models in the world. Inequality here is not only manifested in size, but also in investment capacity and access to subsidies. According to the OECD (2022), 80% of direct support to agriculture in the EU and the US goes to the largest 20% of farms. This reproduces a structural inequality: large farms accumulate resources, technology and land, while medium and small farms are trapped in marginal niches.

Figure 14. Agrarian structure of the “Highly Technified Agriculture and Advanced Agroindustrial Systems” region – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes





c. Region 3. Latin America and the Caribbean – Smallholder Agriculture and Historical Latifundia

The persistence of the large estate-smallholding is a profoundly political phenomenon. As Borrás & Franco (2012) point out, twentieth-century agrarian reforms in much of Latin America were limited, reversed, or captured by local elites. In countries such as Paraguay and Argentina, the expansion of soybeans promoted a new accumulation of land through legal mechanisms (purchase, lease, indirect dispossession), consolidating structures inherited from colonialism.

It is worth noting that Latin America is one of the regions with the highest volume of rural land transactions. According to the Land Matrix (2023), more than 300 land acquisitions have been recorded since 2000, many linked to global food chains (soy, meat, sugar). For example, in Paraguay, 77.2% of the surface area is on farms >50 ha, which coincides with the consolidation of agro-export holdings. In the Caribbean, on the other hand, transactions are more fragmented and linked to rural tourism, without generating large concentrations of area.

The agrarian structure of Latin America and the Caribbean is characterized by a particularly marked combination of high fragmentation in the number of farms and high concentration of agricultural area: most of the units are located in the small ranges, while a very high proportion of the land is concentrated in high ranges. historically associated with the formation of large estates and unequal rural development trajectories.

In most countries of the region, the distribution by APUs confirms a deep agrarian fragmentation, where farms of less than 5 hectares predominate. The highest percentages are observed in Caribbean and Central American countries:

- **Haiti:** 66.6% of APUs in 0–1 ha.
- **Jamaica:** 75.7% in 0–1 ha.
- **U.S. Virgin Islands:** 96.3% in 0–1 ha.
- **Guadeloupe:** 42.9% in 0–1 ha.
- **Granada:** 53.2% in 0–1 ha.

A similar pattern can be seen in Central America:

- **Guatemala:** 78.5% in 0–1 ha.
- **Honduras:** 54.7% in 0–1 ha.
- **Nicaragua:** 48.4% in 0–1 ha.



- **El Salvador:** 68.6% in 0–1 ha.

In South America, although fragmentation is still significant, the percentages are somewhat lower, reflecting mixed structures:

- **Colombia:** 37.3% in 0–1 ha.
- **Brazil:** 20.4% in 0–1 ha and 20.4% in 1–2 ha.
- **Peru:** 37.6% in 0–1 ha.
- **Paraguay:** 22.7% in 0–1 ha and 22.4% in 1–2 ha.
- **Argentina:** 36.3% in 0–1 ha.
- **Uruguay:** 35.5% in 0–1 ha.

Overall, the figure shows that the vast majority of Latin American APUs are defined by their small size, forming agricultural systems based on small producers and family farming.

The distribution in hectares, however, shows the reverse of this structure: most of the agricultural land is concentrated in the upper ranges (50–100 ha, 100–200 ha, 200–500 ha, 500–1000 ha and >1000 ha), with patterns that are particularly intense in countries with a tradition of extensive agriculture.

The most prominent cases include:

- **Paraguay:** 77.2% of the area in >50 ha, with a strong presence in >1000 ha.
- **Brazil:** 56.3% in >100 ha.
- **Uruguay:** 61.3% in >50 ha.
- **Argentina:** 79.9% in >50 ha, with a clear predominance of high ranges.
- **Colombia:** 73.8% in >50 ha.
- **Peru:** 77% in >50 ha.

Highly concentrated structures are also observed in the Caribbean:

- **Barbados:** 44.6% in ranges greater than 100 ha.
- **French Guiana:** 44% in high ranks.
- **Dominican Republic:** 48.1% in >100 ha.
- **Trinidad and Tobago:** 34.1% in >100 ha.



On the other hand, some countries of the insular Caribbean have more balanced distributions or with a predominance of small and medium-sized ranges:

- **Jamaica:** 35.6% in 1–2 ha and a more homogeneous distribution between intermediate ranges.
- **British Virgin Islands:** 22.7% in 1–2 ha and moderate presence in medium ranges.

The joint analysis of APUs and hectares clearly shows the persistence of a highly unequal agrarian structure in Latin America and the Caribbean:

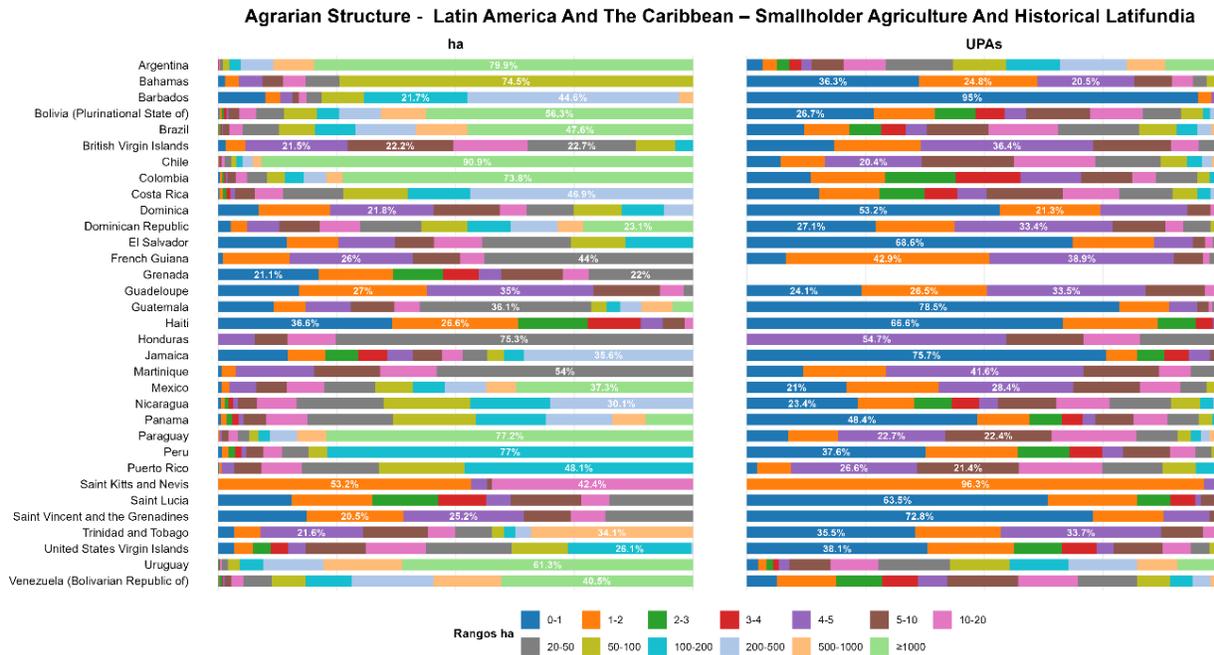
- Many producers, little land: most farms are small and family-owned, especially in the Caribbean and Central America.
- A lot of land in the hands of a few: the total area is highly concentrated in large farms, especially in Argentina, Brazil, Paraguay, Uruguay, Colombia and Peru.

This region is the paradigmatic case of the classic bimodal structure, which maintains a structure with the highest inequality in land tenure in the world. Reports by ECLAC (2021) and Oxfam (2016) show that the richest 1% of landowners own between 50% and 80% of arable land in countries such as Colombia, Argentina and Guatemala. At the same time, more than 70% of farmers have less than 2 ha. This duality is not accidental: it is the direct result of a history of colonization, absolute private property, and truncated or reversed agrarian reforms. Likewise, this territorial inequality translates directly into economic inequality: small producers generate employment but capture a minimal fraction of the value added.

Figure 15 allows us to analyze the extreme fragmentation in number and extreme concentration in area, these are two most persistent and defining features of Latin American agriculture, with profound implications for access to land, productivity and rural inequalities. The comparison between the two panels in Figure 15 shows the coexistence of a very large family farming with large-scale systems that control most of the arable land.



Figure 15. Agrarian structure of Latin America and the Caribbean – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes



d. Region 4. Middle East and North Africa – Agriculture under Arid Conditions

The agrarian structure of the Middle East and North Africa is mediated by systems of state and tribal power. In countries such as Saudi Arabia and Egypt, the state plays a central role in the allocation of irrigable land, favoring economic or military elites. FAO reports (2021) indicate that many large farms (>1000 ha) are owned by state-owned or private companies with political ties, while smallholder farmers rely on rainfed or community-irrigated land.

Formal transactions are limited due to legal restrictions (prohibition of sale to foreigners, land under state control). However, the Land Matrix registers long-term leases in strategic areas (Nile, oasis). For example, in Yemen, before the conflict, there were leases to companies in the Gulf for intensive crops. In Palestine, extreme fragmentation (77.2% of APUs <1 ha) hinders any consolidation, even when there is demand.

In this context, the data show a structure characterized by a combination of a high predominance of smallholdings with respect to the number of farms (APUs); as well as



a significant concentration of agricultural area; in this case marked by environmental limitations and the scarcity of arable land typical of arid and semi-arid areas.

In most countries of the region, small farms dominate in number, especially in the range of 0–1 ha, which concentrates very high percentages in several cases:

- **Djibouti:** 83.2% of the APUs in 0–1 ha.
- **Egypt:** 77.2% in 0–1 ha.
- **Palestine:** 82.1% in 0–1 ha.
- **Yemen:** 73.4% in 0–1 ha.
- **Jordan:** 72.8% in 0–1 ha.
- **Qatar:** 68.8% in 0–1 ha.
- **Lebanon:** 69.4% in 0–1 ha.

The general pattern indicates an agricultural model based on small family farms, which persists even in countries with agriculture highly dependent on irrigation, such as Egypt or Palestine, where smallholdings constitute the predominant productive unit. In contrast, countries with greater water investment capacity or with more corporate agricultural systems, such as Kuwait, Qatar, Bahrain and partially Saudi Arabia, show a higher proportion of farms in intermediate and high ranges, suggesting more technical and less dispersed models.

The distribution of hectares reveals a different pattern: land is much more concentrated than the number of farms, with a considerable weight of the upper ranges (100–200 ha, 200–500 ha, 500–1000 ha and >1000 ha). Some prominent examples:

- **Saudi Arabia:** 38.1% of the area is concentrated in >1000 ha.
- **Djibouti:** 52.8% in ranges above 500 ha.
- **Kuwait:** 31.8% in >100 ha.
- **Algeria:** 29.4% in >100 ha.
- **Morocco:** 21.5% in >100 ha.
- **Oman:** 20.3% in >50 ha and visible participation in >100 ha.
- **Yemen:** 56.1% in high ranges, including 500–1000 ha and >1000 ha.

In some countries, such as Egypt and Palestine, considerable areas persist in small and medium ranges:

- **Egypt:** 28% of hectares are in 0–1 ha, and a significant part in 1–2 ha.

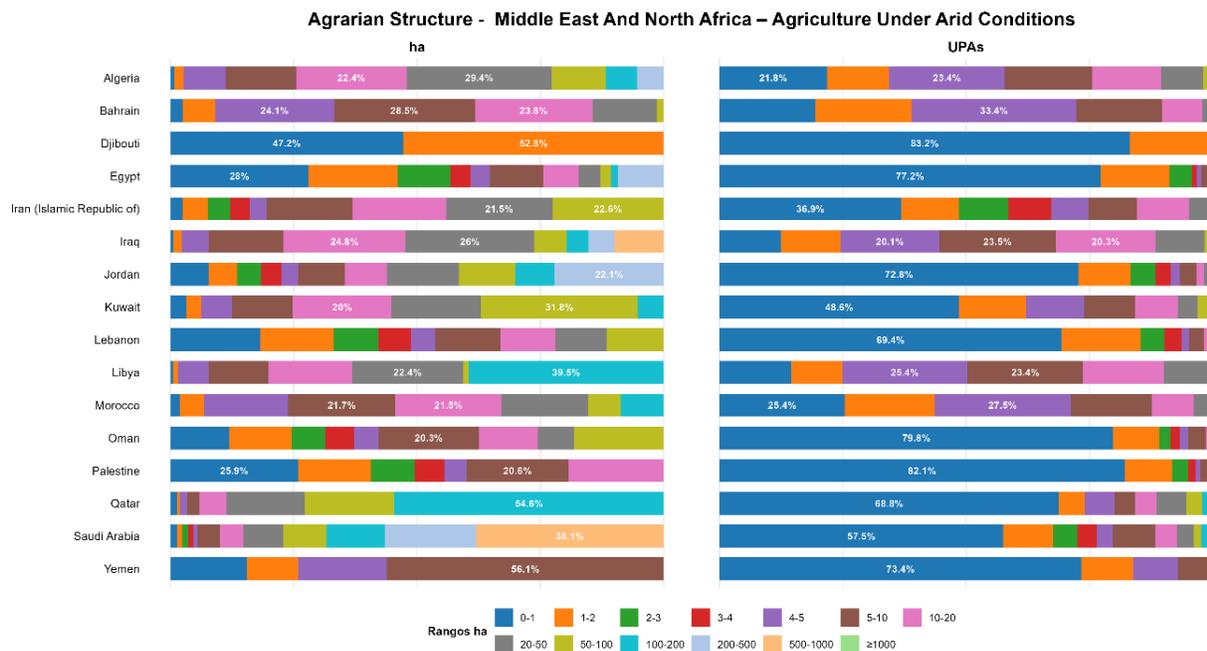


- **Palestine:** 25.9% in 0–1 ha and a more balanced distribution towards medium ranges (20–50 ha).

These cases reflect more intensive and fragmented agricultural systems, where land is subdivided due to demographic pressures and particular institutional frameworks.

The opposition between high fragmentation of smallholdings and a high concentration of environmentally exploitable area can be seen in the panels in Figure 16. However, inequality is concentrated in access to water and irrigable land. The region is acutely suffering from the combined effects of increased extreme heat, drought and aridity, with temperatures projected to rise severely to 2.6°C by 2065. A report by Grain (2025)^[28] shows the implementation of large latifundia projects taking advantage of aquifer irrigation in Algeria, Egypt and Morocco through partnerships with foreign agribusiness companies. These processes have been particularly detrimental to the peasantry, who face reduced access to irrigation water and often have no choice but to accept and participate in in-house farming with corporations.

Figure 16. Agrarian structure of Middle East and North Africa – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes



28 Grain (2025). The Mirage of Food Security: Agricultural Megaprojects in the North African Desert. <https://grain.org/es/article/7232-el-espejismo-de-la-seguridad-alimentaria-megaproyectos-agricolas-en-el-desierto-del-norte-de-afrika>



e. Region 5. Oceania and Pacific – Specialized and Extensive Agriculture

The agrarian structure of Oceania and the Pacific is characterized by a combination of very high fragmentation in the number of farms, but unlike the previous regions, in this case a very diverse distribution of area is observed, ranging from a predominance of small plots to significant concentrations in medium and large ranges, depending on the country. This heterogeneity reflects both the territorial constraints of island states and the coexistence between subsistence agriculture, mixed systems and more extensive models.

The region combines communal tenure systems (Fiji, Papua New Guinea) with plantation models (Indonesia, Philippines). On small islands, transactions are almost non-existent; Land is transmitted by inheritance or customary use. While in Indonesia, Laos and the Philippines, there are active markets, especially in oil palm or sugarcane areas. Studies by FAO^[29] and the World Bank^[30] recognize that the predominant communal tenure systems in Oceania and the Pacific offer security of access to land for millions of smallholders, but their non-formalized nature limits access to credit and modern technologies (FAO & IFAD, 2019, p. 37; World Bank, 2021, p. 28). In Japan and Korea, on the other hand, in the face of a socio-demographic change in which there is a generational emptying of the countryside, state policies have sought to protect small farmers through subsidies and market controls, avoiding extreme consolidation.

In most countries in the region, small farms, especially in the 0–1 ha range, clearly dominate the total number of APUs. Among the highest values are:

- **Philippines:** 56.9% of APUs in 0–1 ha.
- **Fiji:** 65% in 0–1 ha.
- **Indonesia:** 73.4% in 0–1 ha.
- **Northern Mariana Islands:** 62.4% in 0–1 ha.
- **Republic of Korea:** 74.1% in 0–1 ha.
- **American Samoa:** 82.6% in 0–1 ha.
- **Viet Nam:** 65.7% in 0–1 ha.

The near-universal predominance in this region of small APUs reflects a typical pattern of subsistence or semi-subsistence farming systems, especially in countries with high rural population density (such as Indonesia, the Philippines or Viet Nam) and in island

29 FAO & IFAD (2019). United Nations Decade of Family Farming 2019–2028 – Global Action Plan.

30 World Bank (2021). Land Governance in the Pacific: Strengthening Customary Tenure Systems.



microstates (such as American Samoa). On the other hand, some countries show somewhat more balanced structures:

- **Japan:** although 51.8% is in 0–1 ha, there is a relevant participation of intermediate ranges (2–3 ha, 3–4 ha, 5–10 ha).
- **Singapore** and **Brunei Darussalam** have more dispersed distributions between ranges, with a greater presence in intermediate categories.

Regarding the allocation of hectares, a more varied structure is shown and, in some cases, a much higher concentration of land:

- **Indonesia:** 73.7% of the area in upper ranges (>50 ha), reflecting extensive systems and large productive units.
- **Lao People's Democratic Republic:** 58.2% in >50 ha.
- **Japan:** 32.3% in >100 ha and significant presence in intermediate ranges (20–50 ha).
- **Thailand:** 28.7% in >50 ha.
- **Myanmar:** 25.1% in higher ranges.
- **Fiji:** 36.7% in >100 ha.

In contrast, other countries distribute the area mainly in small and medium ranges:

- **Philippines:** 20.2% in 0–1 ha and relatively balanced distribution in intermediate ranges.
- **Réunion:** 29.6% in 0–1 ha, with dispersal to 1–2 ha and 2–3 ha.
- **Cook Islands:** 22.1% in 0–1 ha and combination with intermediate ranges.
- **Niue:** balanced distribution between 23.5% in 0–1 ha and 30.7% in 1–2 ha.

As we can see in Figure 17, the variability of this region reflects the geographical and socioeconomic diversity of the region: densely populated territories with intensive agriculture coexist with larger countries or with greater land availability, where large farms can dominate the area without necessarily being numerous.

The region exhibits a particular dynamic:

1. Small APUs almost universally dominate, indicating high fragmentation and predominance of family farming.

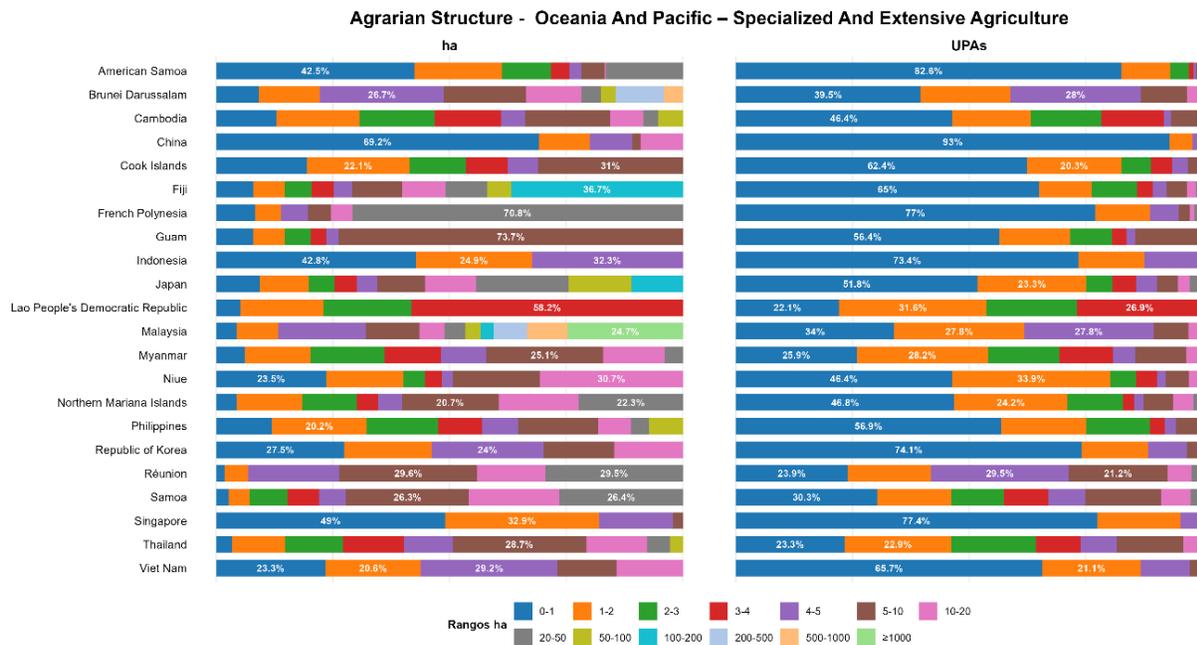


- The agricultural area is distributed in a much more varied way, with some countries showing extensive structures (Indonesia, Lao PDR, Fiji) and others maintaining a predominance of small and medium-sized areas.

The simultaneous presence of subsistence agriculture, intensive commercial agriculture (Japan, Korea), and extensive agriculture (Indonesia, Fiji, Lao PDR) creates a structural mosaic that differentiates Oceania and the Pacific from the rest of the regions analyzed.

The comparison between the two panels shows the coexistence of fragmented family farming with extensive models in specific contexts. Inequality here is more complex: in island countries, inequality is low in terms of formal tenure (many have communal access), but high in productive capacity. In plantation nations (the Philippines, Indonesia), inequality is extreme: a few business groups control thousands of hectares, while millions of smallholders work in precarious conditions.

Figure 17. Agrarian structure of Oceania and the Pacific – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes





f. Region 6. South and Southeast Asia – High Population Density and Intensive Agriculture

Demographic pressure and fragmenting inheritance systems have generated a highly atomized structure. Studies such as those by Otsuka, Liu & Yamauchi (2016)^[31] show that in Bangladesh, India and Nepal, historical land reforms succeeded in redistributing land, but hereditary division has led to a new form of chronic smallholding. The State intervenes through subsidies (electricity, fertilizers), which allows intensification in micro-plots.

Land markets are restricted or informal in many countries (India, Nepal), by regulations that limit sale or leasing. However, there is a growing “reverse fragmentation”: grabbing of multiple micro-plots by urban or industrial actors (e.g. real estate projects, industrial parks). In Vietnam, the government has facilitated land consolidation to improve efficiency, leading to social tensions.

The agrarian structure of South and South-East Asia is marked by a very high fragmentation of the number of farms (APUs) and a variable concentration of agricultural area, the result of population pressure, limited land availability and the long tradition of intensive family farming.

In all the countries of the region included in this figure, small farms, particularly in the range of 0–1 ha, clearly dominate:

- **Bangladesh:** 89.3% of APUs in 0–1 ha.
- **Nepal:** 86.2% in 0–1 ha.
- **Sri Lanka:** 79.4% in 0–1 ha.
- **India:** 68.5% in 0–1 ha.
- **Bhutan:** 45.8% in 0–1 ha and a considerable proportion in medium ranges (28.1% in 1–2 ha).

Overall, the region has one of the highest levels of concentration of APUs in small ranges worldwide, reflecting the pressure on land and the predominance of intensive family farming.

Now, with respect to the distribution of hectares, it shows differentiated patterns between highly fragmented countries and those with greater territorial concentration.

31 Otsuka, K.; Liu, Y. & Yamauchi, F. (2016). The future of small farms in Asia. Development Policy Review. Vol 34.



Very high concentration in small surfaces:

- **Bangladesh:** 67.2% of the area in 0–1 ha.
- **Nepal:** 57% in 0–1 ha.
- **Sri Lanka:** 38% in 0–1 ha and 25.5% in 1–2 ha.

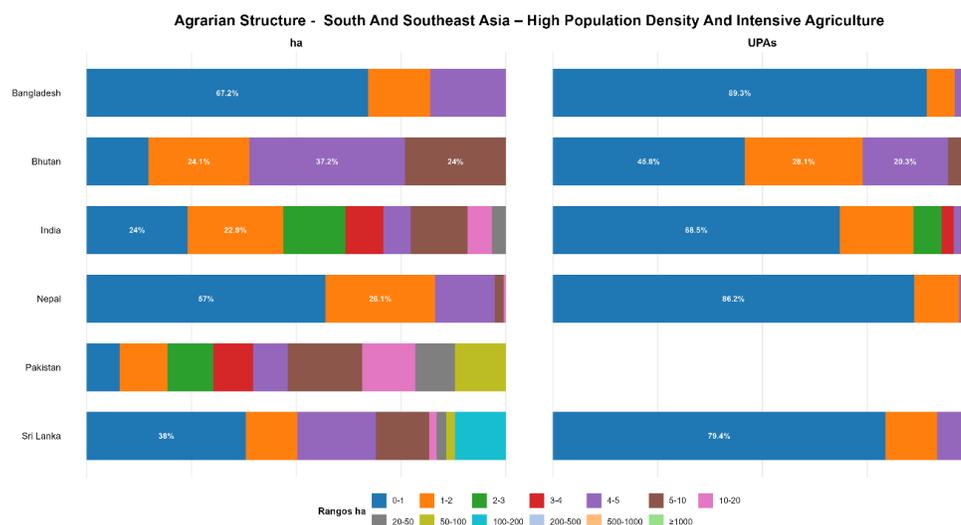
These countries reflect a combination of high population density, pressure on land, and a predominance of smallholder family farms.

Overall, the countries of the region have:

- An overwhelming predominance of small APUs (especially 0–1 ha), associated with subsistence agriculture and land-use intensification.
- A much more heterogeneous distribution of area, where some countries (Bangladesh, Nepal) concentrate land in small ranges, while others such as India show greater diversification and the presence of medium and large farms.

The comparison between the two panels in Figure 18 highlights the determining influence of high population density on the configuration of intensive and fragmented agricultural systems. In these cases, the inequality is not of extreme size (few large estates), but of access to productive resources. However, their profitability is low and they depend on intensive family work. The real inequality is in access to irrigation, credit and markets, where small producers are at a disadvantage compared to cooperatives or agro-industrial companies.

Figure 18. Agrarian structure of South and Southeast Asia – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes



g. Region 7. Sub-Saharan Africa – Subsistence and Small-Scale Agriculture

This analytical region is marked by the tension between systems of communal tenure and the expansion of the private property model. As Anseeuw & Baldinelli (Ibid) point out, in Zambia and Kenya, the emergence of “medium-scale farms” – operated by officials, military or businessmen – is upsetting the traditional balance. This phenomenon is not colonial, but postcolonial: new local actors accumulate land through purchase or political influence. It is also important to note that Africa is the continent with the most transactions recorded in the Land Matrix (2023), especially in South Africa, Mozambique and South Sudan. Many operations are linked to bioenergy, mining or infrastructure development.

The agrarian structure of sub-Saharan Africa is characterized by a very marked predominance of small farms in number of productive units (APUs), combined with more heterogeneous surface patterns, where smallholdings coexist with pockets of land concentration in medium and large ranges.

In almost all countries in the region, APUs of 0–1 ha constitutes the core of the agrarian system:

- Extreme values are observed in Zimbabwe (98.4%), Zambia (92.2%), the Democratic Republic of the Congo (86.7%), Mauritius (82.7%) and Malawi (72.7%), where the vast majority of farms are smallholdings.

This pattern is consistent with predominantly subsistence or small-scale agriculture, dependent on family labor and with little access to land.

At the same time, some countries show somewhat less concentrated structures in the minimum range:

- **South Africa** (22.7% in 0–1 ha),
- **Namibia** (25.4%),
- **United Republic of Tanzania** (28.6%) and
- **Mozambique** (34.5%)

A distribution is more distributed towards ranges of 1–2 ha, 2–3 ha, 3–4 ha and 4–5 ha, suggesting the coexistence of small farmers with medium-sized farms and, in some cases, with larger-scale units.

When the distribution in hectares is analyzed, the picture becomes more nuanced: in

several countries, a considerable proportion of the area is still concentrated in small ranges, but in others there are nuclei of concentration in medium and large ranges.

In countries such as the Democratic Republic of Congo (62.8% of the area in 0–1 ha), Zambia (57.7%), Zimbabwe (50.1%) and Guinea (50.3%), the land is mostly in small plots, reinforcing the smallholder profile also in terms of area.

In other cases, the surface shifts to intermediate and high ranges:

- **Kenya** concentrates more than half of the area in higher ranges (about 52.5% in large categories).
- **Mozambique** registers **48%** of the area in the range of **50–100 ha**,
- **Namibia** has **42.5%** in 50–100 ha,
- **Niger** accumulates **75.7%** of the surface in a higher section,
- **South Africa** distributes much of the land between ranges of **20–50 ha** and above, with a visible presence in categories of more than 100 ha.

Countries such as Rwanda, Malawi, Senegal and Sierra Leone show intermediate structures, where a significant part of the area remains in small and medium ranges (0–5 ha and 5–10 ha), with gradual transitions to larger ranges. The sub-Saharan Africa region exhibits:

- An overwhelmingly broad base of smallholders, with a very high proportion of APUs at 0–1 ha in virtually all countries.
- More diverse surface patterns, ranging from countries where the land is as fragmented as the number of APUs (DRC, Zambia, Zimbabwe), to others where pockets of concentration are observed in ranges of 50–100 ha and above (Kenya, Mozambique, Namibia, South Africa, Niger).

The sub-Saharan Africa region also allows us to observe:

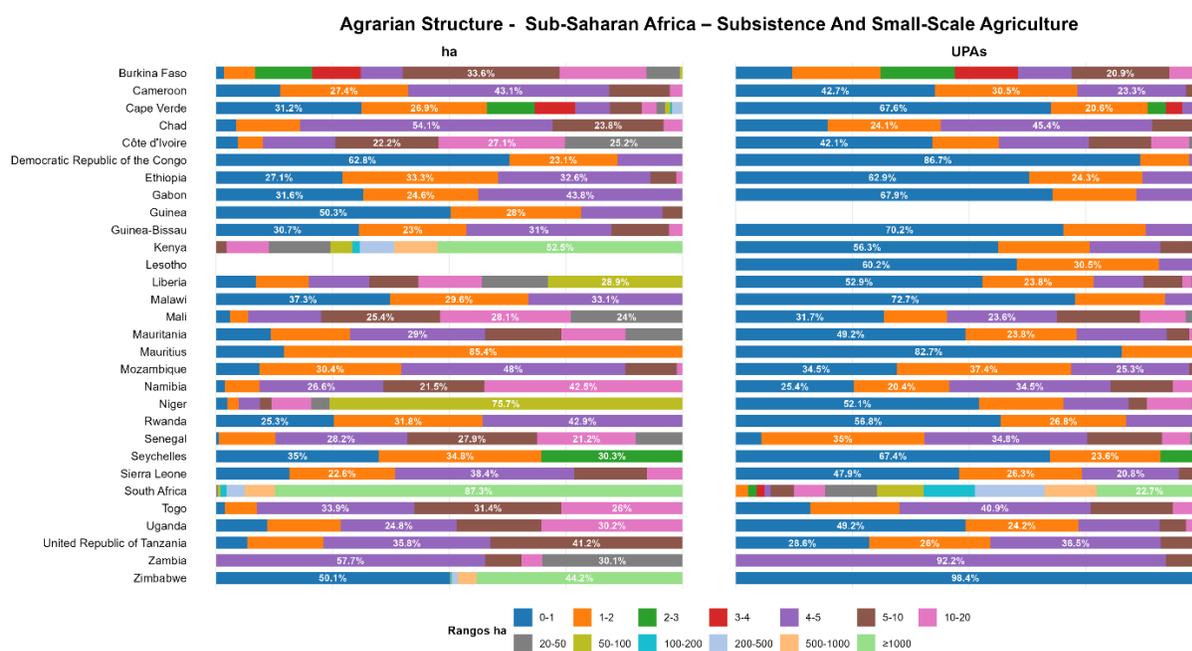
- An overwhelmingly broad base of smallholders, with a very high proportion of APUs at 0–1 ha in virtually all countries.
- More diverse surface patterns, ranging from countries where the land is as fragmented as the number of APUs (DRC, Zambia, Zimbabwe), to others where pockets of concentration are observed in ranges of 50–100 ha and above (Kenya, Mozambique, Namibia, South Africa, Niger).

Figure 19 shows that tenure inequality in this region of Africa is not uniform: it is extreme in some countries such as South Africa, Namibia with a colonial heritage of private



property; while it presents moderate features in other countries such as DRC and Malawi with strong community systems. Like other regions analyzed above, inequality is not only reduced to tenure, but also to differentiated access to services: small producers (70–90% of APUs <2 ha) lack technical assistance, credit, and roads, which limits their productivity despite their food importance.

Figure 19. Agrarian structure of Sub-Saharan Africa – Distribution of agricultural land (ha) and agricultural holdings (UPAs) by standardized size classes





4.

BY WAY OF CONCLUSION:

GLOBAL AGRARIAN PATTERNS BETWEEN FRAGMENTATION AND LATIFUNDIA.

The heterogeneous evaluation of regional data shows that the structure of land ownership is one of the most important issues of the twenty-first century. It is not a residual problem of history, but a central feature of contemporary economies.

Likewise, the regional comparison of the agrarian structure reveals a profoundly unequal map in the world distribution of land and in the size of productive units. The main conclusion is that the overall agricultural structure cannot be understood through a single metric, either the concentration of the area or the distribution of farms. True understanding emerges from the articulation of both, within a specific political, social and historical context. The joint reading of hectares (ha) and productive units (UPAs) shows that each region combines different

degrees of concentration and fragmentation, configuring contrasting production models.

4.1. Distribution by area (ha)

The analysis of hectares shows a **strong global concentration of land in very few regions:**

- **Europe and Western Asia – Industrialized Agriculture and Post-Soviet Transition** presents the most extreme pattern, with a clear dominance of farms larger than 1,000 ha, which concentrate more than 70% of the regional area.
- **Highly Technified Agriculture and Advanced Agroindustrial Systems** also shows a large-scale structure, with approximately 60% of the land on farms over 1,000 ha, consistent with business systems and mechanized agriculture.
- **Latin America and the Caribbean** exhibits a similar level, with about 56% of the area in large areas, reflecting the historical persistence of large estates.

The rest of the regions have a more balanced mosaic, although with different orientations:

- **Middle East and North Africa** distributes its area between medium and large



ranges, without a massive concentration in the >1000 ha segment, but with a notable presence in ranges of 20–100 ha.

- **Oceania and Pacific** are characterized by a mixed pattern: small and medium-sized ranges predominate, but there are important pockets of medium and extensive farms.
- **South and Southeast Asia** leans heavily towards small and very small ranges (0–5 ha), reflecting population pressure on land.
- **Sub-Saharan Africa** has a high fragmentation, with significant proportions in small and medium ranges, although with a lower relative presence of large units compared to other regions.

4.2. Distribution by number of production units (APUs)

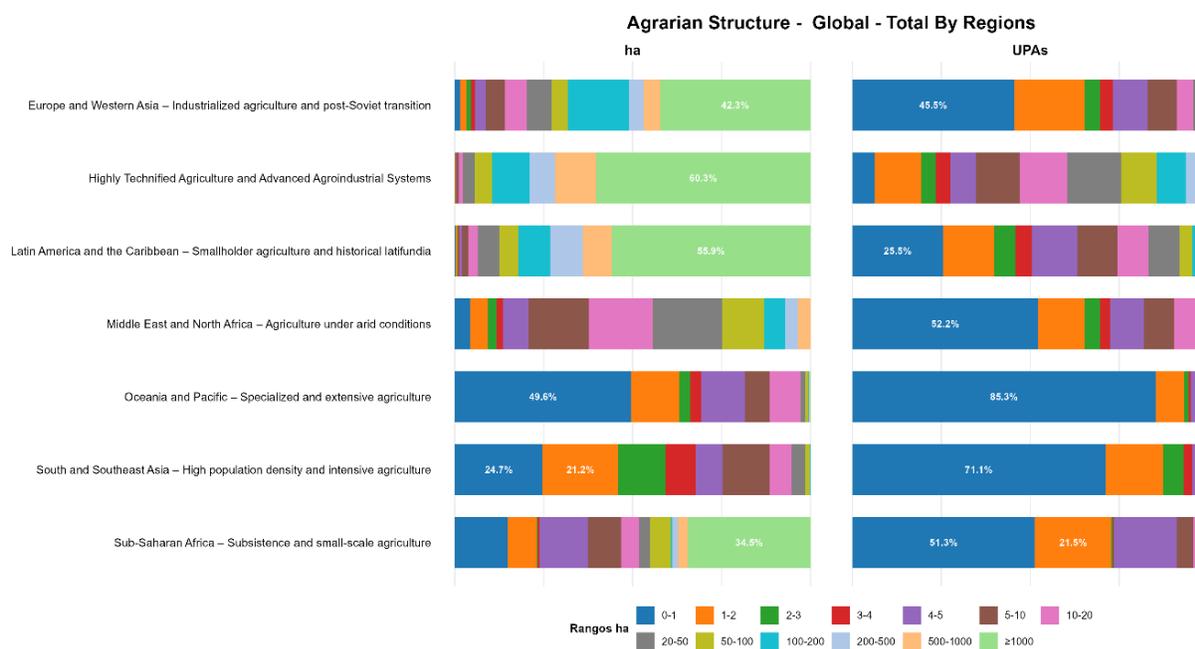
The reading by UPAs reveals a much more homogeneous behavior at the global level: world agriculture is mainly made up of small farms, although the intensity of fragmentation varies between regions.

- **Oceania and Pacific** and **South and Southeast Asia** have the highest proportions of units of less than 1 ha, exceeding 70% in both cases.
- **Sub-Saharan Africa** and **Middle East and North Africa** also concentrate most of their APUs in the 0–2 ha ranges, with around 70% and 65%, respectively.
- **Latin America and the Caribbean** maintains a fragmented structure, with more than 50% of farms under 5 ha, although with greater diversity in intermediate ranges.
- The only exception to the fragmentation pattern is the region of **Highly Technified Agriculture and Advanced Agroindustrial Systems**, where less than 35% of the APUs are located below 5 ha, reflecting production systems oriented towards medium and large farms.
- **Europe and Western Asia**, despite concentrating most of the land in large-scale units, continues to show a high distribution of small APUs, which shows a strongly segmented production structure: numerous small-scale farms in number, but with territorial control of most of the area concentrated in a small set of extensive farms.

Overall, the comparison between hectares and APUs confirms a structural characteristic of the global agricultural system: land is highly concentrated in certain regions, while family farming largely dominates in terms of the number of farms globally.



Figure 20. Global agrarian structure by region – Distribution of agricultural land (ha) and agricultural holdings (UPAs) across standardized size classes



We can see in Figure 20 strong regional contrasts: while Europe and Western Asia and the highly technical regions concentrate most of the land in units larger than 1,000 ha, regions such as South and Southeast Asia, Oceania and Pacific and Sub-Saharan Africa are characterized by extreme fragmentation, with most farms smaller than 1–2 ha.

Thus, the regional comparison shows that, although each territory has its own nuances, it is also possible to identify recurrent agricultural patterns associated with the concentration of land and the predominant size of the productive units. Figure 21 below summarizes these structural characteristics, highlighting whether each region is oriented towards small, medium or extensive farms, and pointing out the relative levels of fragmentation or concentration that define its agricultural organization. This comparative vision allows us to understand more clearly the systemic differences that cross the global agricultural landscape.



Figure 21. Comparison between size and predominant structure by analytical regions

Region	Predominant farm size	Type of predominant agrarian structure
Europe and Western Asia	Many farms small in number, but most of the land concentrated in >500 and >1000 ha.	Strong presence of family farming coexisting with large agribusinesses.
Highly Technified Agriculture and Advanced Agroindustrial Systems	Predominance of medium and large farms in terms of surface area.	Dominant corporate agriculture; Family farming is a minority.
Latin America and the Caribbean	Very abundant small APUs (<5 ha) and large areas in >500–1000 ha.	Numerous small peasants and large producers who concentrate the land.
Middle East and North Africa	Many very small APUs (<2 ha), but part of the surface in medium and large ranges.	Strong peasantry but large landowners.
Oceania and Pacific	Predominance of microplots (<1 ha) on islands; larger sizes in a few specific countries.	Dominant family farming on islands; concentration only in territories of greater scale.
South and Southeast Asia	Extremely small farms (0–1 and 1–2 ha) in the vast majority of cases.	Almost absolute predominance of peasant and family farming.
Sub-Saharan Africa	More than 60–70% of APUs of less than 5 ha in most countries.	Structure dominated by family farming, with large very marginal producers.

The global evidence, consolidated in the work of Lowder et al. (2021) and Ricciardi et al. (2018), confirms a profound paradox: land is increasingly concentrated in the hands of a small number of large farms, which control more than 70% of the world's agricultural area, and at the same time, the vast majority of farms are family farms and responsible for a massive portion of food production. This duality is the starting point for any analysis; and, our regional typology, sought to capture this complexity and its nuances.

4.3. Recommendations for Rural Policymaking: Towards an Integrative Approach

We do not seek that our comparative analysis of regional agrarian structures is only an academic exercise, but rather we intend to adjust the global and regional perspective as an indispensable condition for designing effective, fair and sustainable rural policies.



Consequently, the proposed typology, by emphasizing the diversity of contexts, forces us to abandon one-size-fits-all solutions and adopt a multifaceted policy approach that integrates land governance, food security and social justice. For this reason, we believe that the following recommendations should be contextualized and addressed to the specific problems that each region faces.

a. Land Governance: From Market Liberalization to Rights Guarantees.

Empirical evidence shows that simple deregulation of land markets has been inept at addressing rural poverty and, in many cases, has exacerbated concentration and insecurity. A 1997 Inter-American Development Bank report noted that land markets were ineffective due to social segmentation, widespread informality, and legal uncertainty (Borras & Franco *Ibid.*).

Therefore, the first recommendation is that rural policies should prioritize proactive land governance. This implies guaranteeing secure and formal tenure rights: It is essential to advance in the formalization of tenure, especially for indigenous, Afro-descendant and peasant communities that depend on communal or informal tenure systems. This requires simplifying administrative procedures and reducing physical and economic barriers to accessing legal records.

Likewise, instead of blindly liberalizing, States should tend to actively regulate land markets; seeking to prevent massive speculation, excessive concentration and the exclusion of small producers. This may include the implementation of progressive taxes on idle or uncultivated land to stimulate its productive use

An important element is to broaden the individual's vision of rural property; protecting the rights of communities to decide on the use of their territories and ensuring the right to free, prior and informed consultation (FPIC) before the approval of any project that may affect them, such as infrastructure megaprojects or land acquisitions. For this reason, it appears as relevant, in terms of combating inequality gaps in access to land: to protect ethnic-peasant and gender collective rights.

b. Food Sovereignty: Recognize and support smallholder farmers.

The studies by Lowder et al. (2021) and Ricciardi et al. (2018) converge on a fundamental point: smallholder farmers and family farms are the pillars of global food security. Agricultural public policy, therefore, must recognize and strengthen this vital role.



On this path, it is important to support diversified and local production. Rural policies should incentivize the production of a wide variety of crops for local consumption, rather than just export-oriented monocultures. Undoubtedly, the above improves the resilience of food systems and the diet of the rural and urban population.

Under the previous directive, it is essential to deepen access to fair markets, in particular public food procurement. In this direction, it is necessary to create mechanisms so that small producers can sell their products under fair conditions, avoiding being exploited by corporate intermediaries. This can be achieved through regulations that encourage direct marketing between public entities with a demand for food and small local producers.

A strategic counterpart of any strategic redistributive process that is sometimes left out of analysis is the need to adapt agricultural research and extension. Processes that should seek to focus on technologies and practices suitable for smallholder farms, such as agroecology, that improve productivity without degrading the environment

c. Social Justice: Addressing the root causes of rural inequality.

It seems clear, after this text, that both concentration and its obverse, the fragmentation of the land, are a cause and symptom of social inequality. That's why policies need to go beyond land redistribution to attack the roots of the problem.

Under the above conceptual dogma, it is worth revalidating the relevance of the policies of comprehensive agrarian reform and land restitution. In regions with high levels of concentration and conflicts over land, comprehensive agrarian reforms that include land redistribution, the provision of credit and technical services are a necessary action. In contexts of armed conflict, such as Colombia, Palestine, Sudan or Ukraine, land restitution policies for victims of forced displacement are essential for peace and reconciliation.

On the other hand, at the borders between the regions of analysis, in order to break the cycle of forced migration and job insecurity, it is essential to generate jobs and viable economic opportunities in rural areas. This includes the development of non-agricultural activities, rural tourism and income diversification.

Finally, as a sine qua none of any process of redistribution and equitable access to rural property, it is a priority to protect land and environmental defenders. Corporate interests and, in some cases, state security forces, must stop collaborating with actors who seek to dispossess communities of their territories and, instead, must guarantee the protection of all citizens and the defense of the environment.



In summary, our exercise in regional typology aims to contribute to the navigation around the complexity of rural policies. Rather than applying a one-size-fits-all model, interventions should be shaped by the accurate diagnosis of each region's agrarian structure, addressing its specific strengths and weaknesses.

METHODOLOGICAL ANNEX

As mentioned above, the basis of our work was the FAO database known as FAOSTAT - Structural data from agricultural censuses, which is accessed through the official FAO portal, this portal offers free access to food and agriculture data from more than 245 countries and territories.

FAOSTAT is part of the *World Programme for the Census of Agriculture (WCA)*, which promotes the coordination of agricultural

censuses on a global scale with uniform definitions and standards.

Below we describe in detail the steps that were followed:

1.1. Downloading the data

Within the WCAD module^[1], in the "DOWNLOAD DATA" section, we select the corresponding filters in order to extract the history of farms (number and area) by country. The filters applied were:

- *COUNTRIES* → Select All
- *ELEMENTS* → Number (para recuento de explotaciones) o Área (para superficie de explotaciones)
- *ITEMS* → Holdings
- *WCA ROUND* → Select All

Additionally, the output parameters of the file are configured:

- Output Type: Table

1 <https://www.fao.org/faostat/en/#data/WCAD>

- File Type: XLS
- Thousand Separator in “Show Data”: None
- Output Formatting Options: Flags, Notes, Codes, Units

Finally, **Download Data** is selected and the file corresponding to the dataset is saved.

1.2. Debugging and preparation of the “dataset”

The downloaded files include multiple columns (Code Variables, Flags, Notes, Country Definitions, etc.). We use Python to perform a cleaning and debugging process, keeping only the variables and observations relevant to the study (e.g., country, census year, number or area value, methodological notes, etc.).

Then, a consolidated dataset is built that integrates:

- The clean data (number of farms and/or area of farms according to the file) by country and year.
- A regional grouping of countries built under geopolitical and agrarian structural criteria, in order to facilitate regional comparisons.
- Additional metadata (e.g., methodological notes for each country-year, official data flags).

1.3. Detection of structural trends (concentration and fragmentation)

For each country, the time series of the number of farms (and possibly the area) is analysed to classify their agricultural structural trajectory in one of the following patterns:

1. **Sustained trend** (concentration or fragmentation): series in which the number of farms shows a clear and constant trajectory towards decrease (concentration) or increase (fragmentation).
2. **Trend change peaks**: Countries that start with a trend (e.g., fragmentation), but at some point experience a shift in the opposite direction (concentration) and that new trajectory is maintained thereafter.

Using a Python algorithm, each national series is traversed and the corresponding category is assigned based on statistical criteria (e.g. net slope, sign changes, segment stability). The number of countries that fall into each category is counted.

1.4. Regional and comparative analysis

Once the national trajectories have been categorized, the distribution of structural trends by region (according to the constructed geopolitical classification) is analyzed. The objective is to identify if certain regions are more prone to concentration or fragmentation processes, or if mixed patterns predominate.

In addition, correlations or associations between structural trends and contextual variables (e.g., per capita income, rural population density, agrarian policies, institutional changes) can be explored.

1.5. Validation, limitations, and conclusions

The reliability of the results is evaluated according to the following considerations:

- The methodological notes for each country-year may contain different definitions of what constitutes a farm (size thresholds, inclusion or exclusion of home gardens, livestock-only farms, etc.).
- FAOSTAT data may not reflect more recent censuses available from national sources or adjustments made in other studies (such as those used by Lowder et al.).
- The accuracy in the detection of trends depends on the length and quality of the time series of each country; Countries with few censuses available may be more likely to be classified as “mixed” or incomplete.

Annex 1. Information for 24 countries with recoverable area-by-size-class data according to Lowder et al.

Country	Year (total)	Year (size-class data)	Year (Lowder et al.)	Total holding area (ha)	Area by size classes (ha)	Lowder et al. area (ha)
Bhutan	2009	2009	2009	94,903	–	94,902
China	2016	2016	1997	134,880,000	–	130,039,200
Côte d'Ivoire	2016	2015	2001	3,344,241	–	4,351,663
Djibouti	1995	1995	1995	1,000	–	1,000
El Salvador	2008	2007	2007	929,308	–	929,310
Guadeloupe	2000	1989	2009	41,700	46,740	31,768



French Guiana	2000	2000	2010	34,655	–	25,133
Guinea-Bissau	1988	1988	1988	96,375	–	96,375
Indonesia	2023	2013	2013	47,725,730	–	22,426,846
Libya	2001	1987	1987	1,809,596	–	2,495,906
Malawi	1993	2006	2007	1,167,240	–	2,569,605
Mali	1984	2004	2005	1,699,593	–	5,152,000
Martinique	2000	2000	2009	32,041	–	24,975
Mauritius	2014	2014	2010	66,449	–	66,450
Mozambique	2010	2009	2010	5,633,850	–	5,413,339
Namibia	2014	2013	2014	9,811,517	–	867,577
Niger	2008	2004	2010	6,534,682	–	11,396,574
United Republic of Tanzania	2008	2007	2008	15,756,174	–	14,810,368
Saint Kitts and Nevis	2000	2000	1987	6,369	–	8,870
Senegal	2013	2013	2013	3,131,680	–	3,268,000
Sri Lanka	2014	2013	2014	2,283,753	–	2,023,500
Togo	2014	2012	2012	1,746,265	1,683,162	2,135,355
Uganda	1991	2008	1991	3,683,288	–	3,683,288
Zambia	1971	2000	1990	2,416,187	–	2,911,000

Annex 2. Information for 22 countries with non-recoverable area-by-size-class data according to Lowder et al.

Country	Year (total)	Year (size-class data)	Year (Lowder et al.)	Total holding area (ha)	Area by size classes (ha)	Lowder et al. area (ha)
Afghanistan	2003	0	–	2,700,450	–	–
Angola	1965	0	–	4,179,600	–	–
Belize	1985	1984	–	506,680	253,340	–
Benin	1992	1992	–	1,081,563	–	–
Botswana	2015	2015	–	259,656	–	–
Comoros	2004	2004	–	3,570	–	–



Eswatini	1984	2012	–	629,205	–	–
Gambia	2012	2011	–	343,949	–	–
Ghana	1970	1970	–	2,574,200	–	–
Kiribati	2020	2020	–	36,000	–	–
Madagascar	2005	2004	–	2,083,590	–	–
Micronesia (Federated States of)	2017	2016	–	27,939	–	–
Mongolia	2011	2011	–	802,169	–	–
Nigeria	1951	0	–	11,396,574	–	–
New Caledonia	2002	2002	–	289,545	–	–
Central African Republic	1985	1985	–	272,419	–	–
Syrian Arab Republic	1981	1981	–	3,153,436	–	–
Sao Tome and Principe	1990	1990	–	76,214	–	–
Suriname	2008	2008	–	63,989	–	–
Tajikistan	2013	0	–	5,002,738	–	–
Tonga	2015	2015	–	26,874	–	–
Tuvalu	2017	2017	–	1,800	–	–

