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ANALYZING THE AFFORDABLE DIMENSIONS FOR RESTRICTING THE DIVISION OF AGRICULTURAL LAND: THE CASE OF AZERBAIJAN

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ABSTRACT

Applying restrictions to the division of agricultural land parcels can potentially prevent fragmentation and ensure the efficient use of land. To achieve effective regulation indicators that are justified as targets in evaluating the appropriate dimensions of the plots covered by the legislation need to be defined. This article examines the issues involved in determining the size of land plots that are subject to restrictions, based on efficiency criteria and the necessity to ensure the viability of farms per the goals set for their regulation. To evaluate the size of the areas, it is proposed to use the minimum level of the reference income indicator, which determines the viability of the farm. The authors have prepared formulas for calculating guidelines for the size of the subdivided land areas using the average level of wages in the agricultural sector and the amount of income necessary to meet minimum needs as the basis for the reference income. Using these formulas, the corresponding target indicators, differentiated by regions are calculated, and advanced proposals are made for their application.

INTRODUCTION

Preventing the fragmentation of agricultural lands into small parts and, at the same time, consolidating appropriate parcels can ensure the efficient use of the relevant areas. Some countries have regulated the division of agricultural lands into relatively smaller parts. The implementation of special measures in this regard serves to maintain the size and efficient structure of farms in all areas of agriculture. The application of restrictions to the division of land plots is considered particularly important for transit economies. As a result of fundamental agrarian reforms in these countries, including in Azerbaijan, which have been carried out in connection with system transformations, the relatively small size of the plots owned by rural dwellers, as well as the fact that the plots owned by the same family are often divided into several parcels, is not considered favorable in organizing the effective use of the respective plots. Thus, applying restrictions in the current context may play a positive role in terms of preventing the fragmentation of the land used in agriculture.

In some countries, regulations are not directly aimed at limiting the size of land parcels. The subject of the regulation is the appropriate size of the farm to ensure its viability (the indicator relevant to regulation is called the optimum farm size in

French legislation and the minimum farm size in Italian legislation (Vranken *et al*., 2021)), the goal being the preservation of a favorable structure for the farm and the preservation of the structure of consolidated lands. (In Austria, where such an approach is used, transactions on the sale of land by dividing it into very small parts, which may impair the favorable structure of ownership or disrupt the land consolidation carried out in a previous period, is not permitted. Similarly, Croatian land legislation does not allow re-division of consolidated areas (Vranken *et al*., 2021)). In such cases, a decision on limiting the size of lots is made separately, according to each specific situation. In other parts of the country, the size of the property that may be subdivided is determined by legislation. The minimum size of the land area that can be divided and sold or given to a producer by inheritance is determined by law, based on a factor of efficiency (such an approach is used in Germany, Turkey, and Spain). With regard to the division of agricultural land into separate areas, minimum dimensions for lot size, inheritance, and subdivisional sale are determined in order to prevent further fragmentation (This approach is applied in Bulgaria, Slovakia, and partly in Hungary (LoI, 1949; LOUAL, 2015; LSMALO, 1995).

However, it should be noted that imposing restrictions limiting division may lead to issues in the exercise of property rights in the areas concerned by exaggerating the efficiency factor in the use of land for agriculture, and thus the relevance of these measures can be disputed (Swinnen *et al*., 2010; Vranken *et al*., 2011; Vranken *et al*., 2021). Therefore, in the discussion of the issue we are considering, it is necessary to take into account the extent to which the established dimensions of the land plots, whose division is restricted, comply with the stated criteria.

In this regard, we believe that it is appropriate to evaluate the compliance of land plot dimensions with accepted criteria based on appropriate methodology. This will result in effective decision-making regarding improving the size of the land area and revising allowable plot sizes in order to achieve the goal of the regulation. In the article, different alternatives for determining the size of agricultural land plots, which are subject to restrictions on subdivision based on assessment of the viability of the reference income of the farm, according to the income-area ratio and other relevant calculation methods are based on data from Azerbaijan.

This article is structured as follows: The first section provides the research problem. Then, a brief overview of the literature is provided in Section 2. In Section 3, the methodological strategy is described. The results obtained from the data analysis are described and explained (Section 4). Finally, conclusions are presented (Section 5).

LITERATURE REVIEW

Many studies exist on the effects of land fragmentation in various countries. These studies examine the social, economic and ecological effects of land fragmentation and the laws regulating the legal minimum size of land plots (Barati *et al*., 2021; Brussaard *et al*.,1992; Diab, 2020; Lazıkova *et al*., 2017; OECD, 2017; Dijk, 2002; Todorova & Lulcheva, 2005; Niroula & Thapa, 2005; Di Falco *et al*., 2010; Rahman & Rahman, 2009). These studies emphasize the problems caused by farmland fragmentation in terms of the development of agriculture. Bertini and Zouache (2021) see fragmented ownership and small farm units as a big problem that

constrains productivity growth in agriculture in the Middle East and North Africa. The study by Sadiddin *et al*. (2023) shows that farmland fragmentation, water scarcity, and soil salinity are serious constraints and challenges for the agricultural sector of Iraq, which must be overcome to ensure a sustainable and inclusive development path. From the Middle East region perspective, Diab (2020) notes that land governance and land administration are essential for achieving economic growth and sustainable development in this region. For this reason, land legislation in the Arab region must be modernized to achieve good land governance.

Also, Lazikova *et al*. (2017) researched Slovak legislation concerning land fragmentation and compared this legislation with that of other countries. They show that along with Slovakia, Germany, Bulgaria, Estonia and Lithuania regulate the minimum size of land plots.

This issue has been written and examined in legislation in many countries. In the legislative acts of the European Union, Germany, and some other European countries, as well as by academic researchers, the term viable size of the farm is widely used. In the land legislation of Turkey, the indicator "land area of the size that provides sufficient income" can be accepted as an alternative of the land area that can ensure the viability of the farm. This indicator is approved by the law taking into account regional differences (SCLUL, 2005). According to the mentioned approach, the parcel area should ensure the size suitable for the viable activity of the farm, or the division and sale of a part of the land belonging to the active farm should not result in the loss of the viability of that farm. In this case, it is not allowed to divide the land area below the limit that may lead to deterioration of the structure of the farm.

For example, in order to prevent fragmentation and strengthen consolidation in the conditions of the acceleration of concentration and commercialization in Bulgarian agriculture, the arable land that is inherited, allocated and sold to producers cannot be divided into smaller parts than 3 ha, meadows from 2 ha, vineyards and orchards from 1 ha. In order to prevent further fragmentation of lands, a relatively mild regulatory mechanism has been established by Slovakia's legislation. According to the legislation, if the size of the new land area created by dividing the existing land area is less than 2 hectares, but more than 0.5 hectares, the owner will pay 10 percent of the value of the agricultural land area, if the newly created area is less than 0.5 ha, however, if it exceeds 0.2 ha, a fee of 20 percent of the value of the agricultural land must be paid. The creation of land plots of less than 0.2 ha is prohibited by law (Vranken *et al*., 2021). Regulatory measures aimed at preventing the fragmentation of agricultural land are also applied in Hungary, with a limited scope. Thus, in accordance with the country's legislation, state land cannot be allocated to agricultural producers in a size smaller than 3 ha, including less than 1 ha for the construction of garden plots (Vranken *et al*., 2021). It should be noted that the relative quantity of the threshold indicators of the areas allocated for the organization of agricultural production, as well as those that can be divided and sold or given by inheritance, is not high. The mentioned indicator on the cultivated area is 60 times less than the average size of agricultural land in Germany, 11 times in Bulgaria, 40 times in Slovakia, and 3 times less in Turkey.

As we mentioned above factor in connection with the issue under consideration, the efficiency factor is given importance in Germany, Turkey and Spain. In this case, the absolute quantity of the mentioned land size is determined by the law. The productivity of the cultivated plant and (or) the level of income obtained from the land area is taken as the criterion of efficiency. According to the first criterion, the division of the relevant areas into smaller parts (parcels) is not allowed in order to prevent the decrease in the productivity of the land. For this purpose, the land legislation determines the minimum size that can be divided without causing a decrease in productivity of existing agricultural areas. For example, in Turkish legislation, the minimum size of agricultural land is defined as the parcel area where it is impossible to achieve the previous productivity if that size decreases under the conditions of efficient organization of production activity and effective use of resources (SCLUL, 2005). The minimum size of cultivated land under Spanish legislation is defined as the size of the area where satisfactory productivity is ensured under cultivation conditions with normal production methods and technical means, taking into account the socio-economic characteristics of each region. That indicator can be expanded by regions and municipalities, taking into account the irrigated and drought conditions. It is not allowed to divide or sell plots below the minimum size. The same requirement is applied during the division of the lands given by inheritance (LMEA, 1995). According to the second criterion, the prevention of the deterioration of the economic indicator of land use is taken as a basis. In practice, in cases where the division of the land area will result in the creation of parcels with a lower level of profitability, measures are determined by the legislation to prevent relevant transactions. In German land law, if the division of agricultural land leads to a reduction of economic results, the relevant parcel allocation and sale may not be approved by the regulatory body (GMVA, 1961). The minimum size of a plot that can be divided and sold is set by law at 1 hectare.

Also, the ambiguity of the connections between land fragmentation and the formation of performance indicators at an unfavourable level is also emphasized in the economic literature and in reports prepared by international organizations. (Farugee & Carey, 1999; Vranken *et al*., 2021) In this direction, it is firstly taken into account that an appropriate degree of fragmentation has a certain advantage and can reduce risks. Dispersion of fields can also reduce seasonal labor shortages for farmers and allow for income consistency. This aspect is noted in practice as a factor explaining the maintenance of demand for land fragmentation. Researchers also point out that there is empirical evidence that, especially in conditions of imperfection of other markets, including the insurance market, the labor market, fragmentation is not as ineffective as generally accepted (Vranken *et al*., 2021)

Agriculture is highly fragmented in Azerbaijan. Most farms are small, which is one of the main issues related to the country’s sustainable use of land. Fikretzade and Aliyev's (2022) research, based on an analysis of Electronic Agricultural Information System data, shows that 70% of market-oriented agricultural producers have just one to two hectares of land in Azerbaijan, an indicator of the excessive fragmentation of the country’s crop-growing land .

Shalbuzov's (2020) findings also show that the sizes of more than 80 % of family farms are smaller than required in terms of compliance with the minimum

living standard in Azerbaijan. Scholar stressed that the size of the family-agricultural farm should be more than 3.5 hectares in order to fully ensure the income of the family in the countryside.

For the purpose of our research, the approaches in the economic literature to assessing the viability of the farm, which is considered a criterion in determining limits on the subdivision of land plots, are also of interest. The reference income indicator, which is considered a measure of the economic viability of the farm, is defined.

At the same time, in this case, there is an approach from two different aspects, such as determining viability based on the alternative cost indicator or the household welfare indicator. In the studies of US and Canadian researchers, the viability of the farm is evaluated in terms of its ability to bring income to meet the minimum needs of the family. European researchers, on the other hand, focus on the possibility of paying alternative costs. This situation is explained by the wider availability of statistical data on households in North America, and on the level of farms in Europe (O'Donoghue *et al*., 2016). According to the approach of US researchers, the annual monetary income obtained in a viable farm should be sufficient to cover the farm's operating expenses, minimum consumption needs, to carry out renewals of the fixed capital in accordance with the provision of permanent working capacity, and to repay loans on schedule (O'Donoghue *et al*., 2016). In another relevant approach, it is proposed to estimate the viability of the farm based on the share of operating costs and depreciation deductions in the total farm cash receipts (Scott, 2001).

A widely used method in the Western countries is the assessment of the economic viability (Savickiene *et al*., 2015; Slavickiene *et al*., 2014; Spicka *et al*., 2019; Aggelopoulos *et al*., 2007; Hanrahan *et al*., 2014; Hloušková *et al*., 2022; Cocciarelli *et al*., 2011; Vrolijk *et al*., 2010; Gómez-Limón *et al*., 2023) of the farm based on the comparison of the income from the farm with the income per family labor unit considered as a threshold. In the studies, the threshold income indicator of viability for farms of the EU is calculated in the database of FADN or on the basis of consideration of alternative costs. The amount of the minimum wage for the country, the amount of the average wage in agriculture, the average amount of wages for the national economy, the amount of the paid wage can be accepted as the threshold income. At this time, 8 models are proposed for calculating the indicator, taking into account the general level of development of the country's economy, the possibilities of obtaining the necessary information and other relevant factors (O'Donoghue *et al*., 2016).

DATA AND METHODS

Data

This study uses technical and accounting data from the Farm Data Monitoring System of the Ministry of Agriculture of Azerbaijan (Farm Data Monitoring System of Azerbaijan (FDMS) can be accepted as a simplified version of Farm Accountancy Data Network (FADN) of EU. (Shalbuzov & Huseyn, 2014) and the statistical data of the State Statistics Committee of Azerbaijan (SSC, 2023a; SSC, 2023b; SSC, 2023c).

Methods

In our study, the main approach is the assessment of land plot size where division is restricted, as well as the criteria for the efficiency and viability of the farm. Productivity and profitability indicators are taken as criteria when evaluating the feasibility of applying restrictions to the division of agricultural land plots based on the efficiency factor. The intent of this approach is to limit the fragmentation of land that leads to the creation of a size that results in reduced productivity and profitability. Therefore, the dependence of productivity and profitability indicators on the size of land plots is an important factor to be examined.

The field productivity criterion was assessed based on the following linear regression model of the dependence between the size of the cultivated areas and the volume of the product obtained per hectare for the main types of crops.

$$PP = a + b\,PA + e \quad (1)$$

Here,

PP - volume of the crop per plant type per 1 ha or irrigated cropland, or per hectares perennial planting area, tons;

a – free coefficient;

b – regression coefficient of the free variable;

PA - area of relevant plant or perennial planting, hectares;

e – error of the model

According to the model, the research with the data of Azerbaijan was carried out separately for dry and irrigated areas, as well as perennial planting areas, by involving the indicators of farms with the same or similar natural and climatic conditions, which have indicators in the Farm Data Monitoring System (FDMS). The assessment of the criterion of the profitability of the fields is carried out in a similar manner, on the basis of a regression model of the dependence between the sown or perennial planting area and the indicators of profit (difference between income and expenses) per hectare. In other words, in the mentioned case, the amount of profit per hectare of planted area of plants or per hectare of perennial planting was accepted as a free variable in the (1) model.

Our approach to using the criterion of farm viability is based on linking the size of the restricted area to the level of income corresponding to that criterion. In this case, as a reference indicator for the determination of the size of the land plot, the division of which is restricted, the provision of the minimum amount of income corresponding to the production share of the horticultural sector is envisaged. That is, the transition is made from the level of the reference income, which corresponds to ensure the viability of the farm, to the size of the land plot, the division of which is limited Figure (1). Achieving the mentioned level of income is defined as a threshold in assessing the expediency of land division.

Source: Prepared by the authors

The relevant calculations were made in accordance with the income-area ratio, based the approaches to proposed in the studies as the reference income in the assessment of the viability of the farm, on the opportunity cost and meeting the minimum need. Comparative evaluation is carried out by accepting the average level of wages in agriculture and the amount of income necessary to meet the minimum needs as determined by national legislation as the basis of reference income.

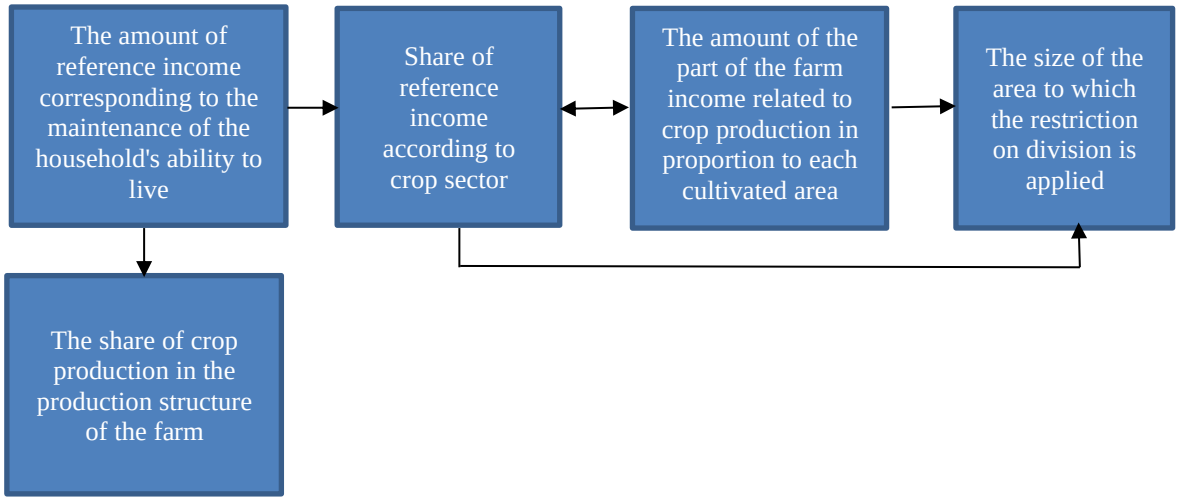

Figure (1): Transition from the reference income to the restricted size of the land plot

In the first case, based on the mentioned approach, it is intended to apply restrictions on the division of land plots in the size corresponding to the provision of income equal to or lower than the average salary for agriculture of the country. The effective "working" of such an approach in regulatory practice is related to the development of a specific methodology for calculating the area size in question. At this time, there is a need to take into account the aspects arising from the specific characteristics of the economy in which the research is conducted. In the case of Azerbaijan, the following are attributed to them:

- Taking into account the affordability factor and the breadth of differentiation in the level of wages, the amount of the average monthly wage in agriculture, forestry and fishing published by official statistics is used as the reference income as the average wage indicator;
- In the calculations, the remaining amount of the salary after taxes is taken into account. In this regard, first of all, the exemption of the income obtained by agricultural producers in Azerbaijan from tax payment is taken into account;
- When making relevant calculations, the production structure of farms was taken according to the situation formed in each administrative region.

Taking into account the above, the size of the area subject to the restriction of division (separately for dry and irrigated lands and perennial crops) by administrative regions was calculated by the following formula:

$$SPRD = \frac{MWA * 12 * FWU * WCP}{IV - EV + Sub} \quad (2)$$

Here,

SPRD- the size of the plot which applied restriction on division, hectares ;

MWA – the amount of the average monthly wage in agriculture in the year in which the calculation was made based on the data;

FWU - coefficient of family labor (use of labor of family members in the farm)

WCP - specific weight of crop production in the total agricultural product of the relevant administrative region, coefficient;

IV – income from 1 hectar area;

EV – expenditure on 1 hectar area;
Sub - the amount of the subsidy given per plant in relation to 1 ha of cultivated area.

In calculations based on Azerbaijan's data, income and expenditure indicators were determined based on FDMS data, as a weighted average quantity of the main crops cultivated in the relevant economic region, and based on the official statistical indicator of the average wage in agriculture .
The following were taken into account during the calculation of the area subject to the restriction of division based on the criterion of satisfying the minimum requirements of the producer:

- The amount of the Living Minimum approved for each year by the country's legislation was taken as the income indicator corresponding to the payment of the minimum demand;
- The amount of state pensions is taken into account as a fixed income in the amount of money required for the payment of minimum needs.

Calculations were made separately for dry and irrigated lands and perennial crops for each administrative region using the following formula:

$$SPRD = (LM - P) * HS * 12 * WCP)/(IV - EV + SUB) \quad (3)$$

Here,
LM – the approved amount of the Living Minimum in the year in which the calculation was made based on its data;
P – monthly average amount of pensions per person in rural areas;
HS – approved average size of household in rural areas, person
WCP, IV, EV and Sub give the meanings in formula (2).

RESULTS AND DISCUSSION

Evaluation based on efficiency criteria

The size plot subject to restricted division was evaluated based on criteria of efficiency, i.e., the productivity of the cultivated areas and the level of profit obtained from each hectare of the area, based on the relevant data from Azerbaijan's agricultural producers.

The relationship between the size of the areas cultivated with the principal crop species and the production volume per hectare was investigated using linear regression models, separating the dry and irrigated areas based on the FDMS data for 2021. Research was conducted on cereals (including winter wheat and barley), cotton and hazelnuts. The decision to use a linear regression model was made based on preliminary research into relevant trends based on data from the products involved in the study. The results of the regression analyses are given in Table (1).

Source: Authors calculations based on FDMS data

It is clear from the data that the regression coefficient for the size of the fields is positive for grain production in both dry and irrigated lands. That is, the effect of an expansion of the cultivated area on productivity is positive. However, the coefficients are very small, and thus not reliable.

Table (1): Results of examining the dependence of productivity on the size of the cultivated area with a regression model.

	Number of observations	Indicators of the regression coefficient			F statistic	
		quantity	t -statistic	p-value	coefficient	Significance
Cereal-rainfed	275	0.002838	0.494711	0.621198*	0.244739	0.621198*
Grain- irrigated	275	0.014078	0.946676	0.344641*	0.896196	0.344641*
Cotton	194	-0.02371	-1.99509	0.047447	3.980398	0.047447
Hazelnuts rainfed	87	0.088825	2.590572	0.011274	6.711062	0.011274
Hazelnuts-irrigated	95	-0.03918	-0.79323	0.429664*	0.629212	0.429664*

*non-significant

The regression coefficient of the independent variable for irrigated hazelnut orchards is negative. This indicator is also quantitatively small and does not meet the necessary reliability tests. The regression coefficient of the plot sizes for the cotton model is negative and is reliable according to the relevant test indicators.The regression coefficient of the independent variable of the model for hazelnut orchards is positive and is reliable. At the same time, the number of coefficients in the test cases is very small. According to the model's calculations, each hectare expansion of the cotton fields corresponds to a 2.4 kg decrease in productivity, and each hectare expansion of the hazelnut orchard corresponds to an 8.9 kg increase in productivity.

Thus, on the basis of relevant econometric analyses, the regression coefficients expressing the dependence between the cultivated areas and the productivity level of grain and irrigated hazelnut plants were not statistically significant. In this regard, it cannot be confirmed that the productivity was depended on the size of the cultivated areas. In cases where the regression coefficients are significant (for cotton and hazelnut), it is possible to confirm that the expansion of the relevant plant and fruit areas does not act as a factor that has a noticeable effect on the increase in productivity.

Results of the regression models show that the effect of the size of cultivated fields (the free variable) on another efficiency indicator, the profit obtained per hectare, is negative for irrigated grain fields, as well as cotton and irrigated hazelnut orchards. This indicator is positive for rain-fed grain fields and rain-fed hazelnut orchards. In addition, the regression coefficient was significant only for rain-fed grain and cotton. The results show an increase in profit from a field of 0.03 manats for each hectare expansion of wheat grain areas, and the decrease of the amount of profit from a field is 16 manats for each hectare of expansion of cotton planting areas Table (2). The data is insufficient for us to say that in both cases the expansion of cultivated areas has a significant impact on the amount of profit obtained from each hectare.

Corresponding regression coefficients for the areas of irrigated grain, as well as rainfed and irrigated hazelnuts are not significant. In this regard, based on those indicators, it is not possible to confirm the existence of a relationship between the size of the plots and the profit obtained from each hectare.

Table (2): Results of examining the dependence of the amount of profit per hectare on the size of the field with a regression model

	Number of observations	Indicators of the regression coefficient			F statistic	
		quantity	t -statistic	p-value	coefficient	Significance
Cereal-rainfed	279	0.003316	5.840041	1.47E-08	34.10608	1.47E-08
Grain-irrigated	274	-10.11	-0.59777	0.550488*	0.357334	0.550488*
Cotton	194	-15.6431	-2.03507	0.043218	4.141509	0.043218
Hazelnuts rainfed	87	192.6661	1.442324	0.152886*	2.0803	0.152886*
Hazelnuts-irrigated	95	-221.685	-1.44027	0.15315*	2.074366	0.15315*

*non-significant

Source: Authors calculations based on FDMS data

Thus, the research shows no positive effect on the increase in the profitability of production with the expansion of planted areas. Considering the results of this analysis, given current conditions, it does not seem appropriate to make decisions on applying restrictions on the division of agricultural land plots based on efficiency criteria, including both productivity and profitability.

Evaluation based on reference income criteria

The size of the agricultural land areas is subject to restrictions with the goal of maintaining the viability of individual farms, which was based on data from 2021 and the two options considered above.

Calculations for the average salary criterion were made using the formula (2). The nominal average monthly salary for agriculture, forestry and fishing from the official statistics classification of economic activities, after deducting the relevant taxes, was used. The Family Labor Coefficient was set at 1.25. The amount of the subsidy given for the targeted crop on one hectare of cultivated area was supplied by data from the Ministry of Agriculture. The share of the crop production in total agricultural output was determined by the data of the State Statistical Committee of Azerbaijan (SSC) administrative regions; the amount of income and expenses for the areas of irrigated, rain-fed and perennial crops was determined according to the data of FDMS. The results are presented in the Table (3).

Source: Authors calculations based on FDMS data

The data given represent the sizes of irrigated, dry lands and perennial planting areas, for which subdivision is restricted to ensure the farms' viability in the relevant administrative districts. The national average indicator was 3.5 ha for irrigated land, 5.3 ha for dry land, and 1.2 ha for perennial crops.

Table (3): The minimum size of the land area suitable for ensuring the viability of the farm in the administrative regions of Azerbaijan, according to the average wage criterion and the minimum need criterion, hectars

Regions	Irrigated lands		Non irrigated land		Orchards	
	according to the average wage criterion	according to the minimum need criterion	according average wage criterion	accorting the minimum need criterion	accorting average wage criterion	accorting the minimum need criterion
Aghjabadi	1.7	2.3	-	-	-	-
Agdam	2.7	3.5	-	-	-	-
Agdash	2.5	3.3	-	-	0.5	0.6
Agstafa	3.3	4.3	4.3	5.7	0.6	0.7
Agsu	5.2	6.9	4.5	6.0	0.5	0.6
Astara	0.6	0.8	-	-	0.3	0.4
Balakan	-	-	3.0	4.0	1.8	2.2
Barda	1.9	2.4	-	-	-	-
Beylagan	2.7	3.5	-	-	-	-
Bilasuvar	4.3	5.7	9.2	-	-	-
Jalilabad	0.9	1.2	8.0	10.6	1.7	2.0
Fuzuli	4.6	6.0	5.7	7.5	-	-
Gadabay	-	-	3.1	4.1	-	-
Goranboy	4.3	5.7	9.3	-	4.2	5.0
Goychay	5.8	7.6	5.0	6.6	0.7	0.9
Goygol	6.1	8.1	5.9	7.7	-	-
Hacıgabul	4.8	6.3	-	-	-	-
Imishli	2.2	2.9	-	-	0.4	0.5
Ismayıllı	9.8	-	6.6	8.7	2.1	2.5
Kurdemir	5.8	7.6	-	-	1.1	1.3
Lankaran	4.6	6.1	3.2	4.2	-	-
Lerik	-	-	3.4	4.5	-	-
Masallı	0.5	0.6	3.1	4.1	1.0	1.2
Neftchala	3.7	4.9	5.0	6.6	-	-
Oghuz	1.1	-	6.6	8.7	1.7	2.1
Gakh	5.4	7.2	6.5	8.6	1.5	1.8
Gazakh	3.2	4.3	5.2	6.8	0.4	0.5
Gabala	2.8	3.7	3.0	4.0	0.7	0.8
Gobustan	2.8	3.6	2.6	3.5	-	-
Guba	4.4	5.8	11.7	15.4	0.7	0.9
Gusar	6.4	8.5	7.6	10.1	1.6	1.9
Saatlı	3.6	4.7	-	-	-	-
Sabirabad	2.3	3.1	-	-	-	-
Shabran	2.8	3.4	2.8	3.3	0.6	0.7
Salyan	2.6	3.4		-	1.2	1.4
Shamakhı	-	-	5.8	7.7	-	-
Samukh	2.3	3.1		-	3.3	4.0
Shaki	4.6	6.1	5.5	7.3	0.6	0.7
Shamkir	3.9	5.1	5.2	6.9	1.0	1.2
Terter	3.8	5.1	-	-	-	-
Tovuz	2.7	3.6	-	-	0.9	1.1
Ucar	3.0	3.9	-	-	-	-
Khachmaz	7.2	9.6	-	-	0.6	0.8
Khızı	6.5	7.8	6.7	8.0	-	-
Yardımlı	-	-	2.3	3.0	-	-
Yevlakh	1.9	2.6	-	-	-	-
Zagatala	2.4	3.1	2.6	3.5	1.2	1.5
Zardab	2.7	3.6	-	-	-	-
Average	3.5	4.6	5.3	6.4	1.2	1.4

For all three indicators, there are significant differences in levels of profitability by administrative regions. Indicators for perennial crops show an even wider range of difference. This is explained by the different composition and yield of fruits and berries grown in the natural environmental zones where the economic regions are located.

Using the criterion of meeting minimum need, the sizes of the plots of land suitable for ensuring the viability of the farms were calculated based on the data from 2021 with the formula (4). Taking the amount assigned as the living minimum, we subtract the monthly average pension per person in rural areas for the corresponding year from the indicator approved by law for that year. SSC (2023c) data for the structure of household incomes were used as the source of the last indicator. Information from the SSC (2023c) was accepted as the average size of households in rural areas. According to the minimum need criterion (LLNC, 2023), a slightly higher plot size was needed to produce a price that would ensure the viability of the farm. This can be explained primarily by the fact that Azerbaijan's minimum monthly wage, which is approved by legislation, is slightly lower than the average monthly amount of wages in agriculture. At the same time, the calculations for both criteria show that there are significant differences among the indicators of individual administrative regions according to specific conditions. In all cases, there are wide differences between the areas of irrigated, dry land and perennial crops in terms of ensuring the viability of the farm.

It should be noted that it was impossible to fully calculate the relevant indicators for irrigated and semi-arid lands, as well as perennial planting areas, for all administrative regions, based on the research we conducted concerning the selection of farms based on the FDMS surveys. Therefore, it will be necessary to organize additional inquiries to obtain the necessary information.

CONCLUSIONS

Currently, restrictions on the size of land plots that may be subdivided exist in a number of countries. This is important from the point of view of increasing interest in improving agricultural practice, the formation of farms with viable development potential, and the provision of sustainable activities. In determining the size of the agricultural land plots for which restrictions are applied, it is appropriate to refer to the target indicators using as a basis the methodological approaches developed, while taking into account the stated regulatory goals. The results of empirical studies using relevant statistical and survey data, show that, given current conditions in Azerbaijan, it is not possible to confirm the existence of a direct and effective dependence between the sizes of cultivated and garden areas for major types of products and the efficiency indicators for the relevant areas. According to the econometric analysis, enlarging agricultural and garden areas on farms does not have a noticeable effect on increasing agricultural productivity or increasing the net income (profit) obtained from each hectare of land. Thus, the application of measures to limit the size of land plots in agriculture by referring to the efficiency factor should be approached with caution. Where restrictions are applied in adjusting the size of agricultural areas, the income-area ratio for the reference income base that is used in assessing the viability of the farm provides targets. At the same time, to account for the differences in levels

of profitability of the farms, it is necessary to differentiate the above-mentioned area sizes by administrative regions for irrigated, dry land and perennial crops. In this case, the quantities of irrigated, dry lands and garden areas in accordance with the provision of farm viability in Azerbaijan by administrative regions can be taken as the basis shown in Table (3) (in accordance with the selection of the appropriate option). The indicators in the mentioned tables can be used to determine the minimum size for the land plots divided by inheritance, as well as the minimum sizes for the land plots to be allocated to farmers from the state fund for the production of agricultural products. It is advisable take into account approach to determination of the size of the lands subject to restrictions on the division based on the criterion of ensuring the viability of farms and the differential approach by the administrative regions, as well as by irrigated and rainfed lands areas when improving of the legislation in the field of land management in Azerbaijan. A quick note: in determining productivity, other factors enter into evaluating agricultural properties, such as climate area (average rainfall, for example), type of soil, amount of fertilizer used, type of fertilizer, and other inputs at the discretion of the producer.

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CONFLICT OF INTEREST

The authors state that there are no conflicts of interest with the publication of this work, and all the authors listed have approved the manuscript that is enclosed.

تحليل التدابير المناسبة للحد من تجزئة الأراضي الزراعية : نموذج أذربيجان

فردوفيسي فكرتزاد [1]، حمزة خليلوف [2]، راميل حسين [3]
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الخلاصة

إن تطبيق القيود على تقسيم قطع الأراضي في الزراعة يمكن أن يكون له تأثير إيجابي على منع التجزئة وضمان الاستخدام الفعال للأراضي. وفي هذا الاتجاه، ومن حيث ضمان فعالية التنظيم، فمن المثير للاهتمام تحديد المؤشرات المبررة بشكل مناسب والتي يمكن اعتبارها أهدافا في تقييم أبعاد المجالات التي يقتصر تقسيمها في التشريع. يتناول المقال مسألة تحديد حجم قطع الأراضي التي تخضع مساحتها لقيود، بناءً على معايير ضمان كفاءة المزرعة وقدرتها على الاستمرار وفقًا للهدف المحدد في تنظيمها. يتم استخدام منهج تقييم أحجام المناطق المذكورة بناءً على الحد الأدنى لمستوى مؤشر الدخل المرجعي المقبول لتحديد جدوى المزرعة. وفي هذا الاتجاه، يتم إعطاء صيغ لحساب حجم مساحات الأراضي، والتي يمكن قسمتها على نسبة الدخل إلى المساحة، بافتراض متوسط مستوى الأجور في القطاع الزراعي ومقدار الدخل اللازم لتلبية الحد الأدنى من الاحتياجات على أساس الدخل المرجعي، والذي يمكن تقسيمه بقبول المبلغ الذي تحدده التشريعات الوطنية.

وباستخدام هذه الصيغ، يتم حساب مؤشرات الأهداف ذات الصلة والمتباينة حسب المناطق وتقديم اقتراحات لتطبيقها.

الكلمات المفتاحية: تجزئة الأراضي، الحد من تقسيم الأراضي، الحد الأدنى لحجم قطع الأراضي، صلاحية المزرعة، الدخل المرجعي.

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