REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

ASSESSMENT OF THE LEVEL OF LIBERALISM–DIRIGISME IN THE AGRICULTURAL SECTOR OF THE REPUBLIC OF AZERBAIJAN

Speciality: 5312.01 – "Field economy"

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GENERAL CHARACTERISTICS OF THE RESEARCH

Relevance of the topic and extent of previous research. Effective state regulation of the economy as a whole and its subsectors is an important condition for ensuring development and social welfare. The agricultural sector is one of the key areas in which state regulation has strategic importance. In contemporary literature and the classifications of international organisations, the term "agricultural sector" is interpreted in both a narrow and a broad sense. In the narrow sense, it covers crop production, livestock farming, forestry, fishing and activities serving these industries. In the broad sense, it also includes agro-processing.

The United Nations International Standard Industrial Classification of All Economic Activities (ISIC), the explanations provided by the World Bank and the Food and Agriculture Organization (FAO), and those of the State Statistical Committee of Azerbaijan (SSC) adopt the narrow interpretation of the agricultural sector. This study uses that interpretation, and its analyses and assessments are based on this approach.[1][2][3][4]

In recent years, population growth, military conflicts, refugees, climate change and threats to food supply have further increased the importance of regulating the agricultural sector. Food supply is strategically important for every country. These factors make active, supportive state intervention in agriculture particularly relevant.

Recognising the socioeconomic importance of agriculture, the Azerbaijani state supports the sector's development and production through various instruments, including tax concessions and subsidies. Several programmes and strategies adopted in recent years provide for agricultural development measures: the Strategic Road Maps, the Azerbaijan 2030 National Priorities, the Socioeconomic Development

[1] European Commission, Directorate-General for Communication. Agriculture: A Partnership Between Europe and Farmers. Publications Office of the European Union, 2017.
[2] World Bank. Agriculture and Food Overview. https://ida.worldbank.org/en/ topics/ results/agriculture
[3] FAO Action Plan 2022–2025 for the Implementation of the FAO Strategy on Climate Change. Rome: FAO, 2023. https://doi.org/10.4060/cc7014en
[4] State Statistical Committee of the Republic of Azerbaijan.https://www.stat.gov.az/source/agriculture/az/agriculture.doc

Strategy for 2022–2026, and the State Programme on the Production and Processing of Agricultural, Fisheries and Aquaculture Products for 2026–2030. Although these measures contribute to agricultural development and greater self-sufficiency, problems concerning infrastructure, technical and technological provision, and productivity remain relevant. Such problems often weaken the impact of state support. Improving the effectiveness of agricultural support and comparatively assessing its relationship with economic and noneconomic factors require quantitative measurement of the depth of state intervention in terms of liberalism–dirigisme.

International experience and statistical measurements show that the central issue in state intervention in agriculture, including support and incentive measures, is the extent to which objectives are achieved rather than the depth of intervention itself. Measuring the level of liberalism–dirigisme in intervention can help assess the outcomes of state support and enable better agricultural policy decisions. In this respect, the dissertation topic is considered relevant.

As is well known, the state regulation of the economy and its sectors has been discussed in economics for many years. Among Azerbaijani scholars, A.F. Musayev, A.N. Muradov, A.Kh. Nuriyev, F.F. Mustafayev, H.P. Allahverdiyev, I.H. Aliyev, K.S. Gafarov, L.A. Allahverdiyeva, N. Muzaffarli (Imanov), R.S. Abdullayeva, Sh.M. Muradov, T.H. Huseynov, Z.A. Samadzade and many others have examined state regulation of the economy and its subsectors. A.H. Valiyev, B.Kh. Atashov, E.R. Ibrahimov, E.A. Guliyev, F.F. Babayev, F.F. Fikratzade, F.V. Guliyev, F.V. Rustamov, M.M. Huseynov, N.J. Gafarov, R.A. Balayev, R.Z. Huseyn, R.K. Isgandarov, R.M. Rustamov, R.P. Sultanova, S.V. Salahov, Sh.N. Yusifzade, V.M. Abbasova, V.I. Ismayilov, V.A. Gasimli, Y.M. Sadigov and others have conducted theoretically and practically significant research on agricultural regulation.

Foreign researchers, including A. Smith, J. Keynes, E. Alimkulova, F. Quesnay, G. Alons, G. Meijerink, H. Ritchie, K. Marx, L. Cui, P. Feindt, Q. He, R.S. Miller, R. Vos, S. Singh, T. Bhandari, V. Kenton and Y. Zhang, have advanced significant theoretical propositions concerning regulation of the economy and the

agricultural sector. Without diminishing the theoretical and practical importance of this research, it may be noted that these studies did not quantitatively measure the level of state intervention in the economy and agriculture. Professor N. Muzaffarli has measured the level of state intervention in the economy. This study applies the same approach to measuring the level of liberalism–dirigisme in state intervention in the agricultural sector and conducts comparative analyses.

The object of the research is the process of state regulation of the agricultural sector in the Republic of Azerbaijan.

The subject of the research comprises the theoretical, methodological and practical issues of direct and indirect state intervention in agriculture and the associated economic phenomena and relations.

Aim and objectives of the research. The research aims to measure the level of liberalism–dirigisme in state intervention in agriculture, assess the current situation, identify discrepancies between intervention and outcomes, and develop proposals and recommendations to improve the effectiveness of intervention.

The following objectives have been established in accordance with this aim:

– to systematise the theoretical foundations of the strengths and weaknesses of liberal and dirigiste regulation and clarify the concepts of state intervention and state support;

– to examine the theoretical aspects of the factors necessitating state intervention in agriculture and study the experience of leading countries;

– to assess institutional transformation in Azerbaijan's agricultural sector during independence and the outcomes of reforms;

– to measure the level of liberalism–dirigisme in state intervention in agriculture, conduct cross-country comparisons and assess its relationships with selected macroeconomic and sectoral indicators;

– to determine the volume of direct and indirect state support for agriculture in Azerbaijan;

– to assess the relationship between state intervention in agriculture, food security and self-sufficiency;

– to develop scientifically substantiated proposals and recommendations for improving regulation and support mechanisms.

Research methods. The study employs analysis and synthesis, induction and deduction, comparative and systems analysis, statistical and correlation analysis, and generalisation. Normalisation is applied to make indicators expressed in different units of measurement comparable.

Main propositions submitted for defence.

- State regulation is a broad system that purposefully influences economic processes through legal, administrative, economic and institutional instruments. Within this system, state intervention has both restrictive and supportive characteristics.
- The natural, climatic and seasonal characteristics of agriculture, production and logistics risks, its role in food security and its impact on the welfare of rural populations necessitate supportive state intervention in this sector.
- Agricultural reforms in Azerbaijan have produced a liberal-oriented mixed model characterised by state, municipal and private land ownership, the predominance of the non-state sector among enterprises, and tax concessions.
- According to the ASLDI results, the level of state intervention in Azerbaijan's agricultural sector has shifted from an intermediate mixed model towards a partially liberal model, in line with the global trend towards liberalisation.
- ASLDI has a weak statistical relationship with agricultural production, a moderately positive relationship with the producer price index for agricultural products, and strong negative relationships with agricultural employment and investment in fixed capital. The weak relationship with agricultural production is attributable to infrastructure, technical and technological provision, and other factors.
- Approximate calculations indicate that tax concessions account for the largest share of state support per manat of gross agricultural output.
- There is a weak negative relationship between the level of liberalism–dirigisme in agriculture and food security. In other

words, increased intervention strengthens the tendency towards improved food security.

Scientific novelty of the research. The scientific novelty of the research consists of the following:

– Liberal and dirigiste models of state regulation and the factors necessitating state intervention have been systematised. Intervention instruments have been classified by the direction of their effects as restrictive (taxes and duties) and supportive (government expenditure and tax concessions), and their mechanisms of influence on economic processes have been substantiated.

– The natural, climatic, economic and social factors necessitating intervention in agriculture, together with their interrelationships, have been systematised, and the dependence of the intervention level on countries' socioeconomic conditions has been substantiated.

– Institutional transformation in Azerbaijan's agricultural sector has been assessed with regard to the predominance of the non-state sector among enterprises, the coexistence of state, municipal and private ownership of agricultural land, and tax concessions and subsidies. The current regulatory system has been substantiated as a liberal-oriented mixed model.

– For the first time, the Agricultural Sector Liberalism–Dirigisme Index (ASLDI) and the Agricultural State Support Liberalism–Dirigisme Index (ASSLDI) have been calculated using two methodologies. Countries have been grouped by the degree of intervention, and a linguistic classification has been established on a scale from 0 to 1. Azerbaijan's transition from an intermediate mixed model to a partially liberal model during the period analysed has been empirically substantiated.

– Relationships between ASLDI and agricultural production, the producer price index, employment and investment have been assessed, and differences in their direction and strength have been identified.

– The approximate volumes of direct budgetary support and indirect support through tax concessions for agriculture have been calculated. Total support has been found to amount to 22.9–26.8

gapiks per manat of gross output, with the largest component (15.8 gapiks) coming from tax concessions.

– A strong positive relationship between ASLDI and the Global Food Security Index has been identified for Azerbaijan. Differences in self-sufficiency across product groups have substantiated that food security cannot be explained solely by the scale of intervention.

Theoretical and practical significance of the research. The findings and proposals may be used to assess state regulation of the agricultural sector, particularly farming, in quantitative and qualitative terms, improve state programmes and increase the effectiveness of support.

Presentation and application of the research findings. Research on the topic has been presented at conferences held in Azerbaijan, Hungary, Türkiye, Italy, Spain, France and Uzbekistan. Presentations were delivered at the national scientific and practical conference on the Current State and Development Prospects of Cooperation in Agriculture, held in Ganja on 10 March 2020; the international scientific and practical conference on Problems of the Impact of the Pandemic on the Socioeconomic Development of the Countries of the World, held in Baku on 31 May 2021; the Third International Congress on Humanities, held in Izmir on 4–6 November 2022; the Fifth International Scientific Conference of Researchers in Economics and Management, held in Baku on 22–25 June 2023; the Third International Silk Road Congress on Scientific Research, held in Uzbekistan on 6–8 March 2024; and the international conference Agricultural Sciences and Economics (ICASE-2024), held in Hungary on 29–30 July 2024.

Sixteen articles and conference papers have been published on the dissertation topic. Eight appeared in foreign journals, including two indexed in SCOPUS.

The dissertation was prepared at the Agricultural Research Center of the Republic of Azerbaijan.

Dissertation length. The dissertation comprises an introduction, three chapters, nine subsections, conclusions, a list of references and appendices. The total volume is 212198 characters. The introduction contains 12116 characters, the first chapter 6425, the second chapter

79257, the third chapter 47473, and the conclusions and proposals 11020. It includes 3 figures, 26 charts, 22 main tables and 7 supplementary tables. The list of references contains 171 sources in Azerbaijani, Turkish, Russian and English.

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MAIN CONTENT OF THE RESEARCH

The introduction substantiates the relevance of the topic and the extent of previous research, defines the object and subject, aim and objectives, methods used and main propositions submitted for defence, and presents information on the scientific novelty, theoretical and practical significance, presentation and application of the findings, the institution where the work was undertaken, and the structure and total volume of the dissertation.

Chapter One, entitled "Theoretical and Methodological Foundations of State Regulation of the Agricultural Sector", examines the conceptual foundations of liberal and dirigiste approaches to state regulation of the economy; clarifies the concepts of state intervention, state regulation and state support; provides a theoretical account of the strengths and weaknesses of liberal and dirigiste economies; examines the factors necessitating state intervention in agriculture and their effects on increasing intervention; and studies the experience of leading countries in state regulation of agriculture. The following propositions and novel findings are advanced on the basis of this theoretical research.

Proposition 1: *State regulation is a broad system that purposefully influences economic processes through legal, administrative, economic and institutional instruments. Within this system, state intervention has both restrictive and supportive characteristics.*

Scientific novelty 1: *Liberal and dirigiste models of state regulation and the factors necessitating state intervention have been systematised. Intervention instruments have been classified by the direction of their effects as restrictive (taxes and duties) and supportive (government expenditure and tax concessions), and their mechanisms of influence on economic processes have been substantiated.*

Rationale: State regulation is a broad concept denoting purposeful influence on economic processes through legal, administrative, economic and institutional instruments. Liberal and dirigiste approaches explain the scope and limits of state intervention in the economy. The liberal approach prioritises private property,

competition, economic freedom and the market's capacity for self-regulation. Nevertheless, it is argued that market mechanisms are sometimes unable to resolve socioeconomic problems. The dirigiste approach advocates an active role for the state in addressing market failures, crises, inequality and employment problems, and in fulfilling social obligations.

The effectiveness of state regulation depends on more than the scale of intervention: regulatory objectives, the instruments selected and the mechanisms of their implementation are particularly important.

States use taxes, duties, licensing, quotas and mandatory standards to impose restrictions on economic agents, while government expenditure, subsidies, grants and tax concessions stimulate economic activity. However, untargeted support may adversely affect competition and resource allocation, while an excessive tax burden may weaken production and investment incentives. Balanced direct and indirect intervention is therefore considered more effective.

Administrative requirements and restrictions operate as direct instruments, whereas economic incentives such as subsidies, concessional loans, leasing, insurance and investment incentives operate as indirect instruments.

Proposition 2: *The natural, climatic and seasonal characteristics of agriculture, production and logistics risks, its role in food security and its impact on the welfare of rural populations necessitate supportive state intervention in this sector.*

Scientific novelty 2: *The natural, climatic, economic and social factors necessitating intervention in agriculture, together with their interrelationships, have been systematised, and the dependence of the intervention level on countries' socioeconomic conditions has been substantiated.*

Rationale: Agriculture remains the principal source of employment and income for a substantial share of the population, particularly in developing and low-income countries. In these countries, farming is considered a key pillar of food supply, social stability and poverty reduction. Although agriculture is no longer regarded as a leading economic pillar in many countries, it retains its strategic importance for food security, employment, regional

development and social stability. States therefore continue to employ various instruments to support the sector, including subsidies, incentives for technological modernisation, innovation programmes, market regulation mechanisms and institutional reforms.

International experience shows that a universal model of intervention and support for agriculture is not effective. The effectiveness of intervention may vary with the level of development, geographical location, natural and climatic conditions, institutional performance, the environment and other social priorities.

Proposition 3: *Agricultural reforms in Azerbaijan have produced a liberal-oriented mixed model characterised by state, municipal and private land ownership, the predominance of the non-state sector among enterprises, and tax concessions.*

Scientific novelty 3: *Institutional transformation in Azerbaijan's agricultural sector has been assessed with regard to the predominance of the non-state sector among enterprises, the coexistence of state, municipal and private ownership of agricultural land, and tax concessions and subsidies. The current regulatory system has been substantiated as a liberal-oriented mixed model.*

Rationale: In the early years of independence, agriculture was characterised by crisis, declining production, uncertainty in management and the breakdown of economic linkages. Reforms aimed to restore economic efficiency, reduce social tensions in rural areas, and preserve employment and continuity of production.

Agricultural reforms abolished the collective and state farm system and restructured land and farming relations, creating an agricultural structure based on private ownership and individual farming. Between 1995 and 2001, 838.2 thousand families received land ownership certificates. According to SSC data, in 2024, 41.2% of agricultural land was state-owned, 23.8% municipally owned and 34.9% privately owned. This distribution shows the substantial shares of state and municipal land alongside private property. State ownership is also overwhelmingly predominant in forestry and fishing. Forests are entirely state-owned. Products cultivated in fisheries and aquaculture may, however, be privately owned.

Agricultural reforms increased the share of private enterprises in the total number of agricultural enterprises. This indicator was 5.3% in 1993, 12.6% in 1995, 58.5% in 1997 and 84.4% in 1999. Between 2000 and 2024, it increased from 86% to 91% (Chart 1).

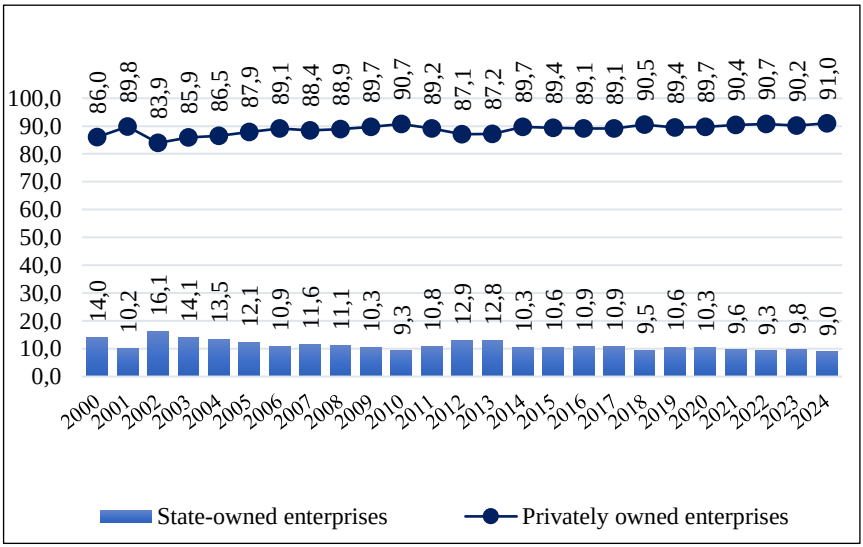


Chart 1. Shares of state-owned and privately owned enterprises in the total number of agricultural enterprises, %

Note. Prepared by the author using SSC data.

Between 2000 and 2024, the number of individual entrepreneurial farms operating without forming a legal entity fell by 77.3%, from 3248 to 736. This decline may reflect the cessation of individual entrepreneurs' activities, changes in legal status and updates to the statistical recording framework.

The non-state sector accounted for 61.5% of GDP generated in agriculture in 1995 and 99.8% in 2024 (Chart 2). It should also be noted that, between 1998 and 2025, farming accounted for 95–99% of GDP generated in the agricultural sector, while forestry and fishing accounted for 1–4%.

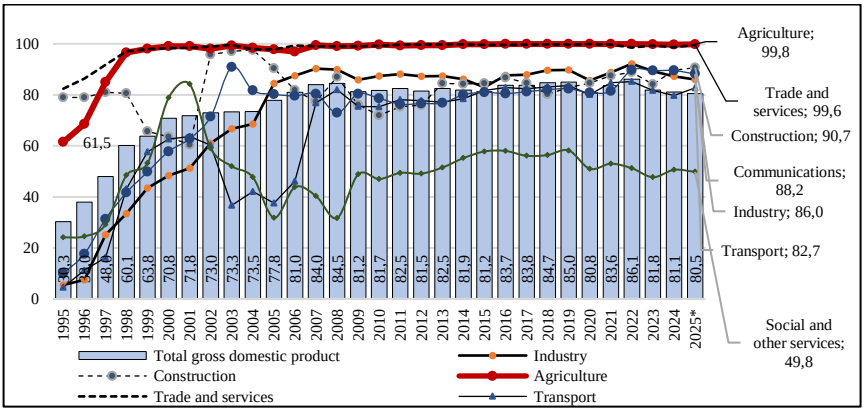


Chart 2. Share of the non-state sector in national and agricultural GDP, at current prices for the respective years, %
Note. Prepared by the author using SSC data.

Alongside liberal-oriented reforms, the state retained its regulatory role through subsidies, tax and customs concessions, concessional loans, technical and technological support, strategies and programmes. Azerbaijan's agricultural sector may therefore be assessed as a mixed model combining private ownership and entrepreneurship.

Proposition 4: *According to the ASLDI results, the level of state intervention in Azerbaijan's agricultural sector has shifted from an intermediate mixed model towards a partially liberal model, in line with the global trend towards liberalisation.*

Scientific novelty 4: *For the first time, the Agricultural Sector Liberalism–Dirigisme Index (ASLDI) and the Agricultural State Support Liberalism–Dirigisme Index (ASSLDI) have been calculated using two methodologies. Countries have been grouped by the degree of intervention, and a linguistic classification has been established on a scale from 0 to 1. Azerbaijan's transition from an intermediate mixed model to a partially liberal model during the period analysed has been empirically substantiated.*

Rationale: The study measures the level of state intervention in agriculture using two indices: the Agricultural State Support Liberalism–Dirigisme Index (ASSLDI) and the Agricultural Sector Liberalism–Dirigisme Index (ASLDI).

ASSLDI has been calculated using the OECD Agricultural Policy Monitoring and Evaluation database. The assessment is based on the share of the Total Support Estimate (TSE) for agriculture in GDP. Calculations cover 28 countries and the EU. TSE is a composite indicator calculated as the annual monetary value of total transfers to the agricultural sector resulting from policies supporting agriculture. Of its 31 indicators, 21 cover support to producers, 3 support to consumers and 7 support to general services.

ASLDI has been calculated for 148 countries using two sub-indices: the Direct State Support Sub-index (DSSSI) and the Indirect State Support Sub-index (ISSSI). DSSSI is based on the share of government agricultural expenditure in total budget expenditure, while ISSSI is based on a scoring assessment of tax and customs concessions granted to agricultural producers.

DSSSI data were obtained from the corporate statistical database of the United Nations Food and Agriculture Organization. Since there is no unified international database for ISSSI, reports by ERNST & YOUNG, the WTO and the IMF, and European Commission tax information were used. Concessions were assessed on a five-point scale. Reverse normalisation was applied when calculating ISSSI.

Table 1.

Measurement of tax and customs duty concessions on a five-point scale

Score	Assessment criteria
1	No special tax or customs duty concessions apply to the agricultural sector.
2	Limited concessions apply to particular taxes, products or groups of farms.
3	Exemption from one or more specific taxes applies.
4	Extensive concessions and exemptions apply to all or virtually all domestic taxes.
5	Extensive concessions and exemptions apply jointly to domestic taxes and customs duties.

Note: A score of 1 denotes dirigiste intervention, and 5 liberal intervention. Artificial intelligence was used to assist in determining the scores.

Indicators for both indices were calculated using the standard normalisation formula:

$$I_n = (V_i - V_{min}) / (V_{max} - V_{min}) \quad (1)$$

Unlike standard normalisation, symmetric and asymmetric extensions were calculated by applying coefficients to the difference between the maximum and minimum values, using the following formulas:

$$R = X_{max} - X_{min} \quad (2)$$
$$L = X_{min} - \alpha R \quad (3)$$
$$U = X_{max} + \beta R \quad (4)$$

Here, R is the difference between the observed maximum and minimum, U and L are the extended upper and lower bounds, and α and β are the extension coefficients. The bounds were determined using the maximum and minimum values for the entire period rather than for individual years. This enables comparison of long-term changes. Under the symmetric method, α and β were set at 0.1; under the asymmetric method, the coefficient was 0 for the minimum and 0.1 for the maximum. At the final stage, the index was calculated using the following formula:

$$I_n = (V_i - L) / (U - L) \quad (5)$$

I_n denotes the normalised indicator, and V_i the observed value of the variable. Indicators were converted to the 0–1 interval. Here, [0] is the theoretical liberal pole, [1] the dirigiste pole, and [0.5] the theoretical midpoint.

Symmetric extension was applied to ASSLDI, while both symmetric and asymmetric extensions were applied to ASLDI. The sub-indices were weighted with regard to the socioeconomic effects of intervention. A weight of 0.40 was assigned to the direct state support sub-index and 0.60 to the indirect state support sub-index reflecting tax and customs concessions. ASLDI was calculated as follows:

$$ASLDI_{it} = 0.40 \times DSS_{it} + 0.60 \times ISS_{it}$$

The linguistic classification for both indices was constructed by dividing the theoretical 0–1 interval into five equal parts.

Table 2.

Common theoretical linguistic intervals for ASSLDI and ASLDI

Interval	Group	Economic interpretation
0,000 ≤ I < 0,200	Liberal	State intervention is very low.
0,201 ≤ I < 0,400	Partially liberal	Market mechanisms predominate; state intervention is low.
0,401 ≤ I < 0,600	Intermediate mixed	Market and state mechanisms operate in parallel.
0,601 ≤ I < 0,800	Partially dirigiste	State intervention and support are high.
0,801 ≤ I ≤ 1,000	Dirigiste	State intervention and support are very high.

Note: Prepared by the author.

Results for ASSLDI: No countries fall into the liberal or partially liberal groups under this index. In 2000, 78.6% of countries were partially dirigiste, 10.7% dirigiste and 10.7% mixed. In 2024, the share of partially dirigiste countries fell to 67.9%, the mixed group increased to 32.1%, and no countries were recorded in the dirigiste group.

Between 2000 and 2024, 9 countries moved to a more liberal group, 19 remained in the same group, and none moved to a more dirigiste group. The index decreased in 24 countries and increased in 4. Although this indicates a relative weakening of intervention, it confirms the continuation of high state support. The overall trend nevertheless points towards liberalisation (Chart 3). The largest decrease was recorded in Türkiye.

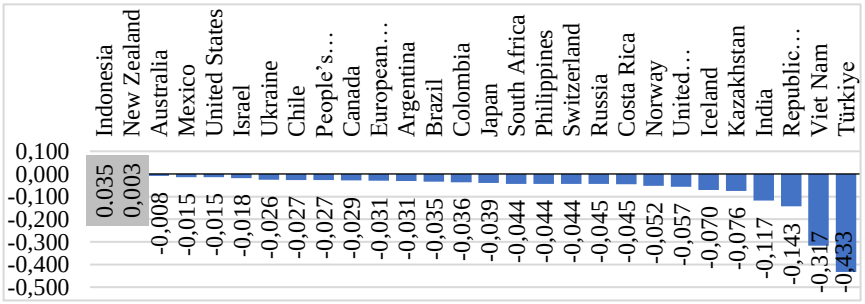


Chart 3. Change in index values in 2024 compared with 2000, index points

Note: Calculated and prepared by the author using OECD data.

The decrease in the mean ASSLDI value from 0.671 to 0.620 between 2000 and 2024 indicates a relative liberalisation of state intervention in agriculture.

Results for ASLDI: The arithmetic mean of ASLDI across 148 countries was 0.412 in 2001 and 0.364 in 2024. The decline of 0.048 index points over this period indicates a shift towards liberalisation (Table 3).

Table 3.

Levels of liberalism–dirigisme in selected countries according to ASLDI

	2024		2001	
	Rank	Index value	Rank	Index value
Central African Republic	1	0,685	58	0,443
Tanzania	2	0,581	34	0,495
India	3	0,567	8	0,649
Algeria	4	0,559	25	0,539
Myanmar	5	0,555	1	0,711
Theoretical midpoint		**0,500**		**0,500**
Türkiye	16	0,498	88	0,373
Kyrgyzstan	29	0,443	19	0,578
China	35	0,429	48	0,458
Kazakhstan	44	0,405	28	0,527
Relative mean		**0,397**		**0,444**
Turkmenistan	47	0,392	100	0,348
Romania	49	0,388	83	0,388
Poland	62	0,373	125	0,280
Finland	63	0,372	81	0,388
Arithmetic mean		**0,364**		**0,412**
Russia	73	0,360	47	0,460
Slovenia	78	0,351	144	0,202
Croatia	80	0,347	76	0,405
Lithuania	90	0,336	92	0,360
Slovakia	96	0,332	111	0,338
Tajikistan	98	0,330	123	0,281
Estonia	100	0,326	148	0,178
Moldova	104	0,325	103	0,346
Azerbaijan	**122**	**0,293**	35	0,490
Czechia	123	0,284	147	0,183
Georgia	125	0,274	96	0,352
DR Congo	145	0,158	75	0,415
Norway	146	0,143	145	0,198
Ghana	147	0,122	135	0,229
Puerto Rico	148	0,110	134	0,230

Note. Prepared by the author.

Of the 148 countries assessed using ASLDI, 133 were on the liberal side of the theoretical midpoint and 15 on the dirigiste side.

Changes across groups show the shift towards liberalism more clearly. In 2001, 45.3% of countries were partially liberal, 41.2%

mixed, 10.8% partially dirigiste and 2.7% liberal. By 2024, the share of the partially liberal group had risen to 66.2% and that of the liberal group to 4.1%, while the mixed group had declined to 29.1% and the partially dirigiste group to 0.7%. There were no countries in the dirigiste group (Table 4). Here, too, the overall trend is towards liberalisation.

Table 4.
Distribution of countries across theoretical groups according to ASLDI

Group	2001		2010		2020		2024	
	No.	%	No.	%	No.	%	No.	%
Liberal	4	2,7	9	6,1	8	5,4	6	4,1
Partially liberal	67	45,3	77	52,0	92	62,2	98	66,2
Intermediate mixed	61	41,2	57	38,5	47	31,8	43	29,1
Partially dirigiste	16	10,8	5	3,4	1	0,7	1	0,7
Dirigiste	0	0,0	0	0,0	0	0,0	0	0,0

Source: Author's calculations based on ASLDI indicators for 148 countries.

As the chart shows, state intervention in agriculture generally shifted towards liberalism between 2001 and 2024 (Chart 4).

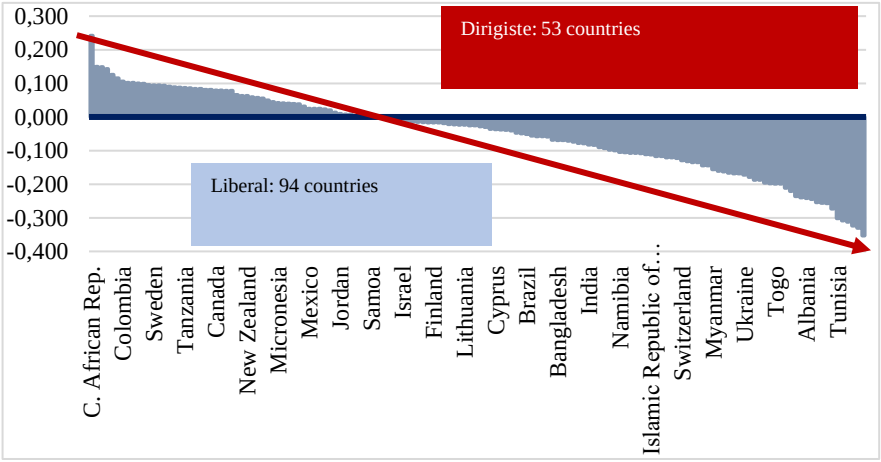


Chart 4. Changes in ASLDI towards liberalism and dirigisme, 2001–2024

The dynamics of Azerbaijan's ASLDI are characterised by three distinct stages. In 2001 and 2005, the index was 0.490 and 0.489, respectively, placing the country in the intermediate mixed group; it remained stable during that period.

Azerbaijan. In 2024, Azerbaijan's ASLDI was 0.293, which was 0.207 index points below the theoretical midpoint, 0.104 below the relative mean and 0.071 below the arithmetic mean for 148 countries. The country occupies a partially liberal position.

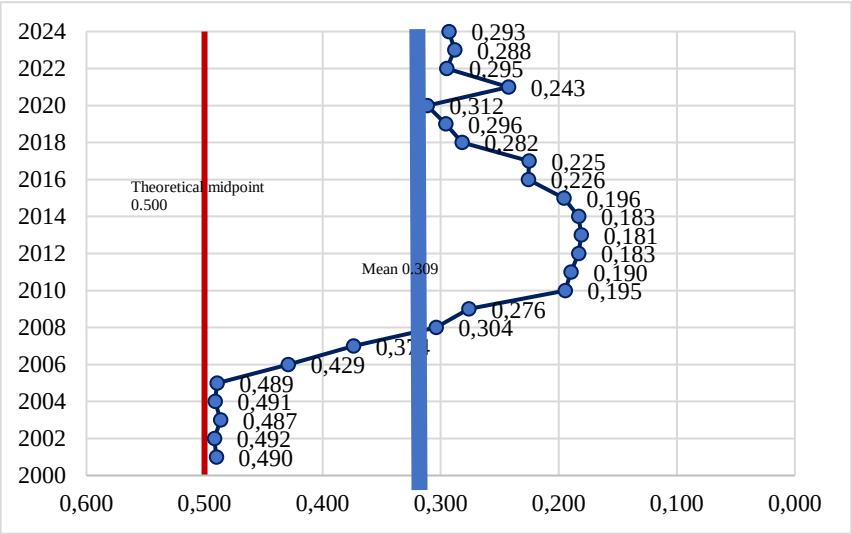


Chart 5. Dynamics of ASLDI in Azerbaijan, 2001–2024
Note: The theoretical midpoint is fixed at 0.500. The simple arithmetic mean of Azerbaijan's annual ASLDI values for 2001–2024 is 0.309.

Azerbaijan's ASLDI trajectory is characterised by stages rather than a linear trend. In 2001–2005, the index ranged from 0.487 to 0.492, close to the theoretical midpoint of 0.500. It then declined rapidly to 0.195 in 2010 and reached its minimum of 0.181 in 2013. Rising from 2014, it reached 0.312 in 2020, fell to 0.243 in 2021, and stabilised within the 0.288–0.295 interval in 2022–2024. Although the dirigiste tendency increased somewhat in the latest period, the 2024 value remains below both the theoretical midpoint and the 2001–2024 mean of 0.309.

Table 5.

Azerbaijan's position according to ASLDI

-	ASLDI	Group	From theoretical midpoint	From relative mean	From arithmetic mean
2001	0,490	Intermediate mixed	-0,010	+0,046	+0,078
2005	0,489	Intermediate mixed	-0,011	+0,063	+0,095
2010	0,195	Liberal	-0,305	-0,212	-0,189
2015	0,196	Liberal	-0,304	-0,231	-0,183
2020	0,312	Partially liberal	-0,188	-0,051	-0,044
2024	0,293	Partially liberal	-0,207	-0,104	-0,071

Note. Prepared using the author's calculations.

Comparison with post-Soviet countries provides a more appropriate reference for Azerbaijan. With an index of 0.293 in 2024, Azerbaijan occupies one of the most liberal positions in the comparison group after Georgia (0.274). Its value is below those of Ukraine (0.310), Moldova (0.325), Tajikistan (0.330), Russia (0.360), Armenia (0.368), Turkmenistan (0.392), Kazakhstan (0.405) and Kyrgyzstan (0.443). The decline of 0.197 index points between 2001 and 2024 indicates a substantial shift towards liberalism.

Thus, over the long term, Azerbaijan moved from an intermediate mixed position to a partially liberal position, through stages of liberalisation and relative movement towards dirigisme.

Proposition 5: *ASLDI has a weak statistical relationship with agricultural production, a moderately positive relationship with the producer price index for agricultural products, and strong negative relationships with agricultural employment and investment in fixed capital. The weak relationship with agricultural production is attributable to infrastructure, technical and technological provision, and other factors.*

Scientific novelty 5: *Relationships between ASLDI and agricultural production, the producer price index, employment and investment have been assessed, and differences in their direction and strength have been identified.*

Rationale. Institutional and economic reforms, modernisation of management and state support have expanded development opportunities in agriculture. Following an initial decline, production, value added, productivity and financial indicators improved. The sector therefore needs to be assessed jointly in terms of gross output, its share in GDP, real production, employment, labour productivity, prices, profitability and investment.

Between 2000 and 2024, the agricultural sector's share in GDP declined from 15.9% to 5.7%. In 2024, the corresponding shares were 4.1% worldwide, 1.6% in the EU and 1.4% in the OECD. Agricultural value added per capita increased 9.3-fold, from 137.1 to 1270.9 manats.

Although the agricultural sector's share in GDP declined, gross output at current prices increased from 1124 million manats in 2000 to 14918 million manats in 2025. During this period, the highest growth, 37.8%, was recorded in 2007, while a decline of 0.3% occurred in 2014.

More sustained nominal growth in gross output generally coincided with years in which ASLDI was within the 0.200–0.300 interval. This is a preliminary empirical observation of the alignment of production growth with the predominance of market mechanisms and a certain degree of state support.

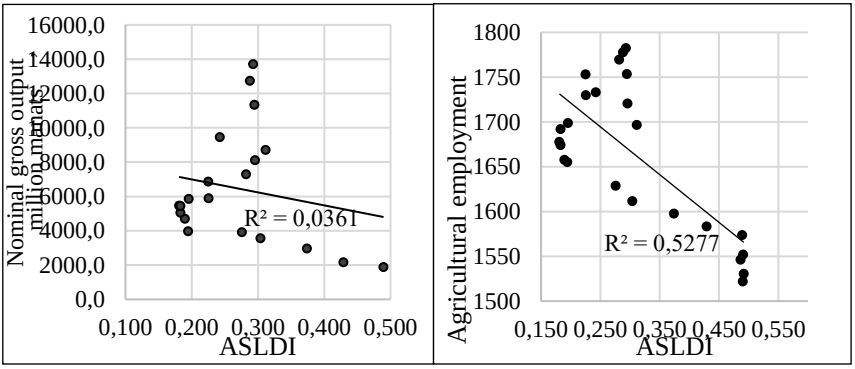


Chart 6. Relationship between ASLDI, gross output and employment in the agricultural sector

Note: Prepared by the author.

As Chart 6 shows, the relationship between ASLDI and gross output is weak, while there is a strong negative relationship with the number of people employed in agriculture (R^2=0.5277; r≈−0.7300). In other words, increases and decreases in intervention do not affect production, suggesting that production depends more heavily on other factors. In employment, increased intervention has a moderately strong effect on declining employment.

Between 1999 and 2024, the number of people employed in agriculture increased from 1569.6 thousand to 1782.3 thousand, while its share of total employment fell from 41.5% to 35.4%. Agriculture's share of total employment in Azerbaijan is high compared with the worldwide figure (26.1%) and OECD countries (4.3%).

In addition to preserving employment, state support can increase productivity through technological renewal and enable the same output to be produced with fewer workers.

Prices and investment attractiveness are among the factors motivating state intervention in agriculture. By supporting the agricultural sector and lowering producer prices, the state pursues a policy of attracting investment to the sector. Assessments indicate a moderately positive relationship between Azerbaijan's ASLDI and the producer price index, and a moderately strong negative relationship with investment in fixed capital (Chart 7).

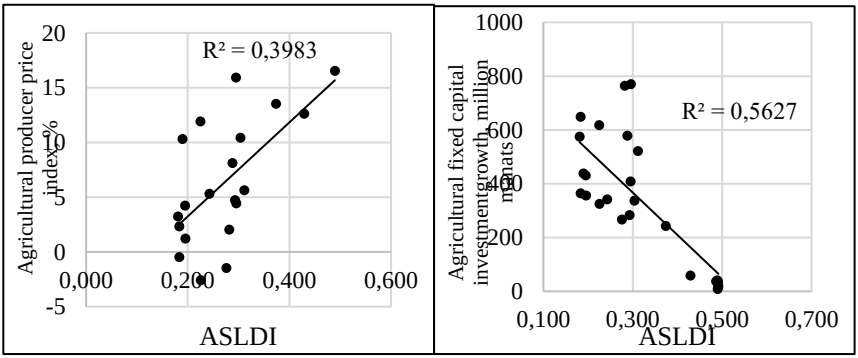


Chart 7. Relationship between ASLDI, the agricultural producer price index and investment in fixed capital

Note: Prepared by the author.

The relationship between the producer price index and mean ASLDI, which runs counter to the policy objective, stems from overall inflation, rising energy prices and the increasing cost of resources used in agriculture. This is also often reflected in productivity.

The analysis shows that other factors, including inflation, energy prices, rising resource costs, infrastructure, and technical and technological provision, influence the relationships between state intervention and agricultural output, employment, investment in fixed capital and producer prices in Azerbaijan.

Proposition 6: *Approximate calculations indicate that tax concessions account for the largest share of total support per manat of gross agricultural output, comprising direct budgetary support and tax concessions.*

Scientific novelty 6: *The approximate volumes of direct budgetary support and indirect support through tax concessions for agriculture have been calculated separately. Support has been found to amount to 22.9–26.8 gapiks per manat of gross output, with the largest component (15.8 gapiks) coming from tax concessions.*

Rationale: Agricultural regulation in Azerbaijan is based on a mixed model coordinating direct and indirect support instruments. Tax concessions constitute the principal component of indirect support for agriculture (60–65%). Subsidies are an important instrument of direct support and account for 35–40% of total support.

Overall, state support for agriculture increased 3.3-fold, from 963.6 million to 3158.9 million manats. However, average support per manat of gross output ranged between 22.9 and 26.8 gapiks.

State support for agriculture in Azerbaijan is extensive and diverse, delivered through subsidies, concessional loans, budget allocations, concessions for purchasing machinery and breeding animals, and tax and customs incentives. ASLDI dynamics show that, although the expansion of support was accompanied by an increased level of dirigisme in certain periods, Azerbaijan remained in the partially liberal group in 2024 with an index value of 0.293. Agricultural policy may therefore be characterised as a mixed model in which substantial state support operates alongside market mechanisms, with liberal components predominating.

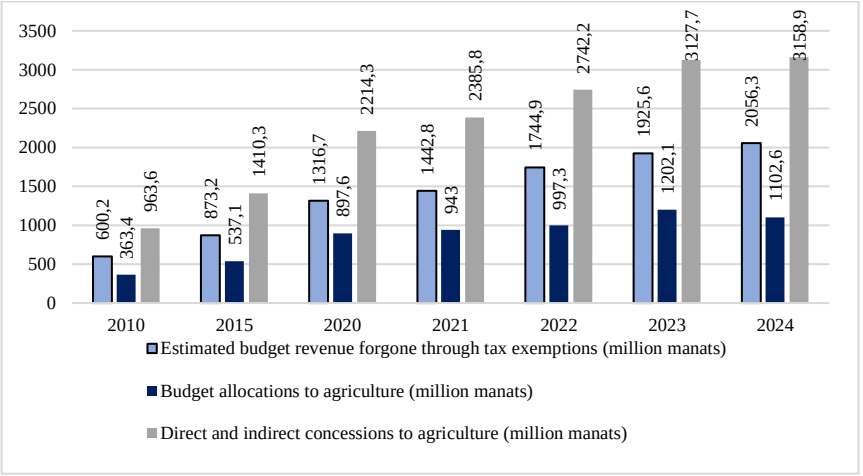


Chart 8. Approximate estimates of total state support in Azerbaijan, million manats

Note. Calculated by the author.

Proposition 7: *There is a weak negative relationship between the level of liberalism–dirigisme in agriculture and food security. In other words, increased intervention strengthens the tendency towards improved food security.*

Scientific novelty 7: *A strong positive relationship between ASLDI and the Global Food Security Index has been identified for Azerbaijan. Differences in self-sufficiency across product groups have substantiated that food security cannot be explained solely by the scale of intervention.*

Rationale: Ensuring food security is one of the factors necessitating state intervention in agriculture. Although the relationship between the overall calculated ASLDI and the Global Food Security Index (GFSI) appears weak, it is strong in Azerbaijan. The calculated ASLDI for Azerbaijan and its GFSI show a strong positive relationship (R^2=0.6485 and r=0.805). In other words, increased state intervention in Azerbaijan has a positive effect on ensuring food security. The small number of observation years may affect this result.

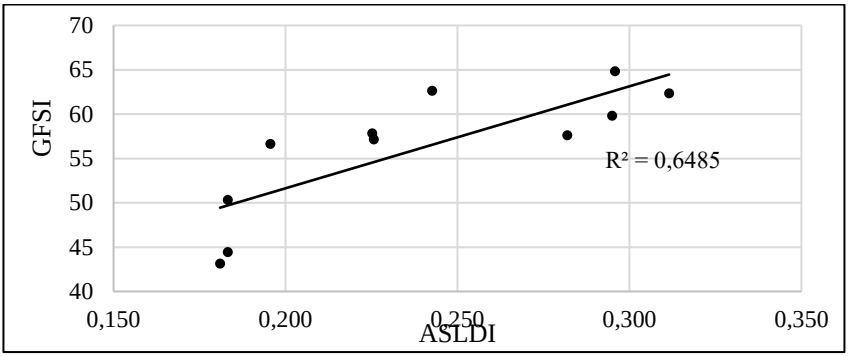


Chart 10. Relationship between ASLDI and GFSI in Azerbaijan

Cross-country comparisons generally show that high food security is achieved under both liberal and dirigiste agricultural models. Azerbaijan ranked 66th in the 2022 GFSI with a score of 59.8. Liberal approaches are more predominant in Finland (83.7 points), Ireland (81.7), France (80.2) and the Kingdom of the Netherlands (80.1), which have some of the highest food security scores. However, index values above 0.500 indicate stronger state intervention in other countries with high food security, such as Norway (80.5), Japan (79.5) and Switzerland (78.2). Conversely, some countries occupying more dirigiste positions have relatively low food security scores. For example, although state intervention is relatively strong in Bangladesh (54.0; 0.674), its food security score is low. This indicates that dirigiste intervention alone does not guarantee high food security; the effectiveness of intervention, economic capacity, production potential and institutional mechanisms are also important.

According to SSC data, Azerbaijan's self-sufficiency in crop products differs across product groups. Although self-sufficiency in cereals increased by 11.9 percentage points between 2010 and 2024, it currently stands at 68.4%, indicating continued import dependence.

The situation in livestock production is relatively better. In 2024, self-sufficiency was 103.7% for eggs, 76.6% for poultry meat and 83.9% for milk and dairy products. Indicators for processed food products are also uneven. Self-sufficiency is high for fresh bread, margarine, fruit and vegetable juices, some dairy products, edible salt and carbonated waters, exceeding 100% in some cases. This indicates

that the processing industry can largely meet domestic demand for these products.

Thus, the relationship between ASLDI and food security, together with self-sufficiency indicators, shows that the outcomes of state intervention depend on more than its scale. Appropriate targeting of support across product groups, higher productivity, the development of processing and logistics, expanded storage capacity and the promotion of sustainable domestic production of strategic products play a decisive role.

Conclusions, proposals and recommendations

Research findings

1. The study examines state intervention in agriculture and its measurement, trends across 148 countries, Azerbaijan's institutional model, and the relationships between intervention and agricultural indicators. ASLDI and ASSLDI have been calculated using two methodologies. Effectiveness has been found to depend also on the suitability of instruments to the objectives and national conditions.
2. Between 2001 and 2024, the share of the partially liberal model across 148 countries increased from 45.3% to 66.2%, while the shares of intermediate mixed and partially dirigiste models declined. This represents a trend towards liberalisation rather than the elimination of support. In Azerbaijan, ASLDI indicates a transition from an intermediate mixed model to a partially liberal model, while the institutional structure indicates a liberal-oriented mixed model.
3. In Azerbaijan, ASLDI has a weak relationship with agricultural production, a moderately positive relationship with the producer price index, and strong negative relationships with employment and investment in fixed capital (R^2=0.5277 and 0.5627, respectively). These statistical relationships do not establish causality; other economic and technological factors must also be considered.
4. State support amounts to 22.9–26.8 gapiks per manat of gross output, including 15.8 gapiks in tax concessions. A weak negative relationship between food security and the level of intervention has been identified across 148 countries, while a strong positive relationship between ASLDI and the Global Food Security Index has

been found in Azerbaijan (R^2=0.6485). Food security depends on self-sufficiency and other factors alongside the scale of intervention.

Proposals and recommendations

To improve the effectiveness of agricultural policy, measures in the following areas are considered appropriate:

1. **Defining the position of state intervention.** It would be appropriate for Azerbaijan to maintain a position consistent with a partially liberal orientation. At the same time, rather than making the index itself a policy target, it is recommended that intervention be adjusted according to the outcomes of support in food security, production risks and general services.
2. **Adapting subsidies to outcomes and farming conditions.** It would be useful to link subsidies to productivity, product quality and actual production indicators, and to differentiate criteria according to regional natural and climatic conditions, water availability, soil characteristics and demand for strategic products. Publishing criteria in advance and regularly assessing outcomes could make support more transparent.
3. **Developing targeted food security measures.** It is recommended that support measures be differentiated according to product self-sufficiency, import dependence and supply risks. Linking production incentives for strategic products with storage, processing and market access measures could contribute to more sustainable supply.
4. **Expanding support opportunities for small and medium-sized farms.** It would be appropriate to facilitate access to concessional finance, machinery, irrigation and advisory services for small and medium-sized farmers and to encourage their participation in cooperatives and production chains. Designing these measures with regard to farm size and regional needs could broaden the coverage of support.
5. **Increasing investment in general services and agricultural infrastructure.** It is considered appropriate to expand support for agricultural research, innovation, farmer advisory services, seed quality control, phytosanitary and veterinary services, as well as

irrigation and land reclamation, rural roads, storage and cold storage infrastructure.

6. **Transparency and fiscal efficiency of tax concessions.** Given the share of tax concessions in state support, it would be appropriate to report tax expenditures separately in budget documents and regularly assess their effects on production, productivity, investment and budget revenues. This could identify the sectors, product groups, regions and farm categories in which concessions are most effective.

7. **Managing climate and production risks.** It is recommended that agricultural insurance coverage against drought, frost, hail and other climate risks be expanded, and that state support for insurance premiums be provided with due regard to risk. Promoting water-saving technologies, climate-resilient varieties and production methods that preserve soil fertility would be appropriate.

8. **Monitoring and researching support outcomes.** It would be appropriate to monitor state support regularly alongside indicators of agricultural production, producer prices, employment, investment in fixed capital and food security. Research by state agencies and research organisations that accounts for time lags and other factors could help assess the outcomes of policy measures more rigorously.

The main propositions of the dissertation, its findings and proposals are reflected in the following articles and conference papers published by the author:

1. Jabbarli L. The role of the state in regulating agricultural cooperatives in European Union countries // Proceedings of the national scientific and practical conference on the Current State and Development Prospects of Cooperation in Agriculture, 10 March 2020, pp. 74–77.

2. Jabbarli L. Mechanisms of tax regulation of the agricultural sector in European Union (EU) countries // Kooperasiya scientific and practical journal, No. 2, 2020, pp. 166–171.

3. Jabbarli L. Subsidising the agricultural sector: international experience // Proceedings of ANAS. Economics Series, 2020, pp. 117–123.

4. Jabbarli L. Current state and development prospects of agriculture in the Upper Karabakh and Kalbajar–Lachin economic regions // State Statistical Committee of the Republic of Azerbaijan, Statistical News scientific and practical journal, 2021 (2), pp. 35–42.

5. Jabbarli L. Directions for agricultural development in the territories liberated from occupation // Agricultural Economics scientific and practical journal, No. 2, 2020, pp. 52–57.

6. Jabbarli L. Liberal and dirigiste views on state regulation of the economy // Proceedings of the international scientific and practical conference on Problems of the Impact of the Pandemic on the Socioeconomic Development of the Countries of the World, Baku, 31 May 2021, pp. 123–125.

7. Jabbarli L. The role of women in employment in Turkic-speaking states and its assessment // Manisa Celal Bayar University, Women and Family Research and Application Center, International Symposium on Women's Studies, 12–13 May 2022, pp. 11–18.

8. Jabbarli L. Türkiye's role in the economic development of independent Azerbaijan: past and present // Izmir Democracy University, Third International Congress on Humanities, 4–6 November 2022, pp. 117–126.

9. Jabbarli L. Assessing the impact of interstate conflicts on food security // AASMA and Manisa Celal Bayar University, 28–29 September 2022 (international conference proceedings), pp. 126–133.

10. Jabbarli L. Government agencies in the field of sustainable agricultural development in various countries // American journal, SCOPUS, No. 2, 2022, pp. 165–183.

11. Jabbarli L. Measuring the level of state intervention (support) in agricultural production // Scopus Sources, Revista Universidad y Sociedad, No. 2, March–April 2023, pp. 18–26.

12. Jabbarli L. Heydar Aliyev and agricultural development // Fifth International Scientific Conference of Researchers in Economics and Management, 22–25 June 2023, pp. 363–373.

13. Jabbarli L. Assessing the role and impact of state regulation of agriculture on agricultural production: international experience // Third International Silk Road Congress on Scientific Research, 6–8 March 2024, pp. 628–639.

14. Jabbarli L. Agriculture Intellectualization: Global Challenges and Effective Regulation // Journal of Propulsion Technology, No. 3, 2024, pp. 3270–3282.

15. Jabbarli L. Labour Migration and Development in Azerbaijan, 1998–2022 // Scopus, No. 3, 2024, pp. 85–102.

16. Jabbarli L. The impact of government regulation in the agricultural sector on food security // Second International Congress on Scientific Research, 27 April–3 May 2026, Rome, Italy, pp. 341–349.

17. Agriculture intellectualization: global challenges and effective regulation // Tenth ISPEC International Congress on Modern Scientific Research, 18–25 April 2026, Madrid, Spain, pp. 1211–1230.

18. Regulation of agriculture in Azerbaijan: liberal reforms // Fifth International Paris Congress on Agriculture and Animal Husbandry, 19–21 June 2026, Paris, France.



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