RESEARCH ARTICLE

Reduction of Inequality of Regions as a Factor of Sustainable Development: the Case of Western Macro-region of Kazakhstan

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Abstract

The most critical Sustainable Development Goals (SDGs) are the promotion of sustainable economic growth, the eradication of poverty, and the reduction of inequality within countries. The hypothesis of the study is the assumption that the achievement of the SDGs in the country depends on the reduction of socio-economic inequality in the West Kazakhstan regions, which includes four regions of the country: Mangistau, Atyrau, Aktobe, and West Kazakhstan. This formulation of the question is because earlier studies by the article's authors indicate a discrepancy between the level of social well-being of a given region and the actual contribution to the development of the country's economy. The aim of the article is to study the dynamics and degree of socio-economic development inequality of the Western Kazakhstan region and to develop recommendations on measures of state regulation to reduce it. To achieve this goal, the methods of generalization, concretization, economic-statistical, index, and comparative analysis were used. The result was a system of indicators for measuring the level of socio-economic stability of regions, taking into account country specifics, a study of trends, and an assessment of the degree of inequality in the socio-economic development of the regions of Western Kazakhstan, and recommendations for improving regulatory methods to reduce regional disparities. The authorities can use the recommendations to make decisions on achieving the Sustainable Development Goals in the regions of Western Kazakhstan.

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1. INTRODUCTION

The modern development of the world economy is taking place in the context of global economic, energy and food crises, technological shifts, and climate change. In this regard, the focus of economic science has become the concept of sustainable development, which is the problem of overcoming inequality in countries, regions, and groups of people. Kazakhstan also approved the Concept of Kazakhstan's transition to a green economy, ratified the 2015 Paris Climate Agreement (UN, 2015), and developed an Environmental Code (2023). The Republic of Kazakhstan's Strategy for achieving carbon neutrality until 2060 has been approved.

The specifics of Kazakhstan's development are significant regional differences in economic potential in the population's level of well-being and quality of life. These differences were due to the wide variety of natural and climatic conditions and the prevailing economic specialization of the regions. To reduce regional imbalances, Kazakhstan has adopted the National Development Plan until 2025 and the National Project "Strong Regions – drivers of the Country's Development" [ ], which set tasks to ensure people's well-being and form a strong economy based on balanced territorial development. However, these documents do not solve the problems of sustainable development in all regions of Kazakhstan and do not consider the impact of modern global challenges. Therefore, it is of particular importance for Kazakhstan to achieve widespread social well-being, sustainable economic growth, and reduction of regional inequality, which correspond to the Sustainable Development Goals (SDGs)

This problem is especially acute in the Western Kazakhstan macro-region, whose branches of specialization are gas and oil production and processing of extracted hydrocarbons. The Western macro-region occupies a special place in the economy of Kazakhstan and includes 4 territories - Aktobe, Atyrau, Mangystau, and West Kazakhstan regions. Their contribution to forming the country's gross domestic product (GDP) reaches 27%. At the same time, these regions are characterized by high poverty levels. For example, in the Mangystau region, it reaches 8.1%. Despite the region's economic contribution, social stability and environmental sustainability are serious problems. Therefore, comprehensive studies of the sustainable development of socio-economic systems of the Western Kazakhstan macro-region are necessary.

The article aims to study the dynamics and degree of inequality in the socio-economic development of the territories of Western Macro-region and develop recommendations for its reduction. The study hypothesized that achieving the SDGs in the country largely depends on reducing socio-economic inequality in the territories of Western Macro-region.

To achieve this goal, a review of the literature on the inequality of economic and social development in different territories of the country, the problems of regional stratification of the population in terms of standard and quality of life as an essential factor in the sustainable development of regions, was carried out, as well as an analysis of the leading socio-economic indicators. The proof or refutation of the hypothesis was carried out by determining regional differences in indicators of social and economic sustainability of the Western Macro-region of Kazakhstan.

The methods of generalization, concretization, economic and statistical, index, comparative analysis, and ranking were used. To monitor the sustainability of the socio-economic development of the Western macro-region of Kazakhstan, the authors proposed a modified system of indicators for achieving the Goals and objectives of sustainable development, including economic and social ones.

The result of the study was a well-founded system of regional indicators of social and economic sustainability, an assessment of the main trends in the socio-economic development of the regions of Western Kazakhstan, and a determination of the degree and risks of maintaining inequality. It is concluded that the high level of social and economic inequality in the territories of Western Macro-region hinders the achievement of SDGs in the country. Recommendations are

proposed for government authorities to improve regulatory methods to reduce regional inequality and increase the socio-economic sustainability of regions.

The scientific and methodological significance of the results consists in substantiating a system of indicators for assessing the level of socio-economic stability adapted to the specifics of Kazakhstan. The practical significance lies in the development of recommendations to reduce regional inequality.

2. LITERATURE REVIEW

Sustainable development has become the focus of economic science in recent years. However, it is still being studied more at the country level and, to a lesser extent, at the regional level. Nevertheless, there are different points of view on the problems of sustainable regional development, approaches to measuring its level, directions, and mechanisms for ensuring it. Thus, Glinskiy et al. (2017) consider the impact of the European "convergence policy" aimed at overcoming regional inequality, bringing the socio-economic indicators of poor regions closer to more developed ones. They assess the correlation between the level of differentiation and the level of stability of the regional economy and conclude that high regional differentiation leads to social upheaval, and low differentiation leads to stagnation. The authors come to a conclusion about the growing influence of intraregional differentiation of the minor territories, the limits of the stimulating effect of territorial differentiation, and its negative impact on the economic growth of a country or region.

Panzera and Postiglione (2022) explores the relationship between economic growth and regional income inequality, as well as the role of space in measuring inequality and implementing convergence policy. The authors draw attention to the effect of spatial dependence and note that regional growth can be influenced by inequality within a region and in neighboring areas. The authors examined spatial interactions and geographic location's role by analyzing 245 areas in 22 countries. They concluded that growth rates in a regional economy depend positively on inequality in the region and negatively on inequality in neighboring regions.

Tian et al. (2010) explore the challenges of economic convergence, noting the importance of focusing on low- and lower-middle-income regions to overcome the poverty trap due to spatial effects. Costanza et al. (2016) draw attention to the interconnectedness of SDG goals and targets and propose the use of aggregate indicators of human and ecosystem well-being to replace gross domestic product (GDP) growth as the primary development goal of countries since the focus on GDP growth has exacerbated inequality and environmental damage in many countries. Increased income inequality, environmental damage, and other costs could offset the positive benefits of GDP growth. Haughton and Counsell (2004) note the importance of regional planning as a component of regional institutional architecture in connection with the actualization of goals and objectives of sustainable development.

Bolcarova and Kolosta (2015) are considering the possibility of creating an aggregated sustainable development index for the 27 EU countries. At the same time, the indicator of economic growth was not considered since it did not lead to positive changes in the social, economic, and environmental areas. A comparison of the aggregate index with economic growth indicators showed a negative correlation for most EU countries. Cobb and Daly (1989) proposed an alternative method to GDP for assessing well-being in 1989. The Index of Sustainable Economic Welfare (ISEW) includes social and environmental components. Stiglitz et al. (2009) also criticize GDP as an indicator of progress and well-being since it ignores household labor, natural and human capital, and environmental degradation. Chelli et al. (2013) developed the idea of using alternative indicators to assess the well-being of society, adapting and offering options for the Index of Sustainable Economic Welfare (ISEW) for Italian regions. Cortinovis &van Oort

(2015) apply the concepts of linked and unlinked diversity to analyze cross-regional data and the relationship between employment and unemployment growth and knowledge spread across sectors, diversification, and specialization levels.

Other scientists believe that prioritizing the equality of territories at the expense of developing "growth points" can lead to economic stagnation. Therefore, it is essential to correctly assess the degree of differentiation and the level of sustainability of the socio-economic development of regions. These issues have received the attention of scientists from many countries.

In the context of the global challenges of the 21st century, the problem of achieving sustainable development has worsened, which requires in-depth research in this area. Under the influence of Industry 4.0, digitalization of economic activity, unstable geopolitical situation, energy and food crises, climate change, the unfavorable conjuncture of world markets is developing, technological chains and established foreign economic relations of states and regions are disrupted. Inertial development in this scenario leads to a situation where the exhaustion of natural resources limits economic growth, the growth of wealth is accompanied by an increase in the number of poor, deepening inequality of countries and regions, and regional stratification of the population in terms of standard and quality of life. In many commodity-based economies, significant contradictions exist between achieving sustainable economic growth and abandoning technologies with high greenhouse gas emissions.

This development cannot be called sustainable. Therefore, experts from international organizations began to develop new economic development models. For example, Harari (2019) believes that the post-labor economy model is adequate in the context of digitalization. Other scientists, in particular Jeffrey (2019), Ranieri and Ramos (2013), Ifzal and Hyun (2007) argue the need to switch to an inclusive growth model and believe that a compromise between fairness and efficiency of economic development can provide an inclusive development model. The same opinion is shared by experts from ESCAP (2015) and OECD (2016). Raheem et al. (2018) investigated the interrelationships of inclusive growth, human capital development, and in-kind rent.
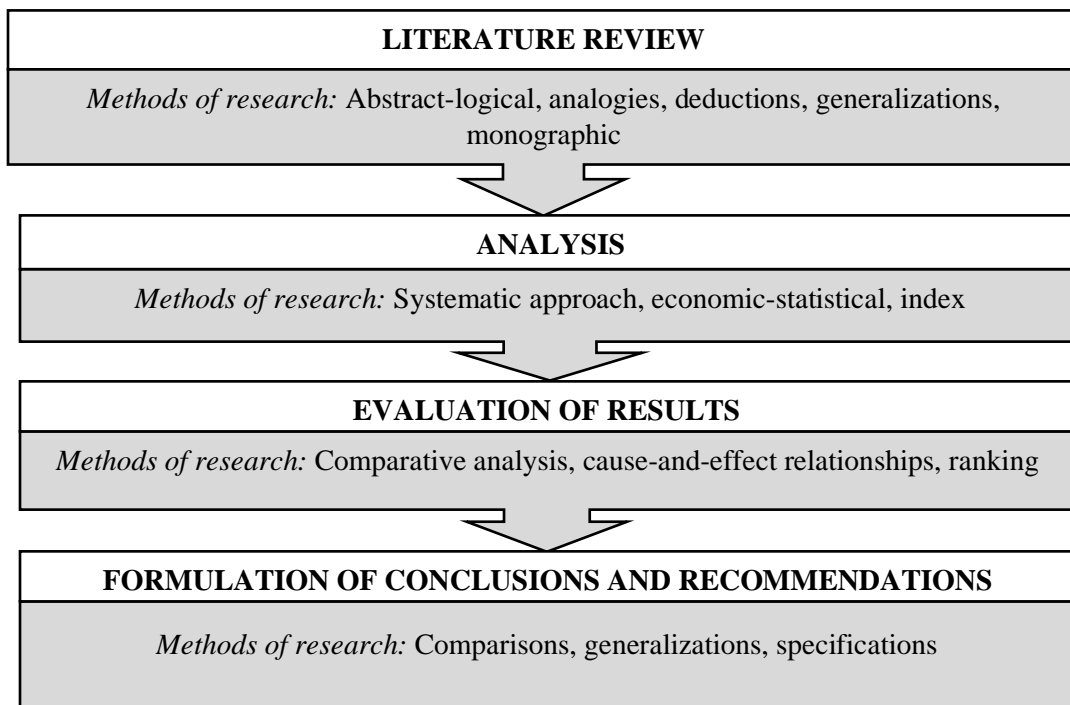
However, there is an alternative point of view on the effectiveness of this model. Lee (2018) believed this idea is romantic, has a declarative character, and serves as a tribute to socialist trends. In our opinion, the problem lies in the fact that many countries have not yet developed criteria and effective mechanisms for achieving sustainable economic growth from a regional perspective based on the effective use of existing resources without prejudice to future generations. Moreover, there is currently no clear concept or tools underlying the definition of the limits of economic growth that can be used to achieve sustainable development.

In Kazakhstan, which has a predominantly commodity-based economy, the problems of sustainable economic and social development have also been insufficiently studied. The imperatives of sustainable development are still poorly seen in regional studies and regional policy of Kazakhstan. It is mainly aimed at forming regions - "points of growth". However, focusing on sustainable development requires the creation of conditions and prerequisites for balanced economic and social development in all regions.

Meanwhile, reducing regional differences in the levels of socio-economic development will contribute to achieving the Sustainable Development Goals for the elimination of poverty in all its forms, steady, inclusive, and sustainable economic growth, full and productive employment, reducing inequality within the country, and, as a result, improving the level and quality of life of its population, social sustainability of regional development. Therefore, research on various issues related to reducing socio-economic inequality in regions and the transition to sustainable development has excellent prospects.

3. RESEARCH METHODS

The methodological basis of the study was made up of theoretical and empirical research methods and modern information technologies of scientific research. The research algorithm can be presented schematically in Figure 1.

LITERATURE REVIEW

Methods of research: Abstract-logical, analogies, deductions, generalizations, monographic

ANALYSIS

Methods of research: Systematic approach, economic-statistical, index

EVALUATION OF RESULTS

Methods of research: Comparative analysis, cause-and-effect relationships, ranking

FORMULATION OF CONCLUSIONS AND RECOMMENDATIONS

Methods of research: Comparisons, generalizations, specifications

FIGURE 1. Stages and methods of research

Note: compiled by authors

A study of the content of the Sustainable Development Goals and the objectives aimed at their implementation showed that the level of achievement of each Goal and objectives can be measured by a system of 278 global indicators (Global Goals for Sustainable Development, 2015). Different countries that have committed to achieving the SDGs determine the national economic and statistical indicators system. Such a system of indicators for monitoring the Sustainable Development Goals, including 262 indicators, was developed in Kazakhstan (Monitoring of the Sustainable Development Goals until 2030, 2016). However, it includes national-level indicators, not all of which are available at the local level and are applicable for monitoring the level of SDG achievement of individual regions of the country.

Identifying the main risks of achieving the Sustainable Development Goals was made possible by comparing such indicators of regional development, such as the dynamics of GRP per capita, investments in fixed assets per capita, the level of vulnerable employment, average monthly wages and per capita nominal incomes. As a result of the comparative analysis, differences in the regions of the region in terms of contributions to the country's GRP and economic and social sustainability were revealed, confirming the existence of inequality in the socio-economic development of the regions of Western Kazakhstan.

To monitor the sustainability of the socio-economic development of Western Kazakhstan regions, we propose applying a system of indicators, tested earlier. The modified system of

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indicators for achieving the Goals and objectives of sustainable development is presented (see Table 2).

TABLE 2. Modified indicator system

Indicators	
Economic	Social
(1) gross regional product (GRP) per capita; (2) average annual volume of investment in fixed capital per capita; (3) vulnerable employment, %.	(1) average monthly salary, including by gender; (2) average per capita nominal income; (3) poverty level (the share of the population with incomes below the subsistence level); (4) real income of the population used for consumption in urban and rural areas, on average per capita; (5) fund ratio (the ratio of the 10% most and 10% of the least affluent population).
*Note: c*ompiled by authors based on reference Nurlanova et al. (2023)	

Based on the use of analysis and synthesis methods, theoretical conclusions were drawn, and measures were formulated for practical use to overcome the identified inequality, allowing to increase in the socio-economic stability of the regions of the Western macro-region in the interests of the SDGs.

Visualization of the research results is provided by tabular and graphical methods, which made it possible to compactly reflect the complexity of the entire set of indicators in 6 tables and one figure, identify trends in the development of phenomena, their level and structure, and typical relationships and connections.

The information base was from literary and Internet sources, as well as the scientific developments of domestic and foreign scientists on the problem of sustainable development of the economy and society. The calculations were based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of Kazakhstan, regional statistical services, and the national platform for reporting Sustainable Development Goals.

4. FINDINGS AND DISCUSSION

The level of economic stability of Western Macro-region of Kazakhstan is primarily characterized by the dynamics of gross regional product (GRP) per capita (see Table 3).

TABLE 3. Dynamics of the gross regional product per capita and the share of the Western Macro-region

Region	GRP per capita, thousand USD						The share of regions in GRP, %
	2016	2017	2018	2019	2020	2022	
Kazakhstan	7,71	9,25	9,81	9,81	9,12	11,48	100
Aktobe	7,20	8,43	9,1	8,87	8,06	10,4	4,3
Atyrau	25,29	29,71	36,16	38,10	28,78	43,38	13,2
West Kazakhstan	9,29	11,13	12,46	11,76	10,05	14,05	4,3
Mangystau	11,34	15,52	16,48	13,98	10,5	12,63	4,2
Note: compiled by authors based on Bureau of National Statistics (2022)							

An analysis of the dynamics of GRP per capita in the regions of Western Macro region for 2016-2022 indicates, firstly, the growth of this indicator during this period; secondly, about a significant increase in the growth rate of per capita GRP, compared to the indicator for the country as a whole. The exception is the Aktobe region, where this indicator is comparable to the national average. The apparent leader is Atyrau region. This region also contributes the most significantly

to Kazakhstan's GRP - 13.2%, and four western regions provide more than a quarter of GRP - 27%. The gap between the maximum GRP per capita in the Atyrau region and the minimum in the Aktobe region in 2022 was 4.2 times.

To assess the level of economic sustainability of Western Macro-region were calculated indicator of investment in fixed capital per capita and the level of vulnerable employment (see Table 4).

TABLE 4. Indicators of economic stability of the Western Macro-region in 2022

Region	GRP per capita, thousand USD	Investments in fixed assets per capita, thousand USD	Vulnerable employment, %
Kazakhstan	11,48	1,68	
Aktobe	10,4	2,25	15,3
Atyrau	43,38	9,44	12,3
West Kazakhstan	14,05	1,70	27,5
Mangystau	12,63	2,23	5,3
The gap between the maximum and minimum	4,2	5,6	5,2
Note: compiled by authors based on Bureau of National Statistics (2022)			

According to the investment indicator in 2022, all regions of Western Macro region were ahead of the national average. However, the differences between regions in this indicator are also high – 5.6 times. The letter is from Atyrau region. A different picture emerged regarding the level of vulnerable employment, including the self-employed population. Here, a higher value indicates a worse situation; it is typical for the West Kazakhstan region - 27.5%. In other words, more than a quarter of the region's workforce lacks permanent, productive jobs.

The analysis showed the relative economic stability of the Western Macro region. However, economic growth is not always accompanied by increased social sustainability, which creates risks for the sustainable development of Kazakhstan. To prove this assumption, consider the leading indicators of social development (see Table 5).

TABLE 5. Differences in indicators of social sustainability of the Western Macro region in 2022

Region	Average monthly salary, USD	Poverty level, %	The ratio of funds, times	Nominal income per capita, USD
Kazakhstan	672,9	5,3	5,61	388,9
Aktobe	595,9	4,4	5,55	285,2
Atyrau	1136,2	3,3	3,25	681,4
West Kazakhstan	599,8	4,2	3,38	313,9
Mangystau	998,9	8,1	2,77	444,9
The gap between the maximum and minimum	1,9	2,5	2.0	2,4
Note: compiled by authors based on Bureau of National Statistics (2022)				

Judging by social indicators, Atyrau region is also characterized by the best social sustainability. Thus, the average monthly salary and average per capita nominal income exceed the national average and indicators of other regions of Western Kazakhstan.

At the same time, the gap between the maximum value of these indicators in 2022 in the Atyrau region was 1.9, and the minimum values in the Aktobe region were 2.4 times.

A difficult situation in terms of poverty level is observed in the Mangistau region (8.1%). This indicator is one of the worst in the country despite the relatively high GRP per capita. The poverty gap in economically stable regions reaches 2.5 times. Even more striking evidence of the social instability of the oil-producing regions of Western Macro-region is the analysis of the poverty level over time (see Table 6).
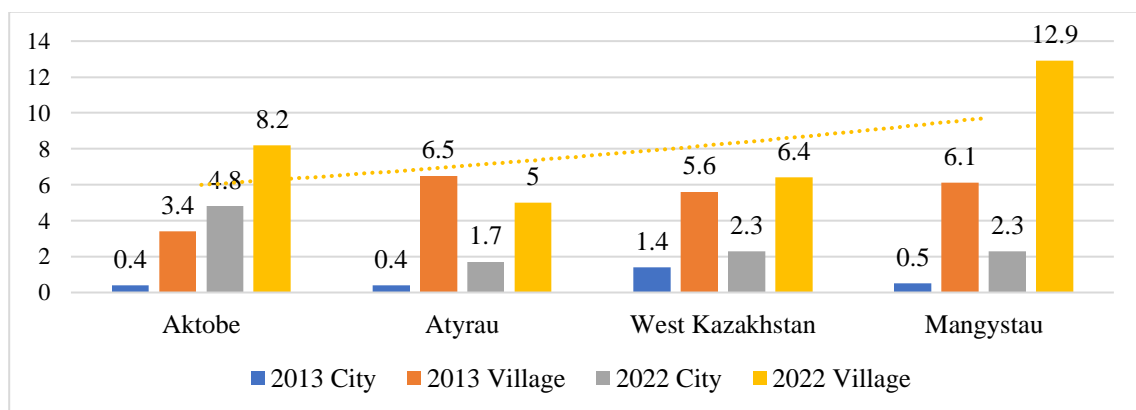
TABLE 6. Dynamics of the poverty level in the Western Macro-region (the share of the population with incomes below the subsistence minimum)

Region	Share of the poor population, %							Change 2016-2022 (+,-)
	2016	2017	2018	2019	2020	2021	2022	
Kazakhstan	2,5	2,7	4,3	4,3	5,3	5,2	5,2	+2,7
Aktobe	1,9	1,9	2,9	3,0	3,5	3,7	4,4	+2,5
Atyrau	3,1	2,8	2,5	2,5	3,0	3,3	3,3	+0,2
West Kazakhstan	2,8	2,7	3,2	3,7	3,9	4,4	4,2	+1,4
Mangystau	2,8	3,3	4,9	4,3	5,7	8,1	8,1	5,3
Note: compiled by authors based on Bureau of National Statistics (2022)								

Poverty rates increased in all regions between 2016 and 2022, especially during the pandemic period of 2020-2022. There is also a big difference in the dynamics of the poverty level, which has increased over the past three years due to the growth of poverty in the Mangistau region. A more detailed study of the poverty level in the Western Macro-region in the urban-rural context shows that the increase in the Mangistau region in 2022 resulted from an increase in rural poverty - up to 12.9%. In 2022, poverty levels increased significantly in the other areas of the Western Macro-region, especially in the Aktobe region (8.2%).

Next, comparative level of poverty in urban and rural areas in the Western Macro-region presented in Figure 1.

FIGURE 1. Comparative level of poverty in urban and rural areas in the Western Macro-region, %

Note: compiled by authors based on Bureau of National Statistics (2022)

On average, in the Western Macro-region, the share of the rural population with incomes below the subsistence level exceeds the exact figure for the urban population by 2.89 times. A record excess (almost ten times) was recorded in the Atyrau region. This situation is explained by

the influence of the difference between high wages in the oil and gas industry and low wages in agriculture, as well as the high share of self-employed in rural areas.

For greater clarity, let's consider the real income of the population used for consumption in urban and rural areas, on average per capita in the Western Macro-region (see Table 7).

TABLE 7. Real incomes of the population used for consumption in urban and rural areas of Western Macro-region, on average per capita, US dollars

Region	2016		2020		2021		Growth rates, 2021/2016, %	
	City	Village	City	Village	City	Village	City	Village
Kazakhstan	139	107	162	126	176	136	155,1	156
Aktobe	121	109	141	115	154	120	155,3	133,9
Atyrau	128	100	132	120	142	121	135,1	148,2
West Kazakhstan	129	97	141	114	152	125	144	157,4
Mangystau	126	108	133	120	137	124	132	140,7
Note: compiled by authors based on Bureau of National Statistics (2022)								

It is obvious that the growth rates of household incomes used for consumption in rural areas of Atyrau, West Kazakhstan, and Mangystau regions outstripped the growth rates of pay of urban households; in absolute terms, incomes in villages were significantly lower than in cities. For example, if in the Aktobe region, the incomes of urban households in 2021 amounted to 154 US dollars, then in the village – only 120 US dollars, in the Atyrau region - 142 US dollars and 121 US dollars, in the West Kazakhstan region - 152 US dollars and 125 US dollars, in the Mangystau region – 137 US dollars and 124 US dollars, respectively. Thus, during the analyzed period, the incomes of rural households in absolute terms remain lower than citizens' incomes in all regions.

Furthermore, the great interest is the analysis of wages of workers of the Western Macro-region by gender (see Table 8).

TABLE 8. The ratio of nominal wages of men and women in the regions of Western Macro-region in 2016 and 2021

Region	2016			2021		
	Average nominal salary, USD		The ratio of male and female salaries, %	Average nominal salary, USD		The ratio of male and female salaries
	Male	Female		Male	Female	
Kazakhstan	514	361	70,2	652	510	78,3
Aktobe	397	299	75,4	559	445	79,6
Atyrau	1050	539	51,3	1144	628	54,9
West Kazakhstan	572	329	57,4	592	464	78,3
Mangystau	1006	464	46,1	1005	563	56
Note: compiled by authors based on Bureau of National Statistics (2022)						

Analysis of nominal wages by gender in the Western Macro-region indicates a significant difference between men and women. At the same time, the situation changed for the better only in the West Kazakhstan region. If in 2016, women's wages were only 57.4% of men's wages, then in 2021, this ratio increased to 78.3%. More opportunities for women's work with decent pay are observed in the Aktobe region. In the leading regions of Atyrau and Mangistau regions, the share of women's wages is the lowest, amounting to 54.5% and 56%. This paradox is explained by the

fact that men living in these areas are predominantly employed in the sector of economic specialization (oil and gas production), where wages are higher.

5. CONCLUSIONS

The aim of the article is to study the dynamics and degree of socio-economic development inequality of the Western Kazakhstan region and to develop recommendations on measures of state regulation to reduce it. Based on the conducted research, the following results were obtained.

Firstly, Western macro-region makes a significant contribution to the economy of Kazakhstan (27% of GRP) and occupies a leading position in economic growth, which ensures its economic sustainability.

Secondly, despite the region's economic successes, there are problems in social development and achievement of SDGs in the region and Kazakhstan as a whole. This is manifested, firstly, in the growth of poverty levels in all regions of the Western MACRO-REGION in 2016-2022; secondly, in the development of inequality and the poverty gap by up to 2.5 times; thirdly, insufficient social sustainability due to the growth of rural poverty (in the Mangystau region up to 12.9%, in the Aktobe region - 8.2%); fourthly, in the substantial gender gap in wages.

Thirdly, the hypothesis is confirmed that the high level of inequality in the social and economic development of the Western Macro region hinders the achievement of SDGs in the country.

For the regions of the Western Macro-region, it is proposed:

(1) introduce a system of incentives and preferences for the diversification of the economy and the development of the manufacturing industry.

(2) stimulate the development of the digital economy and IT technologies, the spread of high-speed broadband Internet, and the increase of digital literacy in rural areas.

(3) creating practical women's jobs by encouraging small businesses based on the use of local raw materials.

(4) tourism development, especially in the Mangystau region, with natural conditions and historical monuments favorable for these purposes.

(5) development of livestock farming and support of small-scale industries for processing dairy, wool, and meat products.

(6) development of crafts.

The proposed measures will overcome significant regional inequality and increase the socio-economic sustainability of the regions of the Western Macro region in the interests of the SDGs. It is planned to continue research in this direction to develop a map of measures to reduce regional socio-economic inequality in the territories of the West Kazakhstan Macro region together with government representatives.

AUTHOR CONTRIBUTION

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