

ISSN 2181-8622

Manufacturing technology problems



Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX  COPERNICUS
INTERNATIONAL

**Volume 10
Issue 3
2025**



ECONOMETRIC ANALYSIS OF THE ACTIVITIES OF MULTI-SECTORAL FARMS

BUSTONOV MANSURZHON

Professor, Namangan State Technical University, Namangan, Uzbekistan
 Phone.: (0897) 375-0440, E-mail.: bustonov1975@mail.ru

Abstract: Projections indicate that the global demand for food products will rise by nearly 60 percent by 2050, presenting one of the most pressing challenges for agriculture and food systems. This surge in demand must be met under conditions of climate change, finite natural resources, and shifting consumption patterns driven by demographic growth, urbanization, and income dynamics. In developing countries, the responsibility for addressing this challenge disproportionately falls on small-scale producers, who account for the majority of food production. Their role is critical not only for ensuring food security at the national level but also for sustaining rural livelihoods and contributing to broader economic resilience. However, their potential is often constrained by limited access to technology, markets, finance, and infrastructure, which amplifies their vulnerability to environmental and economic shocks. The socioeconomic impact of these developments was considerable. In rural areas, agricultural intensification generated higher demand for labor, created new employment opportunities for the rural poor, and contributed to increasing rural wages. Collectively, these dynamics strengthened food security and enhanced the resilience of local economies.

Keywords: agriculture and food systems, food security, small producers, agricultural products, animal husbandry, consumer prices.

Introduction. At the same time, global consumption patterns are expected to undergo profound change. Rising prosperity will not only increase the absolute demand for food but will also shift preferences toward **higher-quality and resource-intensive products**, such as premium crop varieties, livestock-based goods, and processed foods. Meeting this diversified demand will place additional pressure on land, water, and energy resources, which are already under strain in many parts of the world (Table 1) [2].

Table 1. The main indicators of the agricultural economy

Indicators	2000	2005	2010	2015	2016	2017	2018
Agricultural products, bln. soum	1387.2	5978.3	30856.7	99604.6	115599.2	148199,3	192699.2
Agricultural crops cultivated area, thousand hectares	3778.3	3647.5	3708.4	3694.2	3706.7	3474,5	3396.0
Agriculture, bln. soum	696.8	3323.1	18119.0	55429.2	61755.1	83303,4	102495.1
Animal husbandry, billion soum	690.4	2655.2	12737.7	44175.4	53844.1	64895.9	90204.1

From the data in Table 1, it is observed that in the year 2000, the total volume of agricultural output amounted to 1,387.2 billion soums. Of this, 50.2 percent (696.8 billion soums) was generated from crop production, while 49.8 percent (690.4 billion soums) came from livestock production. In the same period, livestock output per capita reached 3,778.3 thousand soums, reflecting the balanced contribution of both sub-sectors to overall agricultural development.

By 2018, total agricultural output had increased by 38.9 times compared to 2000, reaching 192,699.2 billion soums. Within this structure, crop production accounted for 53.2 percent (83,303.4 billion soums), whereas livestock production contributed 46.8 percent (64,895.9 billion soums).

It is important to emphasize that these significant growth rates were achieved despite a reduction of **382.3 hectares in cultivated land area** compared to 2000. This outcome demonstrates that agricultural progress in Uzbekistan during this period was driven primarily by **intensive development strategies**, particularly through improved **land reclamation practices** and the **efficient use of water resources**.

Methods. The research methodology is based on a combination of quantitative and qualitative approaches. Specifically, the study applies statistical analysis to process empirical data and reveal structural patterns, while monographic observation is employed to examine individual cases in depth. Methods of induction and deduction are used to ensure logical consistency in drawing general and specific conclusions.

In addition, the study relies on abstract reasoning to formulate theoretical generalizations, while economic and mathematical modeling allows for the identification of functional relationships and the simulation of possible development scenarios. To complement these methods, expert assessments and rating evaluations are applied, enabling the integration of professional judgments and comparative analysis of alternatives.

Together, this methodological framework ensures both scientific rigor and practical applicability of the research results.

Results. The primary factors behind the low profitability of agricultural enterprises include the reliance on self-financing and appropriated funds, the decline in investment inflows, low levels of employee remuneration, and the persistent price disparity between agricultural and industrial products. In many cases, the profitability of production is sustained at the expense of suppressed wages, making this factor decisive for the survival of most farms in the region.

Moreover, multi-sectoral farms demonstrate relatively stronger financial positions, as their accounts contain larger amounts of available funds compared to single-sector farms. This financial flexibility provides them with broader opportunities to allocate resources purposefully and invest in productive development.

Discussions. Raising wages in the agricultural sector plays a crucial role in motivating employees, strengthening their commitment to work, and enhancing the competitiveness of agricultural products. Higher incomes also contribute to the improvement of rural living standards, the expansion of human capital, and the social stability of the rural population.

At the same time, higher wages inevitably increase production costs and tax liabilities, which can reduce profitability—particularly in regions with unfavorable agricultural conditions. Research findings indicate that the formation of multi-sectoral farms has created opportunities to balance this trade-off. Such farms are better able to compensate for the rising labor costs by diversifying revenue streams, thereby mitigating

the potential negative effects of lower profitability and preserving competitiveness in agricultural production.

Based on the organization of multi-sectoral farms, it will be possible to organize agricultural products processing, cooperation with neighboring agricultural enterprises and other additional complex structures managed by agricultural producers.

To enhance the activities of multi-sectoral farms, it is necessary to establish marketing services that connect production with urban markets and business structures. The integration of such services within the framework of public-private partnerships provides several advantages:

- **Increased profitability and income** of multi-sectoral farms through expanded market access;
- **Strengthened cooperation** between multi-sectoral farms, household plots, and peasant (farmer) farms, thereby enlarging the overall sales volume;
- **Growth of rural employment and real incomes**, contributing to improved living standards and social stability.

Effective development of rural areas—particularly in terms of raising household incomes and ensuring employment—can therefore be achieved through the efficient organization of multi-sectoral farms. In this context, priority should be given to the training of highly qualified specialists and the continuous improvement of farm managers' skills.

Based on the research analysis, the following **priority measures** are required to increase the efficiency of multi-sectoral farms:

1. **Balanced use of agricultural land** to ensure long-term sustainability;
2. **Improving the productivity of agricultural products** through intensive and innovative methods;
3. **Maximizing export opportunities** to strengthen the competitiveness of agriculture in global markets;
4. **Enhancing the efficiency of budgetary support** for agricultural financing;
5. **Ensuring secure land ownership rights** for farms to strengthen investment incentives;

Developing and implementing modern management methods, thereby improving governance mechanisms and institutional capacity of multi-sectoral farms.

Along with the growth of gross domestic product (GDP), the development of its sectoral network structure remains one of the most urgent issues of the current era. Within the scope of this research, it is particularly important to assess the impact of socio-economic and demographic factors on the dynamics of the gross agricultural output of farms in the Republic of Uzbekistan.

For this purpose, the following explanatory variables were selected as factors influencing farm output (**Y**):

- X_1 – volume of investment in agriculture (billion soums);
- X_2 – real total income per capita (thousand soums per year);
- X_3 – number of people employed in the agricultural sector (thousand persons);

- X_4 – population density in the country (persons per square kilometer per year).

On this basis, an econometric regression equation was constructed and analyzed to identify the quantitative influence of each factor on the change in the gross agricultural product (see Table 2).

Table 2. Correlation coefficient between the selected factors of the gross output of farms of the Republic of Uzbekistan

	Y	X1	X2	X3	X4
Y	1	-	-	-	-
X1	0,752336	1	-	-	-
X2	0,98506	0,787484	1	-	-
X3	0,897593	0,515908	0,79501	1	-
X4	0,957394	0,81823	0,954609	0,979945	1

Table 3. Criteria-based testing of regression equation coefficients and reliability

Dependent Variable: LNY				
Method: Least Squares				
Date: 12/03/20 Time: 12:32				
Sample: 2000 2019				
Included observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN X_1	0.442429	0.402704	1.098645655	0.0120
LN X_2	2.192569	0.940448	2.331409073	0.0329
LN X_3	0.039426	0.682030	0.057806841	0.0462
C	-13.44545	10.01737	-1.342123177	0.0094
$t_{jad}=2,119905285$				
R-squared	0.959137	Mean dependent var		8.512908
Adjusted R-squared	0.951476	S.D. dependent var		2.030439
S.E. of regression	0.447270	Akaike info criterion		1.405550
Sum squared resid	3.200814	Schwarz criterion		1.604696
Log likelihood	-10.05550	Hannan-Quinn criter.		1.444425
F-statistic	125.1851	Durbin-Watson stat		1.845037
Prob(F-statistic)	0.000000	$F_{jad}=3,238871522$		

According to the data of Table 2, it was found that all the factors are strongly connected with the resulting factor agricultural output, however, the country's population density (population per 1 sq. km per year) – X_4 factor with other factors ($r_{(x_1,x_4)}=0.81823, r_{(x_2,x_4)}=0.9546$ and $r_{(x_3,x_4)}=0.9799$) $r_{(\sim_n, x_{(n+1)})} > 0.8$ because it creates multicollinearity, in order to ensure the reliability and adequacy of the model,

we exclude the factor of population density in the country in the study. Now, based on the selected indicators, we move from the variation of the measurement units to the logarithm and continue the process by defining the regression equation and using the Ewiews program to check its reliability and adequacy (Table 3).

Based on the data of Table 3, it should be noted that the determined regression equation (1) is expressed as follows:

$$\ln Y = 0,44 \ln X_1 + 2,19 \ln X_2 + 0,04 \ln X_3 - 13,454445 \tag{1}$$

We can exponentiate this logarithmic equation (1) to bring it to a linear equation, and according to it, the logarithmic equation (1) will look like this:

$$Y = \frac{X_1^{0,44} * X_2^{2,19} * X_3^{0,04}}{e^{13,454445}} \tag{2}$$

We check the significance of the determined equation (2) $\alpha=0.05$ for the case $F_{jad}=3,239$ when $k_1=3, k_2=16$. According to the data in the table, the regression equation (2) determined by the fact that $F_{his}=125.2$ and $F_{his} > F_{condition}$ is fulfilled is significant, but ($t_{jad}=2.12 > t_{x1}=1.0986; t_{x3}=0.058$) according to $t_{jad} > this$ condition MAPE this parameter We check with the criteria <10 and $TIC < 1$ (Fig. 1).

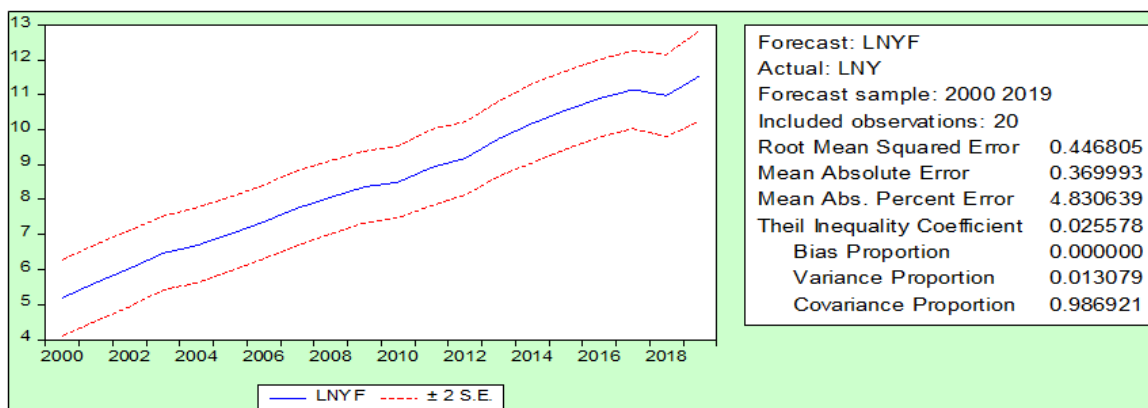


Figure 1. Assessing the retrospective predictive quality of a variable.

According to the condition, - due to the good accuracy of the forecast and using $MAPE=4.83 < 10$ and $TIC=0.026 < 1$, parameters X_1 and X_3 were also proved to be significant, and model (2) determined from $DW=1.85 \leq 2$ was reliable and adequacy arises.

According to regression equation (2), 1 bln. increase to 0.6 billion sums of the gross output of farms. to soums, increasing the total real income per capita by 5.6 million soums. 15.8 mln. per soum and by increasing the number of items in the network by one unit. it was found that it is possible to increase it to soum.

Now, in Namangan region, which is the object of the research, the factors affecting the gross output of farms- Y are the number of people employed on the farm - X_1 , the area of agricultural crops - X_2 , real total income per capita - X_3 and the population density in the area (per year, 1 sq. .population per km)- we will continue the research on X_4 . According to its results, the following were determined (Table 3).

Table 3. Correlation coefficient between factors of the agricultural product of Namangan region

	Y	X1	X2	X3	X4
Y	1	-	-	-	-
X1	0,884914	1	-	-	-
X2	0,794147	0,524794	1	-	-
X3	0,894589	0,798956	0,525572	-	-
X4	0,98861	0,927926	0,881338	0,936035	1

Based on the information in the table, all the factors selected for the volume of agricultural products are strongly connected and the population density in the area (per year, population per 1 sq.km) with other factors ($r_{(x1,x4)}=0.9279, r_{(x2, x4)}=0.8813$ and $r_{(x3,x4)}=0.9360$) created multicollinearity under the condition $r_{(x_{i-1},x_i)} > 0.8$. According to it, we continue to determine the regression equation with the remaining factors, population density (population per 1 sq. km per year)– X4. It should be noted that since the measurement units of the selected factors are different, we logarithmize all indicators, and this, in turn, determines the regression equation will not have a linear form. For the regression equation, it is first required to check the coefficients and their reliability and significance, which is done using the Ewievs program (Table 4).

Table 4. Regression equation coefficients and test results for reliability criteria

Dependent Variable: LNY				
Method: Least Squares				
Date: 12/02/20 Time: 15:15				
Sample: 2000 2019				
Included observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN _{X1}	1.089575	3.61693	0.301243	0.0537
LN _{X2}	0.798733	9.14803	0.087312	0.0319
LN _{X3}	1.241637	0.40453	3.069332	0.0075
C	-13.0831	55.7804	-0.23455	0.0452
			$t_{jad}=2.119905$	
R-squared	0.989727	Mean dependent var		11.32019
Adjusted R-squared	0.987801	S.D. dependent var		1.545551
S.E. of regression	0.170705	Akaike info criterion		-1.520907
Sum squared resid	0.466241	Schwarz criterion		-1.321761
Log likelihood	9.209074	Hannan-Quinn criter.		-1.482032
F-statistic	513.8349	Durbin-Watson stat		1.9292811
Prob(F-statistic)	0.000000	$F_{jad}=3.006917$		

According to the table, the defined regression equation (3) looks like this:

$$\text{LnY}=1,089575\text{LnX1}+0,798733\text{LnX2}+1,241637\text{LnX3}-13,0831 \quad (3)$$

We can exponentiate this defined logarithmic equation according to the accuracy of calculations and the rule of use. Then the regression equation (3) is:

$$Y = \frac{X_1^{1,0896} * X_2^{0,798} * X_3^{1,242}}{e^{13,083086}} \quad (4)$$

will have an appearance. Now we check the significance of the coefficients of equation (4) according to the Student's test. It is known that $t_{jad}=2.119905$ when $\alpha=0.05$ and $df=16$, and only $tx_3=3.069$ parameter is significant in this model.

According to the condition, $MAPE < 10$, and according to the conditions $MAPE=1.236 < 10$ and $TIC=0.0067 < 1$, all the investigated parameters were proved to be significant. Now we test the significance of this regression equation according to Fisher's test. When the result is $k_1=3$, $k_2=16$, $F_{jad}=3.006917$, according to the table, it is equal to $F_{his}=513.8$ and since the condition $F_{his} > F_{jad}$ is fulfilled, the regression equation (4) is significant and the model determined from $DW=1.929 \leq 2$ is reliable and adequate. comes out.

Conclusion. According to regression equation (4), the following marginal effects were identified for Namangan region:

- An increase in employment in farms by one person leads to an additional rise of 15.9 million soums in farm output;
- An increase in land area by one hectare results in an additional rise of 39.1 million soums in farm output;
- An increase in real per capita income by one thousand soums contributes to an additional rise of 0.15 million soums in farm output.

These findings highlight that both labor engagement and land utilization remain decisive factors in boosting agricultural productivity, while income growth also has a measurable, albeit smaller, effect.

REFERENCES

1. Будущее продовольствия и сельского хозяйства: Цели и альтернативы глобального устойчивого развития. <https://assets.publishing.service.gov.uk>
2. Ўзбекистон Республикаси Давлат статистика қўмитаси маълумотлари асосида муаллиф ишланмаси
3. Rashidov R. Tadbirkorlik iqtisodiy faoliyatni tashkil etish shakli sifatida// Biznes-Expert jurnali, 2022-yil 11-12 (179-180)-soni, – B. 71-73. (08.00.00; №3).
4. Rashidov R. Madaniyat, iqtisod va tadbirkorlik tasavvurini shakllanishi va o'zaro bog'liqligi// Mashinasozlik ilmiy-texnika jurnali, 2022-yil. №6-soni, – B. 782-786.
5. Rashidov R. Mamlakatimiz iqtisodiyotida kichik biznesning tutgan o'rni va uning rivojlanish holati// Berdaq nomidagi Qoraqalpoq Universitetining Axborotnomasi. 2022-yil 4(58)-son, – B. 60-62.(08.00.00; №26)
6. Rashidov R. Characteristics of business activity during the transition to the innovation economy// Namangan muhandislik-texnologiya instituti ilmiy-texnika jurnal, 2022-yil. №6-soni, – B. 426-431.

7. Bustonov, M.M. Macroeconomic trends and patterns of sustainable economic growth and its quality. *Test Engineering and Management*, 2019, 81(11-12), страницы 1581–1595
8. Digital Spillover Measuring the true impact of the digital economy. – Huawei, Oxford Economics.
9. The Global Information Technology Report 2016. – World Economic Forum and INSEAD, 2016, 290 p.
10. McKinsey Quarterly 2018 Number 4: Overview and full issue. – McKinsey Quarterly, 14 Dec 2018.
11. Rashidov R., Adaxamov X., Sidiqov D. Kichik biznes va xususiy tadbirkorlikni rivojlantirishda innovatsiyalarni oʻrni. Monografiya. – N.: Usmon Nosir, 2022-yil. – B. 114.
12. Rashidov R., Xasanova Z. Aholi daromadini oshirishda oilaviy tadbirkorlik faoliyatini rivojlantirish yoʻnalishlari. Monografiya. – N.: Arjumand mediya, 2023-yil. – B. 114.
13. Rashidov R., Rustamov A. The importance of digital payment systems in the digital economy// *Namangan muhandislik-texnologiya instituti ilmiy-texnika jurnal*, 2021-yil. №6-soni, – B. 279-285.
14. Rashidov R., Usmanov R. Omparative analysis of investment activity in the republic of uzbekistan in 2021// *Namangan muhandislik-texnologiya instituti ilmiy-texnika jurnal*, 2022-yil. №1-soni. – B. 125-131.
15. Rashidov R., Mirzaev Q. Kichik biznes subʼektlarini rivojlantirishda innovatsiyaning roli va ahamiyati// *Mashinasozlik ilmiy-texnika jurnali*, 2022-yil. №6-soni, – B. 771-781.
16. Rashidov R., Toxtoboyev N. The role of free economic zones in the development of the national economy// *European Scholar Journal (ESJ)*, Volume 3, Issue 1-2022, pages: 59-63. (ISSN – 2660-5562), (SJIF: 7.235).
17. Rashidov R., Abdulkakimov Z., Abdumutaliyev A. The role of investment in economic development// *TRANS Asian Journal of Marketing & Management Research (TAJMMR)*, Volume 10, Issue 5-2021, pages: 72-76. (ISSN – 2279-0667), (SJIF: 7.263).
18. Rashidov R., Usmanov R. Issues of using bank credits in development of family entrepreneurship// *World Journal of Advanced Research and Reviews*, Volume 15, Issue 01-2022, pages: 418-423. (ISSN – 2581-9615), (SJIF: 7.8).
19. Rashidov R., Sidikov D. The nature of resource-saving technologies and features of their use in cotton farming// *Galaxy international interdisciplinary research journal (GIIRJ)*, Volume 10, Issue 10-2022, pages: 65-68. (ISSN – 2347-6915), (SJIF: 7.718).
20. Рашидов Р., Хасанова З. Роль представлений работодателей в образовательной политике вузов // *Экономика и социум*. 2022 йил 12 (103)-сон. Часть 12.

C O N T E N T S

TECHNICAL SCIENCES: COTTON, TEXTILE AND LIGHT INDUSTRY

Dustkobilov U.	
Circular economy practices in the textile industry: Current status, indicators, and development opportunities	3
Kuldashov G., Oripov J.	
Forecasting the temperature gradient of cotton revolt	10
Kuldashov G., Oripov J.	
Optoelectronic three-wave moisture meter of raw cotton	16
Umarov A.	
Research on the optimization of the saw gin's roll box	26
Tursunov A., Sharibaev N.	
Techniques and devices for mitigating environmental pollution in cotton processing industries	36
Ganikhanov Kh., Mavlyanov A., Abdusamatov A., Mirzaumidov A.	
Effect of the forces on the separation of fiber flow from the saw in an improved lower fiber removal device	43
Nurulloyeva Kh., Abdusamatov A., Mirzaumidov A.	
Experimental determination of the load on the multifaceted columns on the elastic supports of the cotton ginner	49
Muradov A.	
Study of the dynamics of the drive mechanism of moving needles	54
Ismatullayev N., Shamsiyeva M.	
Development of technology for producing leather from african catfish skins	59
Rahmatova S.	
Theoretical study of the quality indicators of newly structured knitted fabrics based on a mathematical model	65
Parpieva N., Kayumov J., Parpiyev D., Lastochkin P.	
Theory of torsional vibrations of grooved cylinders	71
Komilov Sh., Mamadaliyev N., Jurayeva G.	
Quality indicators of cotton fiber analyzed	83

TECHNICAL SCIENCES: AGRICULTURE AND FOOD TECHNOLOGIES

Sobirova M., Mohamed R., Farmonov J., Samadiy M.	
Impact of calcium chloride on the cheese yield during swiss cheese manufacturing process	91

Kurayazov Z., Ravshanov S., Kanoatov X.	
Analysis of the influence of the whitening process during preparation for flouring on the quality of bakery flour made from a mixture of wheat and rye grains	96
Xusanxodjayeva F., Meliboyev M., Ergashev O.	
Development of technology for complex processing of garlic onions	105
Meliboyev M.	
Development of complex processing technology for the secondary mass of watermelons and zucchini	112
Nishonov U., Mominov U.	
Evaluation of organoleptic properties of soft drinks prepared from plant materials	118
Khurmamatov A., Yusupova N., Sarsenbayev N., Mallabayev O.	
Results of determination of bitumen movement modes at different temperatures	124
Yusupova N., Sarsenbayev N., Mallabayev O.	
Results of improving the construction of the plate heat exchange	130

CHEMICAL SCIENCES

Jumayeva D., Zaripbaev K., Oxunjonov Z., Nomonova Z.	
Compositional analysis of raw materials in sorbent production	135
Abdumalikov A., Ummatov O., Mamajonov B., Esonkulova N., Ochilov G.	
Thermal treatment of various samples of low-molecular-weight polyethylene – a by-product of polyethylene production	145
Mamajonova M., Salixanova D., Abduraxmonov E., Ismailova M.	
Energetics of water molecule adsorption on modified bentonite surfaces	153
Abdurahimov A., Abdullayeva F., Usmonova Z.	
Infrared spectroscopic analysis of the purification of sunflower oil from waxy substances using perlite and vermiculite	160
Eshbaeva U., Gökhan Z., Bahri B.	
Theoretical foundations for ensuring the mechanical strength of papers containing collagen hydrolysates	167
Eshbaeva U.	
Research on the printing and technical properties of kraft paper incorporating "cotton cellulose-industrial waste-paculate"	172
Makhkamova D.	
Research on the separation of zinc from metallurgy waste with a mixture of ammonia and ammonium salts	181
Yuldasheva M., Makhkamova D., Turayev Z	
	188

Study of interaction of components in the H_3BO_3 – KNO_3 – H_2O system	
Juraev M., Siddikov D., Askarova O.	
Aboveground components of salvia sarawschanica	194
Davlatova O.	
Zeolite-based bimetallic composite catalysts for pyrolysis and gasification: chemical technologies for deep biofuel upgrading and conversion intensification	202
Davlatova O.	
Use of BaNaY faujasite zeolite-based bimetallic composite catalysts for deep biofuel purification and selective xylene separation	208
Shamuratova M., Giyasidinov A., Eshmetov I., Nurjanova G.	
On the study of physicochemical properties of soils in the regions of the republic	214
Hoshimov F., Lutpillayeva M.	
Optimized chemical synthesis of stable silver nanoparticles using various reducing and stabilizing agents	220
Sarimsakova N.	
Investigation of the adsorption properties of the sorbent obtained in the process of modification of clinoptilothite in the purification of natural gas from sulfur compounds	227
Aliyeva M., Kokharov M., Bakhronov Kh., Sultonov A., Jumaeva D., Jumaboeva Z., Gaybullayeva D., Abdullaxanova G.	
Adsorption isotherm of hydrogen sulfide on an activated adsorbent derived from hybrid paulownia tomentosa wood	234
Ikramov M., Zakirov B.	
Optimization of the aqueous solubility of monoammonium phosphate, potassium nitrate, and magnesium nitrate via thermodynamic analysis and selective crystallization	243
Nazhimova N., Seitnazarova O., Mallabayev O., Abdukodirov E.	
Study of the chemical and mineralogical composition of thermal power plant wastes	249

TECHNICAL SCIENCES: MECHANICS AND MECHANICAL ENGINEERING

Berdiev U., Hasanov F., Avazov B., Ostanayev., Viktor M.	
Study of the nature and prospects of practical application of the magnetocaloric effect in energy-efficient cooling systems	256

Sodikov T.	
Research of mechanical part of solar photovoltaic power station	263
Otamirzayev D.	
Calculation of absorption coefficient of organic dye N719 for dye-sensitive solar cell (DSSC)	270
Abduvakhidov M.	
Study on determining the bending and torsional stiffness of packaged working bodies	276
Abduvakhidov M.	
The study torsion fluctuations packet worker organ with provision for influences of the correlation longitudinal acerbity their element	280
Shodmonov J.	
Energy-integrated smart textiles: international trends and prospects for uzbekistan's research ecosystem	285
Djurayev Sh.	
Integrated genetic-differential evolution approach for simultaneous pressure-drop reduction and efficiency enhancement in multi-cyclone dust collectors	292
Mamaxanova Z.	
Technological principles for creating a suit that ensures high reliability and safety in aquatic environments	297
Pirnazarov U.	
Theoretic observation of the cotton movement in the operating camera of the new separator	306
Pirnazarov U.	
Investigation of the interaction between the moving separator screen surface and the cotton mass	315
Yusupov D., Abduraximov D., Muxammadjonov M.	
Determination of energy loss in the magnetic core of oil power transformers under long-term operation conditions	319

ADVANCED PEDAGOGICAL TECHNOLOGIES IN EDUCATION

Abdullayev X.	
Transition function of second-order element	326

ECONOMICAL SCIENCES

Isroilov R.	
Criteria, indicators and laws of small business development	331

Isroilov R.

Concept of assessment of the economic development potential of small business and its evaluation **340**

Salimov A.

Directions for effective use of resources in improving the quality of services in the higher education system **348**

Bustonov M.

Econometric analysis of the activities of multi-sectoral farms **354**

Bustonov M.

Global digitalization: paths and problems **362**

Kadirova Kh.

Prospects for development and improvement of the mechanism of functioning of the stock market **372**
