ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Satbayev University

Х А Б А Р Л А Р Ы

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Satbayev University

N E W S

OF THE ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
Satbayev University

SERIES
OF GEOLOGY AND TECHNICAL SCIENCES

1 (445)

JANUARY – FEBRUARY 2021

THE JOURNAL WAS FOUNDED IN 1940

PUBLISHED 6 TIMES A YEAR

ALMATY, NAS RK

NAS RK is pleased to announce that News of NAS RK. Series of geology and technical sciences scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of geology and technical sciences in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of geology and engineering sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді геология және техникалық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия геологии и технических наук» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК. Серия геологии и технических наук в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по геологии и техническим наукам для нашего сообщества.

«ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы».

ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ (Алматы қ.).

Қазақстан Республикасының Ақпарат және қоғамдық даму министрлігінің Ақпарат комитетінде 29.07.2020 ж. берілген **№ KZ39VPY00025420** мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Тақырыптық бағыты: ***геология және техникалық ғылымдар бойынша мақалалар жариялау.***

Мерзімділігі: жылына 6 рет.
Тиражы: 300 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219, 220 бөл.,
тел.: 272-13-19, 272-13-18,
http://www.geolog-technical.kz/index.php/en/

Типографияның мекенжайы: «NurNaz GRACE», Алматы қ., Рысқұлов көш., 103.

«Известия НАН РК. Серия геологии и технических наук».

ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан (г. Алматы).

Свидетельство о постановке на учет периодического печатного издания в Комитете информации Министерства информации и общественного развития Республики Казахстан **№ KZ39VPY00025420**, выданное 29.07.2020 г.

Тематическая направленность: ***публикация статей по геологии и технических наукам.***

Периодичность: 6 раз в год.
Тираж: 300 экземпляров.

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, 220, тел.: 272-13-19, 272-13-18,
http://www.geolog-technical.kz/index.php/en/

Адрес типографии: «NurNaz GRACE», г. Алматы, ул. Рыскулова, 103.

News of the National Academy of Sciences of the Republic of Kazakhstan. Series of geology and technology sciences.

ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty).

The certificate of registration of a periodical printed publication in the Committee of information of the Ministry of Information and Social Development of the Republic of Kazakhstan **No. KZ39VPY00025420**, issued 29.07.2020.

Thematic scope: ***publication of papers on geology and technical sciences.***

Periodicity: 6 times a year.
Circulation: 300 copies.

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://www.geolog-technical.kz/index.php/en/

Address of printing house: «NurNaz GRACE», 103, Ryskulov str, Almaty.

N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF GEOLOGY AND TECHNICAL SCIENCES
ISSN 2224-5278
Volume 1, Number 445 (2021), 46 – 51 **https://doi.org/10.32014/2021.2518-170X.7**

UDC 628.3 (574.54)

K. K. Anuarbekov[1], E. T. Kaipbayev[1], G. Mengdibayeva[2]

[1]Kazakh National Agrarian Research University, Almaty, Kazakhstan;
[2]Kazakh Research Institute of Plant Protection and Quarantine named after J. Zhiembaev, Almaty, Kazakhstan.
E-mail: kanat.anuarbekov@kaznau.kz, yerbolat.kaipbayev@yandex.ru, www.gulnaz87.kz@mail.ru

ASSESSMENT OF SOCIAL AND ENVIRONMENTAL DAMAGE CAUSED BY SEWAGE AND COLLECTOR-DRAINAGE WATER POLLUTION IN THE LOWER REACHES OF THE SYRDARYA RIVER

Abstract. The significant impact of irrigation on the natural and ecological situation in the zone of irrigated agriculture in Kazakhstan was determined by the concept of irrigation development in Central Asia and Kazakhstan.

The problem of reducing the existing environmental conditions on the irrigated lands of Kazakhstan, especially in the Southern and South-Eastern regions, and the normalization of the ecological and meliorative situation are directly related to various water management regions of Kyrgyzstan and Uzbekistan.

The Syrdarya river, which flows among these countries, comes to us with a water salinity of 1,75 g/l. They are also contaminated with pesticides, organochlorine pesticides – DDT (dichlorodiphenyltrichloroethane) and HCH (hexachlorocyclohexane), used on irrigated land. Water salinity is also increasing in the territories of Kazakhstan.

In general, on irrigated lands, as a result of salt intake from irrigation waters, there was an increase in salt reserves in soils and ground waters. Their intensity largely depends on the salinity of irrigation water and the volume of water intake. As a result of regulating the flow of the river. An irreversible soil-ecological process is taking place in the Syrdarya with great intensity, where the development of irrigated land and the volume of CDW (collector-drainage water) and wastewater discharged into the rivers in the upper reaches of the rivers has been widely developed.

Key words: mineralization, wastewater, irrigation system, salt balance, irrigation regime, collector-drainage water.

Introduction. Thus, as a result of anthropogenic impact in the natural environment of the river basin, in the Syrdarya, salt accumulates mainly in ground water, which can dramatically worsen the reclamation and environmental situation on irrigated lands and transfer it from the zone of controlled and accounted for consequences to the zone of uncontrolled and not accounted for, as in the Aral sea basin.

Therefore, the system of economic levers should include such management parameters as cost estimates of damage from water pollution. This will encourage the introduction of environmental and resource-saving technologies in agriculture, as well as compensation for damage caused to agriculture as a result of water pollution.

A full calculation of the damage to the national economy and the state caused as a result of the negative impact of economic activities on water resources is possible on the basis of an economic assessment and consideration of factors affecting the environmental situation of the region, which include economic, socio-economic and social damage.

Economic damage (*Ei*) – losses from product quality reduction (*Ep*), losses from product under-receipt (*Ec*), costs of restoring or maintaining the normal state of the natural environment (*Em*).

Socio-economic damage (*ESi*) – losses in health and social security related to the increase in morbidity (*Esm*), losses due to migration caused by the deterioration of the natural environment (*ESp*), the cost of additional recreation due to the unsatisfactory state of the natural environment (*ESr*).

Social damage (*Si*) – ecstatic losses due to the destruction of the natural environment (*Se*), psychological losses caused by the unsatisfactory state of recreation areas (*Sp*), losses caused by the deterioration of the environmental conditions of life of members of society (*Sl*). All this is the amount of transformable damage caused to the national economy from pollution of water sources and is defined as the sum of individual damages, i.e.:

$$\sum Di=Ei+ESi+Si=(Ep+Ec+Ea+Em)+(ESm+ESp+ESr)+(Se+Sp+Sl), \quad (1)$$

The economic damage caused by water sources pollution caused by water consumers who carry out various measures to restore lost products is determined by the formula:

$$Ep=(P_1-P_2)VP, \quad (2)$$

where $Ц_1$ and $Ц_2$ are the purchase price of agricultural products before and after contamination of the water source; ВП is the annual volume of agricultural production.

$$Ec=\Delta VP(C_2-C_1+K), \quad (3)$$

where C1 and C2 are the annual production costs, respectively, before and after source pollution and humus removal; Δ VP - decrease in annual production when a water source is polluted and soil fertility decreases; ΔK - increase in specific capital investments of a water consumer when a water source is polluted and loss of fertile soils.

The economic assessment of the annual damage from the annual discharge of pollutants into the water management area is determined by the formula:

$$Eai=144*б_к*M, \quad (4)$$

where $б_к$ is a constant that characterizes water management areas and river basins; M is the reduced mass of the annual discharge of impurities by this source of pollution into the water source, conditionally T/year and is determined by the formula:

$$M=\sum_{i=1}^{N} Ai*m_i, \quad (5)$$

where *i* - ordinal number of the discharged impurities; m_i is the total mass of the annual reset of the *i*-th impurity, T/year; *N* is the total number of impurities, discharged into the water source; *A* - the relative hazard of resetting the *i*-th substance in reservoirs, conditionally T/year, determined by the formula:

$$Ai= 1 / MPCp/x/, \quad (6)$$

where *MPCp /x/* is the maximum permissible concentration of the *i*-th substance in the water used for fisheries purposes, t/ m^2.

The A_i value for some common pollutants, depending on the type of wastewater, is shown in table 1.

Economic damage from the cost of restoring or maintaining the normal state of the natural environment is determined by the formula:

$$Em=(Cs_1-Cs_2)*W_i, \quad (7)$$

where Cs_1 *and* Cs_2 are the cost of treatment per 1m^3 of water before and after certain stages of water protection measures, tenge; *Wi* is the volume of contaminated water, m^3.

Methods. Socio-economic damage due to increased morbidity is determined by the direct counting method, which consists in comparing the incidence rates in the studied polluted and control (non-polluted) areas. In this case, the damage due to increased morbidity *(ESm)* is defined as the sum of the cost of "unexpected" products and treatment costs.

$$ESm=U+H_1+H_2, \quad (8)$$

where *U* is the cost of under-delivered products, tenge; H_1-funds spent on hospital treatment, tenge; H_2 - the same for medical examination of patients, tenge.

$$U=O*I_{wd}, \quad (9)$$

where O is the average output of one worker per day, tenge; I_{wd} is the number of working days lost due to disability due to increased morbidity.

$$H_1=K*D, \quad (10)$$

where K is the cost of hospital bed days, tenge: D is the number of days of hospital stay.

$$H_2=K_1*D_1, \quad (11)$$

where K_1 is the cost of one doctor's visit, tenge; D_1 is the duration of medical examination.

Losses due to migration caused by environmental degradation (*ESp)* and is defined as the sum of "non-produced products and compensation costs".

$$ESp=N_1+Cc=(Aa*St)+(Ce*P), \quad (12)$$

N_1 - the cost of non-produced products due to migration of personnel, tenge; *Aa* - average annual output of one employee, tenge; *St* - staff turnover due to deterioration of the natural environment, h; *Cc* - compensation costs due to migration caused by deterioration of the natural environment, tenge; *Ce* - the amount of compensation expense received due to migration; *P* - the number of people changing their residence due to deterioration of the natural environment, people.

The cost of additional recreation required due to the unsatisfactory state of the natural environment (*ESr*) is determined as the amount:

$$ESr=U+Sm=A*Nr+Hc*Hr, \quad (13)$$

where *Nr* is the number of working days lost for additional rest necessary due to the unsatisfactory state of the natural environment; *Hc* is the cost of bed days in holiday homes and resorts; *Hr* is the number of days spent in a holiday home and resort.

Results. The most difficult task was to determine the social damage received by the national economy from water pollution and depletion. Since the payment for social damage caused by environmental pollution has not been established, they can be estimated based on the standards for the cost of new land as a means of production in the national economy, i.e.

$$Si=(Sm+ Sp + Sl)=F(C_0+ Ces), \quad (14)$$

where F is the area of the recreation area in river basins, ha; C_0 - is the cost of land tenge/ha; *Ces* is the capital investment spent on restoring the ecological situation of the recreation area, tenge/ha.

Losses from water pollution are equated to the costs necessary to restore the quality of contaminated water to the required condition. The amount of losses is determined depending on the mass of discharged pollution *(Pi)*, specific values of losses, type of pollution *(i)* and categories of water body and is determined by the formula.

$$P_i=Q_i(K_{opi}-K_{hi})*t^i*10^{-6}, \quad (15)$$

where *Pi* - weight of *i*-th contaminated substances, taken into account when calculating the damages (m_i); Q_i - flow rate of return water exceeds the *i*-th pollutant, m^3/t; K_{opi} and K_{hi} - average for the reset period of the concentration of the *i*-th pollutant, respectively, the actual and permissible according to the standards and agreed with the authorities on regulation of use and protection of water, g/m^3; t^i - is the reset period of the *i*-th contaminated substances hour.

At this concentration, the amount of damage can be determined by the reduced cost of cleaning water from a contaminated source to the requirements of the "rules for the protection of surface water" using the formula:

$$D_i=P_i*C_s; \quad (16)$$

where Y_i is the damage caused by water pollution, tenge; C_s is the specific amount of losses caused to the national economy from the mass of discharged pollutants, tenge/t.

Table 1 – Estimated values for preventing economic damage when using wastewater for irrigation

Indicators of pollution	Reduced weight of annual discharge of impurities (mm) us, g/m	Pollution concentration, content in wastewater before irrigation, g/m^3	Degree of soil purification (MPC), g/m^3	Amount of dirt removed by the soil, m, g/m^3	Indicator for the dangerous discharge of impurity *i* of the substance (*Ai*)
Suspended solids	Municipal sewage	485,4	20,0	465,4	0,05
*BOC_5	23,3	120,0	3,0	117,0	0,33
**COD	38,6	152,0	6,0	146,0	0,17
Total nitrogen	24,8	13,4	–	3,4	0,10
Suspended solids	0,3	595,0	20,0	585,0	0,05
BOC_5	Poultry factories	1500,0	3,0	1497,0	0,33
COD	29,3	850,0	6,0	844,0	0,17
Total nitrogen	494,0	64,0	10,0	54,0	0,10
Suspended solids	143,5	1987,0	20,0	1967,0	0,05
BOC_5	5,4	–	–	–	–
COD	Animal and water complex runoff (cattle)	214,0	6,0	5208,0	0,17
Total nitrogen	98,4	805,0	10,0	795,0	0,10
Suspended solids	–	143,0	20,0	123,0	0,05
BOC_5	885,4	59,0	3,0	56,0	0,33
COD	79,5	313,0	6,0	307,0	0,17
Total nitrogen	Standard clean waters of industrial enterprises	29,0	10,0	19,0	0,10
Suspended solids	6,2	800,0	20,0	780,0	0,05
BOC_5	18,5	–	–	–	–
COD	52,2	144,2	6,0	1436,0	0,17
Total nitrogen	1,9	1288,0	10,0	1278,0	0,10
Suspended solids	Meat processing plant drains	328,0	20,0	308,0	0,05
BOC_5	39,0	–	–	–	–
COD	–	352	6,0	346,0	0,17
Total nitrogen	244,1	23	10,0	13,0	0,10
	Drains of the cotton mill	15,4	–	58,8	1,3
* - Biochemical oxygen consumption ** -Chemical oxygen demand					

Based on the use of hydrogeological and hydrochemical data. We have determined the amount of social and environmental damage from the mass of discharged wastewater and CDW, taking into account the type and chemical composition, as well as its specific features (table 2).

Table 2 – Socio-economic damage from Syrdarya river pollution with in the Republic of Kazakhstan

Source of pollution	Indicators		
	P_i, mln.t	C_y, tenge/t	Y_i, mln.tenge
Industry	0,25	130,14	32,535
Communal service	0,52	130,32	67,766
Agricultural industry	0,015	126,0	1,894
CDW from irrigated land	10,09	129,6	1297,3
Surface runoff from urban areas	0,20	128,7	25,74
TOTAL:	11,075	644,76	1425,235

As can be seen from table 2, huge social and environmental damage was caused by the South Kazakhstan and Kyzylorda regions in the basin of the river Syrdarya, where irrigated agriculture and industry are widely developed, which amount to 1425.235 million tenge.

Thus, today every sovereign state has the right to demand compensation for social and environmental damage that occurs when water resources are polluted by water users located in the upper reaches of rivers. To do this, it is necessary to develop an economic mechanism for nature management that would ensure the most complete coordination of individual, collective and state interests in the protection of the environment and the rational use of natural resources.

К. К. Ануарбеков[1], Е. Т. Кайпбаев[1], Г. Ж. Меңдібаева[2]

[1]Қазақ ұлттық аграрлық зерттеу университеті, Алматы, Қазақстан;
[2]Ж.Жиембаев атындағы өсімдік қорғау және карантин ғылыми-зерттеу институты

СЫРДАРИЯ ӨЗЕНІНІҢ ТӨМЕНГІ АҒЫСЫНДАҒЫ ТӨГІНДІ ЖӘНЕ КОЛЛЕКТОР-ДРЕНАЖ СУЫНЫҢ (КДС) ЛАСТАНУЫНАН КЕЛЕТІН ӘЛЕУМЕТТІК-ЭКОЛОГИЯЛЫҚ ЗИЯНЫН БАҒАЛАУ

Аннотация. Қазақстанның суармалы егіншілік аймағындағы табиғи-экологиялық жағдайға суарудың маңызды әсері Орта Азия мен Қазақстандағы ирригацияны дамыту тұжырымдамасы негізінде анықталды.

Қазақстанның суармалы жерлерінде, әсіресе, оңтүстік және оңтүстік-шығыс аймақтарында қалыптасқан экологиялық жағдайды азайту және экологиялық-мелиоративті жағдайды

Бізге осы елдерде ағып жатқан Сырдария өзені суының тұздылығы 1,75 г/л-мен келеді. Ол суармалы жерлерде қолданылатын пестицид, хлорорганикалық пестицидтермен – ДДТ (дихлордифенилтрихлорэтан) және НСН (гексахлорциклогексан) арқылы ластанған. Судың минералдануы Қазақстан аумағында да артып келеді.

Жалпы суармалы жерлерде тұздың суармалы сумен келуі нәтижесінде топырақта және жерасты суында тұз қорының көбейгені байқалды. Олардың қарқындылығы көбінесе суармалы судың тұздылығына және су алу мөлшеріне байланысты.

Сырдария өзенінің ағынды суын реттеу нәтижесінде суармалы жерлерді игеру және өзендерге құйылатын КДВ (коллекторлық-дренажды су) көлемі мен өзендердің жоғарғы ағысындағы ағынды су мөлшері кең дамыған қайтымсыз топырақтық-экологиялық үдеріс жүреді.

Түйін сөздер: минерализация, төгінді су, суғару жүйесі, тұз тепе-теңдігі, суғару режимі, коллектор-дренаж су.

К. К. Ануарбеков[1], Е. Т. Кайпбаев[1], Г. Ж. Мендибаева[2]

[1]Казахский национальный аграрный исследовательский университет, Алматы, Казахстан;
[2]Казахский научно-исследовательский институт защиты и карантина растений им. Ж. Жиембаева

ОЦЕНКА СОЦИАЛЬНО-ЭКОЛОГИЧЕСКОГО УЩЕРБА ОТ ЗАГРЯЗНЕНИЯ СТОЧНЫМИ И КОЛЛЕКТОРНО-ДРЕНАЖНЫМИ ВОДАМИ В НИЗОВЬЯХ РЕКИ СЫРДАРЬЯ

Аннотация. Значительное влияние ирригации на природную и экологическую обстановку в зоне орошаемого земледелия Казахстана было определено концепцией развития ирригации в Центральной Азии и Казахстане.

Проблемы снижения существующей экологической обстановки на орошаемых землях Казахстана, особенно в южных и юго-восточных регионах, и нормализации эколого-мелиоративной обстановки непосредственно связаны с различными водохозяйственными районами Кыргызстана и Узбекистана.

Река Сырдарья, протекающая между этими странами, приходит к нам с минерализацией воды 1,75 г/л. Они также загрязнены пестицидами, хлорорганическими пестицидами – ДДТ (дихлордифенилтрихлорэтан) и ГХГ (гексахлорциклогексан), используемыми на орошаемых землях. Минерализация воды и на территориях Казахстана.

В целом на орошаемых землях в результате поступления соли из оросительных вод наблюдалось увеличение запасов соли в почвах и грунтовых водах. Их интенсивность во многом зависит от минерали-

зации оросительной воды и объема водозабора. В результате регулировалось течение реки. Необратимый почвенно-экологический процесс с большой интенсивностью протекает в Сырдарье, где широко развито освоение орошаемых земель и объем сбросов ЦДО (коллекторно-дренажных вод) и сточных вод в верхних течениях рек.

Ключевые слова: минерализация, сточные воды, оросительная система, солевой баланс, режим орошения, коллектор-дренажные воды.

Information about authors:

Anuarbekov Kanat, PhD, associate professor of the Department of “Water resources and melioration”, Kazakh National Agrarian Research University, Almaty, Kazakhstan; kanat.anuarbekov@kaznau.kz; https://orcid.org/0000-0003-0832-6980

Kaipbayev Yerbolat, PhD, associate professor of the Department of “Water resources and melioration”, Kazakh National Agrarian Research University, Almaty, Kazakhstan; yerbolat.kaipbayev@yandex.ru; https://orcid.org/0000-0002-7931-7881

Mendibayeva Gulnaz, PhD, Kazakh Research Institute of Plant Protection and Quarantine named after J. Zhiembaev, Almaty, Kazakhstan; www.gulnaz87.kz; https://orcid.org/0000-0002-0929-061X

REFERENCES

[1] Mustafayev Zh.S. Soil-ecological justification of agricultural land reclamation in Kazakhstan. Almaty: "Gylym," 1997. 57 p.

[2] Shomantayev A.A. Hydrochemical regime of watercourses and agricultural use of wastewater and drainage in the lower reaches of the Syrdary. Kyzylorda, 2001.

[3] Aidarov M.P. Regulation of water-salt and nutrient regimes of irrigated land. M: Agropromizdat, 1985. 304 p.

[4] Anuarbekov K.K., Zubairov O.Z., Nusipbekov M.Z. Influence of the improvement of water-salt regime on the yield // Biosciences Biotechnology Research Asia. April 2015, Vol. 12 (1), 999-1006.

[5] Anuarbekov K.K and other. Exploitation of wastewater irrigation system (WWIS) // News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences, Vol. 6, N 432 (2018). P. 129-136.

[6] Anuarbekov K., Zubairov O., Nusipbekov M. Improving water-salt regime in irrigated agriculture // Life Science Journal 2014; 11 (5): 459-464] (ISSN:1097-8135)

[7] Anuarbekov K.K and other. Water-saving technology of irrigation of corn // Journal News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences, Vol. 2, N 428 (2018). P. 149-155.

Publication Ethics and Publication Malpractice
in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of Sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of Sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www:nauka-nanrk.kz

ISSN 2518-170X (Online), ISSN 2224-5278 (Print)

http://www.geolog-technical.kz/index.php/en/

Редакторы *М. С. Ахметова, Д. С. Аленов, А. Ахметова*
Верстка *Д. А. Абдрахимовой*

Подписано в печать 01.02.2021.
Формат 70x881/8. Бумага офсетная. Печать – ризограф.
12,75 п.л. Тираж 300. Заказ 1.

Национальная академия наук РК
050010, Алматы, ул. Шевченко 28, т. 272-13-19, 272-13-18