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Содержание

ASSESSMENT OF HEAVY METALS IN THE ENVIRONMENTAL SYSTEM IN THE SOUTHERN UZBEKISTAN

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Abstract: *environmental system contamination by heavy metals is a global problem and influences a longer period of human life. Bibliographical analysis has allowed revealing that detailed programmed researches on estimation heavy metals in system "water-land" in southern Uzbekistan were not conducted. For example of the river basin Kashkadarya are choose representational plots with the help of GPS (Global Positioning System) and is realized sampling in 55 points. Laboratory analysis allows revealing some regularity and work out GIS - heavy metals of the region. Moreover, the adsorption of heavy metals from aqueous solution using expanded minerals was also investigated. Furthermore, the development of the technical decision is provided on the improvement of soils.*
Keywords: *heavy metals, environmental pollution, sampling, expanded minerals.*

ОЦЕНКА ТЯЖЕЛЫХ МЕТАЛЛОВ В СИСТЕМЕ ОКРУЖАЮЩЕЙ СРЕДЫ ЮЖНОГО УЗБЕКИСТАНА

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Аннотация: *загрязнение экологической системы тяжелыми металлами является глобальной проблемой и влияет на более длительный период жизни человека.*
В статье дан библиографический анализ выявления тяжелых металлов в системе «вода-почва» юга Узбекистана. Подобная работа в Кашкадарьинской области не проводилась. Помимо этого нами были исследованы и выделены репрезентативные участки с помощью GPS (спутниковая система навигации) и осуществлен отбор проб в 55 точках. Лабораторный анализ позволяет выявить закономерности и разработать ГИС тяжелых металлов региона. Кроме того, была исследована адсорбция тяжелых металлов из водного раствора вспученными минералами. В дополнение предусмотрена разработка технического решения по оздоровлению почв.
Ключевые слова: *тяжелые металлы, загрязнение окружающей среды, отбор проб, вспученные минералы.*

The problem of polluted water and degraded soils was actual always. At present anthropogenic influence powerfully tells to nature, but its main components water and soil - are the main sources of the food stuffs (97-98%). More dangerous in contrast with salinization, erosion, underflooding, alkanization and other negative reason is a contamination of water and soil by heavy metals. They already presently occupy the second place on degree of the dangers, yielding pesticides and vastly overtaking such known contaminants, as carbon and sulphur dioxides, in forecasting they must become the most dangerous, more dangerous, than wastes atomic power-plant and solid wastes. Contamination heavy metals is connected with their broad use in industrial production, motor transport and when contributing the high doses of the fertilizers and substances of protection plants (Mortvedt, 1995). The study heavy metal in soils, underground and surface waters concerned with many scientists. For instance, Wahba & Zaghloul (2007) compared different soil minerals such as montmorillonite, kaolinite and calcite adsorption ability (about 74.2%) of heavy metals. Calcite showed a higher adsorption capacity of Pb compare to montmorillonite and kaolinite. Moreover, researchers from Iran (Ghassabzadeh et al., 2010a) also investigated the ability of expanded perlite to different heavy metals from aqueous solutions using batch experiments.

And nevertheless, which is noted by V.D.Postavalov and E.V.Denisova: “At the last years problem of the polluting natural environment with heavy metals was attended more attention, but in conceptual, theoretical and practical plan it is not developed enough” (2010).

On the monitoring of Nature protection committee of the Republic of Uzbekistan is installed excess possible standards (the Bulletin board. T.: 2006, p.27) of the value of heavy metals on the area are located in close proximity industrial enterprises, tailing pit and sludge storage in Surkhandarya, Navoiy, Andijan, Namangan and Tashkent provinces of Uzbekistan. The local determination of heavy metals was conducted as a whole republic of Uzbekistan (Aparin B.V., Bakiev S.A. and others 1998-1999 y.), Karakalpakistan (Hudaybergenova A., 2009), in Khorezm (Zahidova D.V., 2002, 2004, 2005), Samarkand (Bobobekov I.N., Fayzullaev O.F., 2005, 2006), Navoiy (Abdurahmanov T.A., Ahmedov Sh.M., 1998), and Kashkadarya provinces (Muradov Sh.O., Holbayev B.M., 1992; Hydromet of Uzbekistan, 1998-2002).

Evidently, the detailed programmed researching of heavy metals in system "water-land" in separate basin was not conducted. Considering aforementioned facts, our researches are directed on estimation of the contamination with heavy metals water-land resources representational plots of Kashkadarya province, development of the technical methods on readjustment of soils.

Evidently, detailed programmed researching of heavy metals in system “water-land” in the separate basin were not conducted. Considering aforementioned facts, our researches are directed on the estimation of the contamination with heavy metals water-land resources representational plots of Kashkadarya province, development of the technical methods on readjustment of soils and are directed on the decision of the principle requirements emphasized in the fundamental monograph of the first president of the Republic Uzbekistan I.A.Karimov, where is noted: “Level of the using the inorganic mineral fertilizers in Uzbekistan in groups of ten once exceed at most possible rates. The real threat became intensive contamination of soils different type of industrial and domestic wastes”. Industry to salvaging toxic departure in Republics until it is created. So the most important problem guard natures in Uzbekistan is a recovery of its lands, the realization of the broad complex of the measures on reduction of the contamination of soils (Uzbekistan on threshold XXI century: Challenges to Stability and Progress. T.: -Uzbekistan, 1997. - p. 114-116). And is hereinafter noted in Edict of the President “About measure on the scolded improvement of the system мелиоративного improvements of the lands”: “Define in count; calculate; list the most important priority of the development of the agriculture for a period of 2008-2012 cardinal improvement land reclamation conditions of the irrigated lands”.

In the southern Uzbekistan, especially Kashkadarya region is a large object industrial enterprises (14.6% - a share of the polluting the atmospheric air of the Republic in the industrial enterprise area, basically such large enterprise as Shurtan gas chemical complex, Unitary Branch Establishment (UBE) "Shurtanneftgaz", Mubarek gas processing industrial plant, UBE "Mubarekneftgaz" – relates I categories to dangers, altogether 10 major enterprises, total atmospheric emission is composed 104,0 thousand tons in 2005-2006 years), motor transport (77,479 thousand tons contaminants in 2005-2006 y.) and irrigated agriculture (more than 500 thousand ha). Its climate represents typical continental climate and partly semi-tropical.

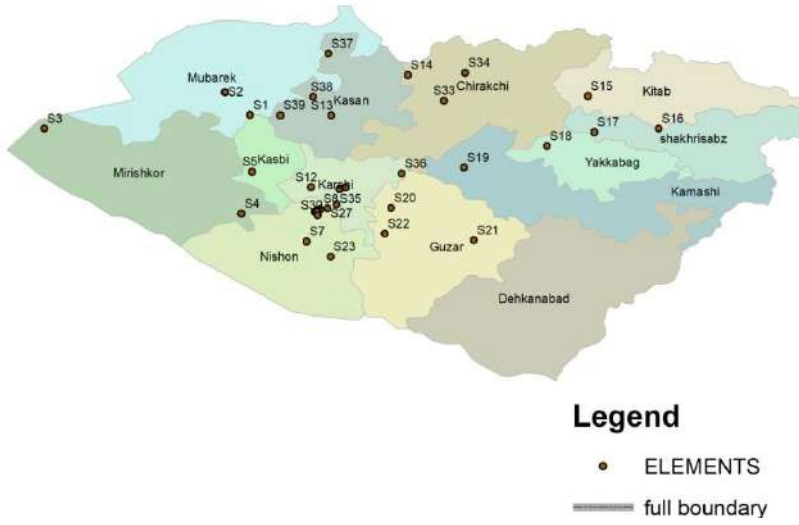

Fig. 1. Location of study area and sampling sites

The intensive developing of industry, agriculture and connected with them growing of the number of the motor transport conducted deterioration ecological-land reclamation of the condition is accompanied in Kashkadarya region and in particular brings about contamination and heavy metals contamination of water and soils. As a result of agglomerations in surrounding ambience their biological activity and toxicological characteristic threaten the living organism. They influence vegetation and humanity in movable form through water and soil.

Our study can be up to the quality of republics where priority at a walk for preparing the question of the joining to International Orhuss protocol on heavy metal (1998) is provided to proceed with a determination of the sources surge of heavy metals and estimation to efficiency applicable technology and measures of the checking (National report of Committee for nature protection of the Republic of Uzbekistan, 2005. - p.30).

The urgency of these study increases in connection with requirements of priority Orhuss protocol on heavy metals (the December 29, 2003 y.), which is one of eight protocols Convention of European Economical Commission UNO (About transboundary air polluting at a greater distance - LRTAP), including members which are pertaining countries of the Europe, USA, Canada, Israel, Russian Federation as well as republics of Central Asia.

Until today in the republic, this problem is spared insufficient attention. These witnesses the facts of Ecology and Environmental Protection State Committee of Uzbekistan, which notes about polluting of waters and soils with heavy metals. With the growing of the number of industrial enterprises and amount of the motor transport and contributed mineral fertilizers, given problem, especially in Kashkadarya region, has gained vital importance.

The estimation of the polluting with heavy metals were conducted in 1991 by Muradov Sh.O. and Kholbaev B.M. on a local irrigated area of Karshi steppe at the methods of the All-Russian research institute of water engineering and land reclamation. The following

heavy metals were determined on irrigated lands: Lead, Rubidium, Barium, Zirconium, Vanadium, Strontium, Cobalt, Nickel, and Zinc. It is necessary to note that in that time of the value of such elements as Vanadium, Rubidium, Zirconium, Barium were found above at maximum permissible concentration (MPK).

However, repeated our analysis of soils (2008-2009) on representational areas have allowed with defining availability of some metals: Lead, Nickel, Zinc, Strontium, and Barium. In all probability decreasing of heavy metals in soils are connected with reduction of the share contributed mineral fertilizers for the last 20 years (if in 1991 was contributed 108538 tons then in 2009 - 63392 tons, given province agriculture chemical committee).

Considering that these pollutants, monitoring carried reconnoitring character, necessary undertaking wide-ranging detailed researches, which - have installed the geography, the sources and promoted the development of the way of fighting with heavy metals in water and soil.

The most efficient method of the translation of the element from active in a passive condition, in which it can't be used by plants, is the using of the phosphate calcium which practically will not dissolve in water, phosphorus in this form to be inbound to form and inaccessible for plants. However it will fairly well dissolve in the form Ca $(H_2PO_4)_2$ or H_3PO_4 (Svetkova L.I. and others Ecology.- SPB.: Himizdat, 1999. p.123-127.).

There is a large volume of published studies describing the role of expanded minerals to remove heavy metal ions from aqueous solution (Ghassabzadeh et al., 2010b; Gong et al., 2010; Wahba & Zaghloul, 2007). In this study, the adsorption potential of expanded kaolinite, perlite and montmorillonite in the removal of Ni, Pb and Cu ions from aqueous solutions has been studied. Accordingly, minerals were divided in to 3 parts: Big fraction, a small fraction (between 1.5 and 1 cm) and sand (minerals were milled). Results showed that the expanded perlite and montmorillonite with a small fraction had higher adsorption ability to remove Ni ions (data not shown).

Broadly wide-spread method of excavation is abetting quick defogging of soils. However, an undesirable process is a carrying polluted material on the other territory. This process requires undertaking ecological monitoring (Lambert et al., 2000).

Execution of given problems allow to solve the responsible problem, which also pertain and region of the republic of Uzbekistan in context international effort on ensuring the firm development with provision for that burden, which impose industry, agriculture and motor transport on biosphere and technologies which they possess. Given problem is subjects to International worry (the General Assembly UNO, Rio-de-Janeiro Declaration on surrounding ambience and development. Principle 14, 1992).

The study of the question will allow reducing the risk of the damaging to not only population given territory, but also the other region. This is an important argument in many-sided of agreements on chemical matters and environment.

Thereby, at decision given problems we shall provide the prevention of the increase the risk of the damaging surrounding ambience or the general resources and in particular water-soil resource, from which depends on dividing products of the feeding. Urgency and timeliness of the execution in given functioning is motivated also in republic that in purpose of the restriction and reductions surge of heavy metal is developed national strategy, the policy and program.

The most actual is considered that system of water-land is a main ambience, in which get the heavy metals, including from atmosphere. Soil is a source of secondary contamination surface air and water falling into a river, lake, etc. From the system of water-land of heavy metals are adopted by plants, which then fall into food highly-organized animals. Our task is to give a complete estimation and prevent the risk for the health of the person and environment for achievement level and international misgivings, requiring urgent decisions.

Summarizing is possible to note that at present realized separation representative area by means of modern navigational instruments GPS is displayed tests on 55 areas and is made

some findings. Provided formation GIS maps - heavy metals in soils and water of Kashkadarya province, is approved new way of the fight with heavy metal.

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