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Deklaracja.

Specyfika i zawartość merytoryczna czasopisma nie ulega zmianie.
Zgodnie z informacją MNIŚW z dnia 2 czerwca 2014 r., że w roku 2014 nie będzie przeprowadzana ocena czasopism naukowych; czasopismo o zmienionym tytule otrzymuje tyle samo punktów co na wykazie czasopism naukowych z dnia 31 grudnia 2014 r.

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The issues of environmental safety in the conditions of Eastern-Ukrainian war conflict

Babienko V. V.

Odessa National Medical University, Odessa, Ukraine

SUMMARY

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Babienko V.V.

Odessa National Medical University, Odessa, Ukraine

The aim of the study was to assess the issues of environmental safety in the conditions of Eastern-Ukrainian war conflict. There was demonstrated that the risk of environmental contamination remains to be high in conflict areas. There is a great potential for long-term civilian health risks from the pollution generated by the war conflict in the Eastern Ukraine. The necessity to restore water infrastructure and access to safe drinking water in conflict areas and IDP shelters and to provide remediation means for elimination of long-term environmental risks related to the war conflict is discussed.

Key words: environmental safety, environmental health, risk assessment, military medicine.

Eastern-Ukrainian war conflict becomes a challenge not only for Ukraine. Donbass was a region with the drastically concentrated objects of mining, chemical industry and transport hubs [1]. Any damage of this infrastructure could be a cause of severe contamination of environment with hazardous chemical and biological agents. Donetsk city was one of the most populated cities in Ukraine – its population at 01.04.2014 was 9149,825 persons and total population of the region was 6,504,405 [1, 2]. Thus man-made chemical disasters or other casualties can affect thousands people in this region.

According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the number of documented deaths caused by the war in the Eastern Ukraine as of 8 May 2015 was 6,254 [3]. Ukrainian government forces have lost a confirmed total of 2,112 –2,854 men as of mid-May 2015, while the separatists reported that they had lost 1,400 men at most as of the beginning of February 2015 [4].

Total number of IDPs in Ukraine is 1,299,770 and the majority of them were from occupied territories (477.644 men in Donetsk region and 179.540 men in Lugansk region – see Fig. 1). 334,544 of IDPs called for asylum application.

Economical losses due to ruining residential buildings and industrial objects exceed 3 bln UAH (appr. 120 mln. €) in Donetsk region and 1.7 bln UAH (appr. 68 mln. €) [6]. Ukrainian state road agency evaluates the costs for repairing and reconstruction of damaged roads as 4.7 bln UAH (appr. 188 mln. €) [7]. There were damaged and destroyed more than 600 gas distributing sites so many people cannot cook food and got hot water supply in the zone of war conflict.

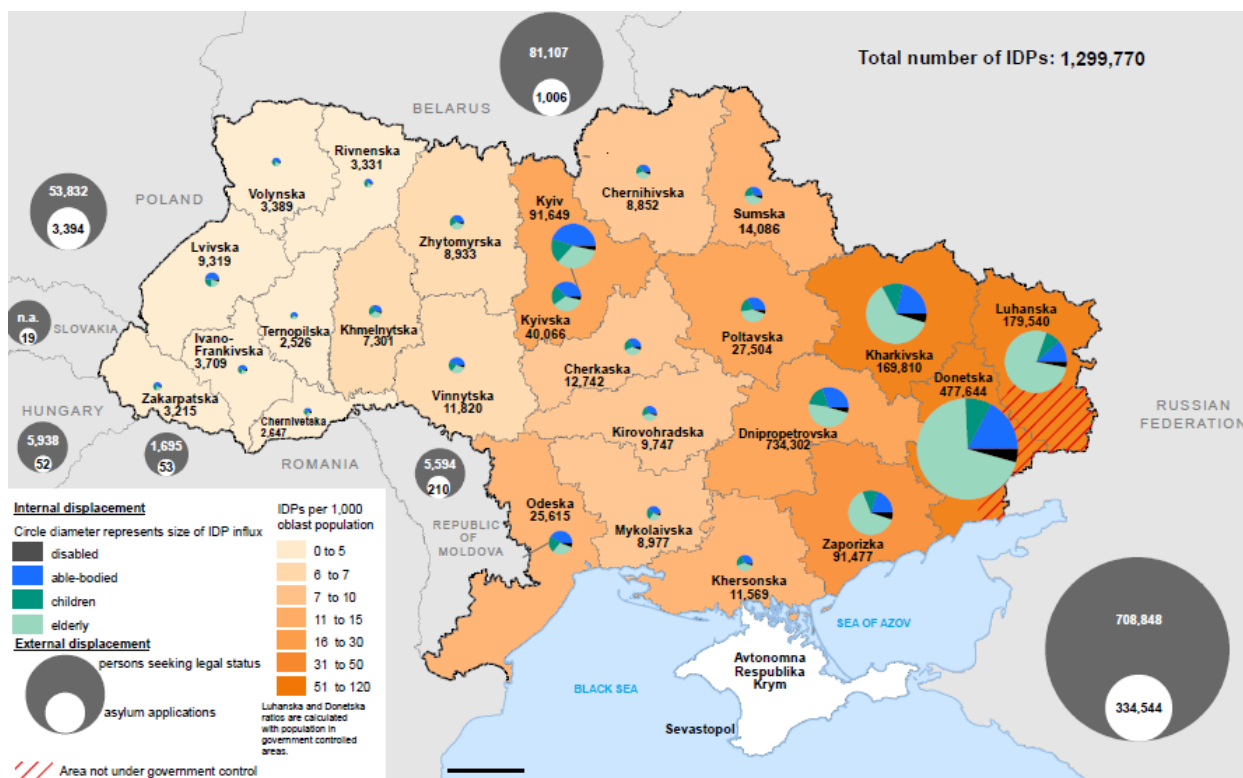


Fig. 1. Population displacement in Ukraine [5].

The environmental legacy of conflict and military activities is rarely prioritised in post-conflict response, in spite of the short and long-term impact of damage on civilian health and livelihoods. At times relationships between incidents and harm may be complex, often requiring detailed and lengthy analysis. Warfare in highly industrialised areas has the potential to generate new pollution incidents and exacerbate existing problems; the conflict in Ukraine has done both, as well as damaging the area's natural environment.

The aim of the study was to assess the issues of environmental safety in the conditions of Eastern-Ukrainian war conflict.

Material and methods.

The search strategy was based on the Boolean logics and following key words were searched in the specialized databases (Medline, Ovid, EMBASE and HINARI), web-sites of national and international agencies and Google search engine: "environmental health" and "Ukraine" and "risk assessment".

The letters, comments, editor articles, anecdotal and discussion papers and articles published before 2014 were excluded from the list of retrieved publications.

Additionally we conducted the search in the data bases of international agencies and Ukrainian government. In all stages of reviewing there was used reference manager EndNote 7.0 [8].

Results.

The available information is controversial and incomplete because the work of state sanitary services in the occupied territories is not conducted properly. However some available data demonstrate evidence of serious risks for environmental health in the Eastern Ukraine.

About one mln persons do not have access centralized water supply. For example on 23.05.2015 after separatist's fire there was damaged water supply line providing water to Lugansk and such situations are common and repeatable. Due to lack of chlorine and other agents for water conditioning the risk of water-borne diseases in the cities and settlements occupied by pro-Russian separatists and Russian insurgents remains to be very high. The additional risk factor is pertinence of *Vibrio spp.* in the waters of local rivers and other water reservoirs.

Due to continuing war action between Ukrainian army and separatists in spite of declared cease-fire the epidemiological situation remains to be serious. Population of occupied territories does not have access to preventive and curative medical services. Furthermore, medical supplies have become limited, with demand increasing due to the wounded and displaced. Consistent care and prevention regarding communicable diseases, including TB, is difficult, and the risk of outbreaks among those affected by the conflict is particularly high.

By the assessment of international humanitarian services 1.8 million people are in need of food assistance, and 2.7 million in need of livelihood assistance in

2015, compared to 1.1 million and 1.2 million, respectively, at the end of 2014 [9].

Some farming enterprises close to the conflict zone have reportedly lost up to 30% of their winter harvest, as they were unable to plant autumn crops properly due to continued conflict. 13% of wheat, barley, and maize, and up to 30% of sunflower crops were not harvested in 2014 due to displacement, corresponding to losses of 530,000 and 400,000 metric tons. 80,250 people living in small farming households in rural areas need assistance in the next six months, particularly animal feed and spring and vegetable fertilizers, which households are unable to purchase (Ukrainian Government/FAO 31/01/2015) [10, 11].

Food prices have risen especially in the eastern parts of the country. A survey carried out in January found that prices in the area have gone up 30% in a year for items such as bread and milk, and by 75–80 % for meat and cheese [10]. We saw a seasonal increase in fruit and vegetable prices (by 17.8% month-on-month and 13.5% month-on-month, respectively) (Raiffeisen Aval 19/02/2015) [12].

4.5 million people are estimated to be in need of healthcare in 2015, compared to 1.4 million at the end of 2014 [3, 5, 6]. Access to health services and medicines is based on out-of-pocket payment, and is hampered by losses in IDP purchasing power [5, 6]. The situation has aggravated following the 3% rise in healthcare prices in January, due to a 3.3% increase in medicine prices (Raiffeisen Aval 19/02/2015) [12]. The health budget for 2015 will only cover an estimated 30% of needs, due to the devaluation of the Ukrainian currency. There are no extra-budgetary resources allocated for IDP health services (OCHA 24/02/2015) [3, 5].

Reported inadequate provision of specialist care for the chronically ill (oncological, neurological, etc.) in IDP shelters, leading to overloading of inpatient care units in hospitals [9]. Areas under government control are

expected to run out of drug supplies for HIV and TB patients. Medical facilities in non-government-controlled areas rely entirely on humanitarian aid. They face shortages of medicine, hygiene kits, and crucial drugs for patients in psycho-neurological care (nearly 2,330 in Luhansk region) [3, 5]. There is also a significant insulin need for diabetes patients in Donetsk [9].

Hepatitis A incidence is growing in the Donbas area [9]. New TB cases have increased by 5% in non-government-controlled areas in Donetsk, mainly among older people and combatants.

Access to food remains a critical issue for those in the conflict zones due to insecurity despite the current cease-fire. IDPs still experience problems in purchasing food because of their deteriorating financial situation.

The water supply in many areas of Donetsk and Luhansk is still interrupted, although repair work is underway. The risk of using unsafe drinking water and the outbreak of related water-borne diseases remains high. In February 2015, numerous cases of intestinal diseases were reported in Horlivka, in Donetsk region [3, 5, 13]. Furthermore, people sheltering in bunkers in Donetsk city reportedly do not have access to safe drinking water, sanitation facilities and hygiene supplies.

In the last year in Donetsk region there were registered more than 200 cases of acute intestinal infections per week, the incidence rate was 5.5 per 100 thousand of population. However in 2015 the incidence of water-borne diseases could be much higher in the summer season.

Total weight of solid industrial waste accumulated in Donetsk and Luhansk region is 4 billion tons. The most of storage sites do not meet sanitary and environmental safety requirements.

Prior to the outbreak of the war, more than 5,300 industrial enterprises were operating in the pre-war Donetsk and Luhansk regions. Damage to the region's industry is widespread, and ranges from direct damage to industrial

installations, to enterprises simply stopping production because of the lack of raw materials, energy, workforce or distribution channels.

It is this disruption of the region's industry that is likely to be primarily responsible for the environmental side-effects of the conflict. In some cases, the disruption has led to accidental releases of pollutants from shelled or bombed facilities. In others, facilities have been forced to shift to more polluting technologies that have impacted regional air quality.

The rivers and reservoirs Donetsk region reset annually more than 2 million m³ of contaminated water - 24% of all emissions in the reservoirs of Ukraine. The main pollutants of water bodies were the enterprises of metallurgy, chemical and coal industries as well as energy and heat supply but the biological and chemical pollution becomes to be dependent mostly on military sources.

Most of the rivers in the region are classified as polluted and severely polluted, which is defined as entering into water bodies untreated sewage industrial, storm water from urban, agricultural, and large multi-year accumulation of xenobiotics in the sediments. In almost all of the water of rivers region there are high concentrations of salts.

In the Donetsk region mostly all soils (over 95%) are technologically altered as a result of intensive use in industry and agriculture. The proportion of analyzes of soil exceeding the hygienic regulations for heavy metals is greater in urban areas ($50.1 \pm 3.8\%$) compared to rural areas ($30.8 \pm 5.7\%$). Hygienic analysis of soil quality of the Donetsk region in terms of chemical pollution shows that xenobiotics, in addition to the accumulation in the environment, have the combined effect on the human body. The most polluted and most dangerous for the health of the soil marked in the cities of Gorlovka, Yenakiyevo, Konstantinovka, Dzerzhinsk, Kramatorsk, Druzhkovka, Donetsk, Makiyivka and Mariupol.

Accordingly to conducted analysis the priorities for humanitarian intervention in the Eastern Ukrainian territories involved in the conflict should include provision of access to and availability of health care in the conflict areas. It would include the supply of pharmaceuticals and consumables (vaccines, diabetes, HIV/AIDS and TB medications. The improved access and availability of medicine and healthcare in government- and non-government-controlled areas should include nutrition support for displaced people especially for pregnant and lactating women.

Limited access to food either because of insecurity or because of limited financial resources remains a concern; many livelihoods have been impacted by the crisis, businesses destroyed and employment opportunities been hampered. Otherwise the risk of contamination of food products by the hazardous wastes is high.

Conclusion:

1. The risk of environmental contamination remains to be high in conflict areas
2. There is a great potential for long-term civilian health risks from the pollution generated by the war conflict in the Eastern Ukraine.
3. There is necessary to restore water infrastructure and access to safe drinking water in conflict areas and IDP shelters.
4. The remediation means could be necessary for elimination of long-term environmental risks related to the war conflict.

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