Agricultural problems of Ukraine during 10 year period following accident of Chernobyl Nuclear Power Plant

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The Chernobyl accident in 1988 - one of the biggest disaster of our modern civilization has been disappeared deep in the elapsing time. One of its most important and heavy effects seems to be radioactive contamination of agricultural lands and natural or seminatural ecosystems what in turn accentuates an emmergency associated with the posibility of radionuclide absorption by a human organisms for many years at all. Today, 10 years after the accident still seems impossible to predict all eventual its effects. According to the various estimations there was thrown out 3 - 6 % ofradioisotope activity generated in the reactor what equalled approx. 50 - 90 mios Ci. Noteworthy, the expulsions of radioactive substances off the nuclear power plant in Chernobyl were more than 100 times bigger than that of Hiroshima and Nagasaki. The accident characterized first of all with many weeks lasting emission to the atmosphere of some gaseous, volatile and aerozolic products. A wind rose so characteristic for the country practically implied constant presence of the atmospheric masses contaminated with radioactivity above Ukraine during the whole period of active expulsion of radionuclides from the damaged reactor. Together with the rainfalls it has strongly determined an orientation of radioactive contamination (Figure).

Among the estimated contamination zones there were found significant differences in the view of quantitative ratios of expulsed and nuclides responsible for occuring radioactivity.Increase of the contamination level of soils with caesium 137 and strontium 90 has been noted in the regions associated to the western and northern pathways of the radioactive clouds(the ratio of the mentioned above radionuclides was equl to 8-10:1).In the regions associated to the southern pathway of the expulsions (Kiev, Vinnitsa, Poltava, Tcherkassy, Nikolaev and Odessa voivodships) there was found the highest concentration of strontium 90 (ratio caesium 137 : strontium 90 was on the average approx. one - 0.8 - 1.2). Clustering of the fallouts so characteristic for the accident did not allow for any objective cartography of the contamination level of agricultural lands as e.g radioactivity of two points being only 50 m away each from the other can differ more than tens times. Nowadays, according to the verified data there is in Ukraine radioactive contaminated about 42,000 km^2 of the country area (*ca* 7%). Zhitomir voivodship has 27.4 %, Kiev voivodship (without the town Kiev) 23% and Rovno 22.7 %. From the point of view of their land use structure nearly 30,000 km^2 belong to the agricultural(and arable) lands, while the remaining 12,000 km^2 to the forrests.

Noteworthy that for 18 voivodships of Ukraine in quite different points there were found in the soils abnormal concentrations of pluton 239 and 240 radioisotopes. Importance of agricultural effects of radioactive contamination of the environment roots not only from the checked pathways of the fallout but also from enormous complexity of the item. Simultaneously with the problem of the radioactive contamination of the population of inhabitants there is a link between this one and that social-psychological, employment, changing adopted way of life and the manner of the use of the natural resources. On total the zone of radioactive contamination in Ukraine involves 2180 points inhabited by 3 mio inhabitants.

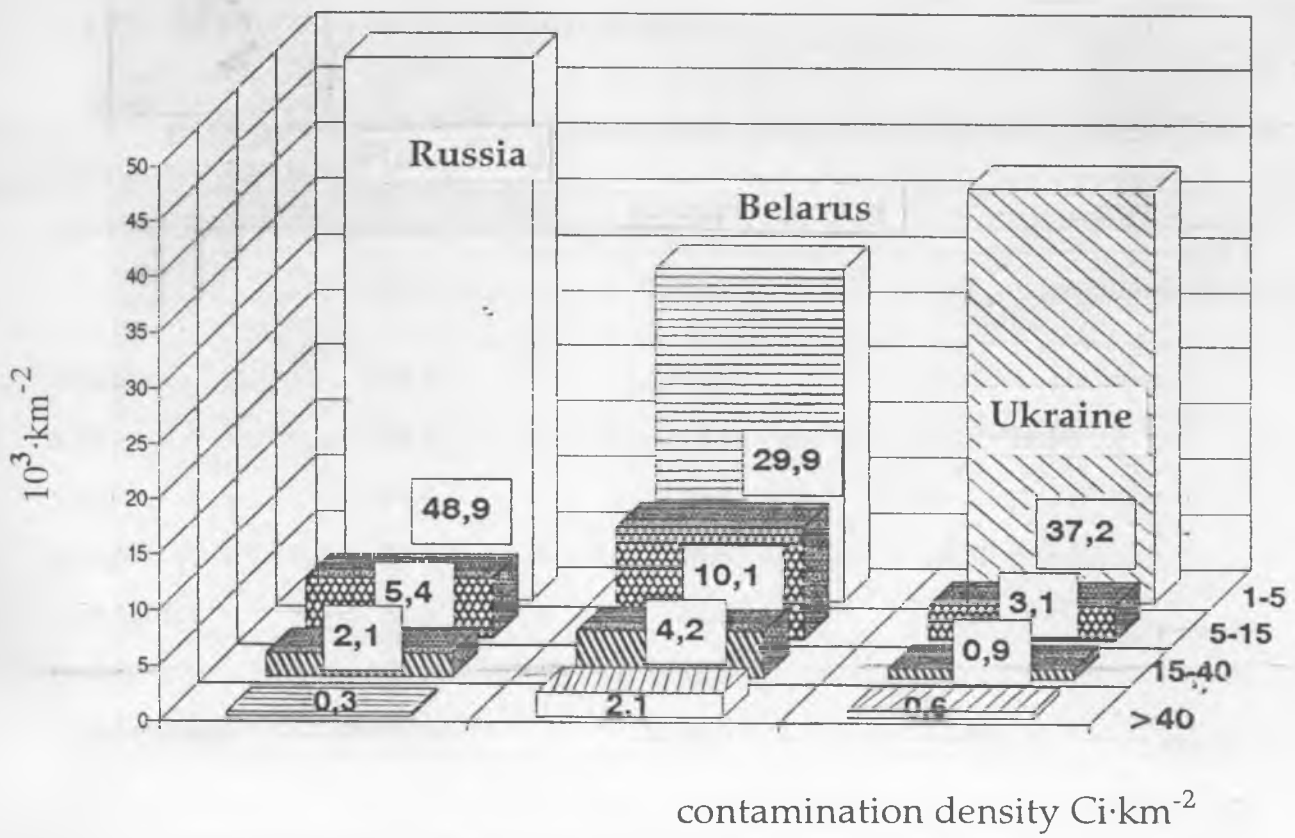

Figure. Radioactive contamination of the area after the damage of Chernobyl nuclear power plant as at 1.01.93

Children till the age of 18 consist 662,000 and it highly affects the complexity of the matter. Serious awarness coincides to the actual state of the health of all categories of inhabitans affected by the accident.Indded, during the last 10 years demographic situation of the regions under consideration has seriously changed. According to the medical checking of the children every third child of those living in the contaminated territory shows the health status inferior to the accepted standards. Today seems to be important to know to what extent the increase in morbility can be rooted from the radiation effects since it can be affected by many other independent factors. Nevertheless there is no way to claim that the Chernobyl

accident did not influence these effects.In this context very important seems to be the care for save theinhabitants health lost during the damage, further reduction of radioactive risk and forming the conditions for better quality of living in the contaminated territory. When analyzing the concentrations of radionuclides in the food and fodder products (Table) it is reasonable to denote some outstanding results of both kolkhoses and sovkhoses in the field of agricultural productivity that meet the appropriate standards. Nevertheless it is not substantiated to claim that the qualitative items of agricultural productivity have been already resolved. Though comparing to the data of 1986 year today contamination was many times lowered, yet nowadays data are 10 - 100 fold higher than that of the pre-accident period. As it was earlier very sharpe problem is a purity of food products got in so important sector of national economy as agriculture, first of all the purity of milk. Last years nearly in 30 inhabited points there was constant or periodic registration of milk contaminated above accepted standards.

Table. Activity of ^{137}Cs of some food products in Narodicky region of Zhitomyr voivodship

food product	activity of ^{137}Cs ($Bq \cdot kg^{-1}$)		
	1988	1994	till an accident of ChNPP
meets	214.6	195.8	6.07
milk	536.5	112.2	5.7 - 11.6
eggs	229.4	126.4	-
potato	44.4	35.6	0.78
vegetables	51.8	44.8	0.89 - 0.67
fruits	125.8	62.7	-
mushrooms	9671.8	6770.3	1.48

It should also be outlined that in spite of mentioned earlier acreage there is an another problem of exploitation of 123,000 ha arable land left aside laid in the protection zone? Very important task seems to be development of normative-ecological basis for the manadement of some amelioration practices. It is horrible to reveal a tendency to diminish valorisation of the soils what in turn could result in increase of radionuclide concentration in achieved production. Also today, there must be an awareness concerning efficacy of the means of protection bringing about lowering of radiation dose of the inhabitants.For example, while most of these means might be able to help to decrease individual emergency dose that of the group is still on the starting level. Thus, the outline of the problems born during and after Chernobyl accident, an attempt to overcome its effects nowadays, strongly speak for the need to undertake inter- disciplinary investigation that can provide some scientific basis for both intervention and protection extents lost.