

Impact of the Chernobyl accident on agriculture – Countermeasures on agricultural areas

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Following the accident at the Chernobyl nuclear power plant on 26 April 1986, considerable quantities of radioactive materials were released into the atmosphere, contaminating the food and feed of several European countries at significant levels from a health point of view. Measures have been taken to ensure that agricultural products were only introduced into the Union market according to common arrangements which safeguard the health of the population while maintaining the market unity. This accident significantly impacted the agricultural sector. About 23 % of Belarus territory (46 thousand km²), populated by 2.2 million people and 1.8 million ha agricultural land were contaminated with ¹³⁷Cs (37 kBq.m⁻²) of which 265 000 ha were totally excluded from the agricultural system [1, 2].

In this context, a large programme of countermeasures was conducted to evaluate the liquidation possibility for the consequences of radioactive contamination of great magnitude. Particularly in the field of agricultural production for the contaminated territories, the radionuclides concentration in the main food products significantly decreased compared to the first years after the Chernobyl disaster. Impressive results were achieved between 1987 and 1990 through the implementation, for a farm, with a complex agro-technical measures, agrochemicals and veterinary designed to reduce the transfer of radionuclides in the chain "soil - plants - animals - agricultural production ". From 1992 to present days, the use of agrochemicals and agro-technical measures continued. Recommendations were developed in regards to the agricultural production management for the situation of radioactive contamination of lands in the Republic of Belarus, as well as the Republican Permitted Levels for cesium and strontium in food products and drinking water. The protective measures system applied in the agrarian production is shown in the diagram thereafter.

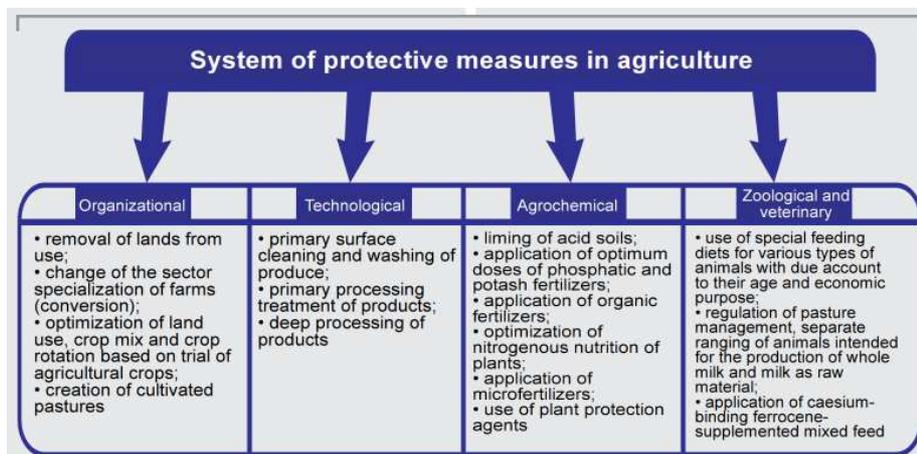


Fig.1: Protective measures System in agriculture [3].

One of the crucial problems related to agricultural production in the contaminated districts is to reduce the entry of radionuclides in food products. This issue can be solved by a set of actions to reduce the migration of radionuclides in the links of the biological chain "soil - plant" and "plant (forage) - agricultural animals." Practice showed that the introduction of protective measures with proven effectiveness and specific processes in the cultivation of plants used to reduce the concentration of radionuclides in production (cereals, potatoes, vegetables) by a factor between 1.5 and 4.0. The introduction of protection measures in livestock reduces the radionuclides concentration in milk, meat and eggs by a factor of 3 to 7. Moreover, the re-specialization of farms towards productions with low radionuclide concentration is another route to reduce the input of radionuclides in the pathway to human body. These include revenues from the meat and dairy farming, breeding pigs, or the creation of poultry farms. Calculations show that a change in direction of current production (potatoes production, cereals production , dairy) to, preferably, beef, pork and bacon, chicken, fatty dairy products (cream , butter, ghee) would reduce the entry of radionuclides in food products by a factor of 1.5 to 2.0, and proportionally reduce the collective dose of internal radiation exposure.

The presentation will notably provide examples of such protective measures and their effectiveness.

References:

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