



Belarus and Post-Chernobyl Experience

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RESEARCH
INSTITUTE OF RADIOLOGY

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THE BELARUSIAN STATE PROGRAM FOR MITIGATING THE CHERNOBYL DISASTER CONSEQUENCES yy.2011-2015: PRIORITY AREAS



Social protection, medical maintenance and regular health improvement provided to the affected population



Radiation protection and direct target-oriented implementation of protective measure including management of foodstuff



Design and implementation of specific projects developed to provide modernization and efficient utilization of production capacities, natural, primary and labour recourses, social development, human capacity building



Improvement of public communications policy on the problems referred to mitigation of the Chernobyl accident consequences, including outreach to the population, information sharing and dissemination etc.

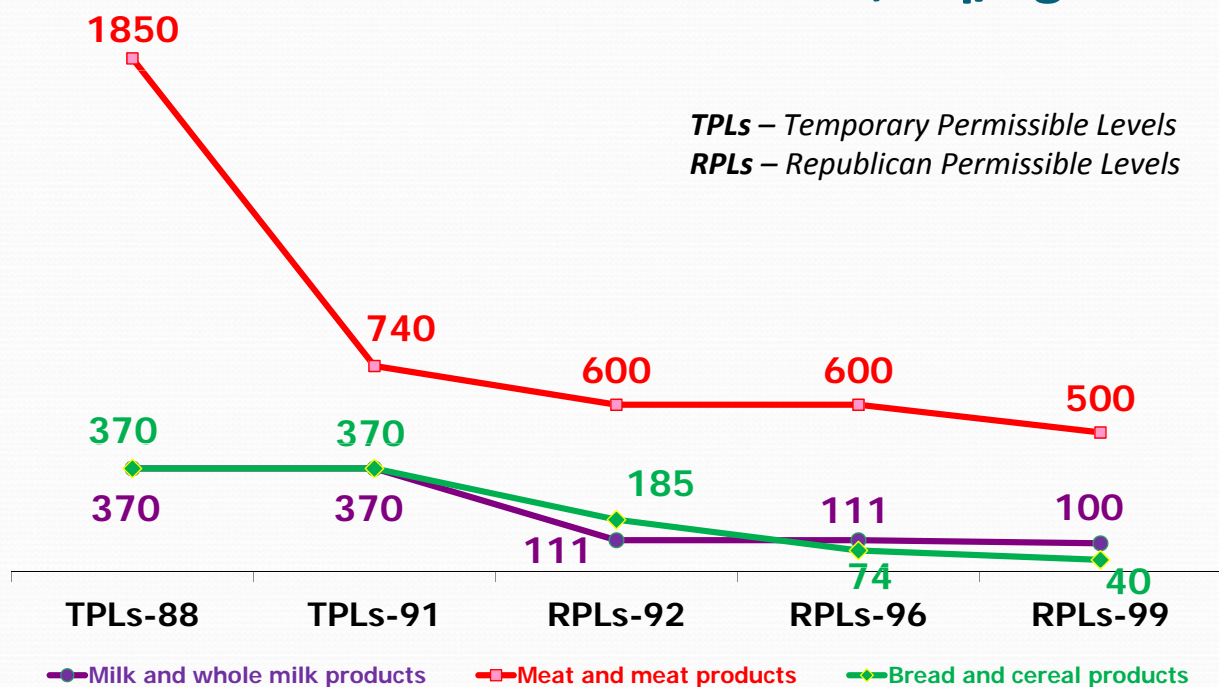
In the framework of radiation protection and target-oriented implementation of protective measures

Implementation of radiation protection activities to secure an average dose target lower than **0.1 mSv/year** (according to the RB legislation) and the Republican Permissible Levels (**RPLs**) established for controlling the radionuclide concentrations on the basis of 1mSv

Implementation of scientifically grounded integrated **set of measures in agricultural production**

Radiological examination of **farmsteads**, creation of **cultivated haylands** and **pastures**, surface and radical improvement of **meadows** for private and public **cattle grazing**, supply of compound **feed** with cesium-binders, on-farm reclamation system maintenance

Gradual Revision of ¹³⁷Cs Permissible Levels in Food, Bq/kg



RPLs-99 revised and accepted in y.1999 is a current national standard for ¹³⁷Cs content in food



Radiation Control System

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is developed and implemented in order to:



Assess the radiation situation and determine the levels of ionizing radiation exposure



Exclude production and storage of foodstuffs and raw materials with radionuclide concentration levels above the specified limits



Evaluate the effectiveness of protective measures, provide their optimal and targeted implementation



Develop a sound strategy of recovery actions



Radiation Control System of the Republic of Belarus

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State Radiation Control:

On-Site Radiation Control:



Ministry for Emergency Situations



Ministry of Agriculture and Food



Ministry of Health Care



Ministry of Forestry



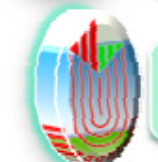
State Committee on Standardization



Ministry of Housing and Communal Services



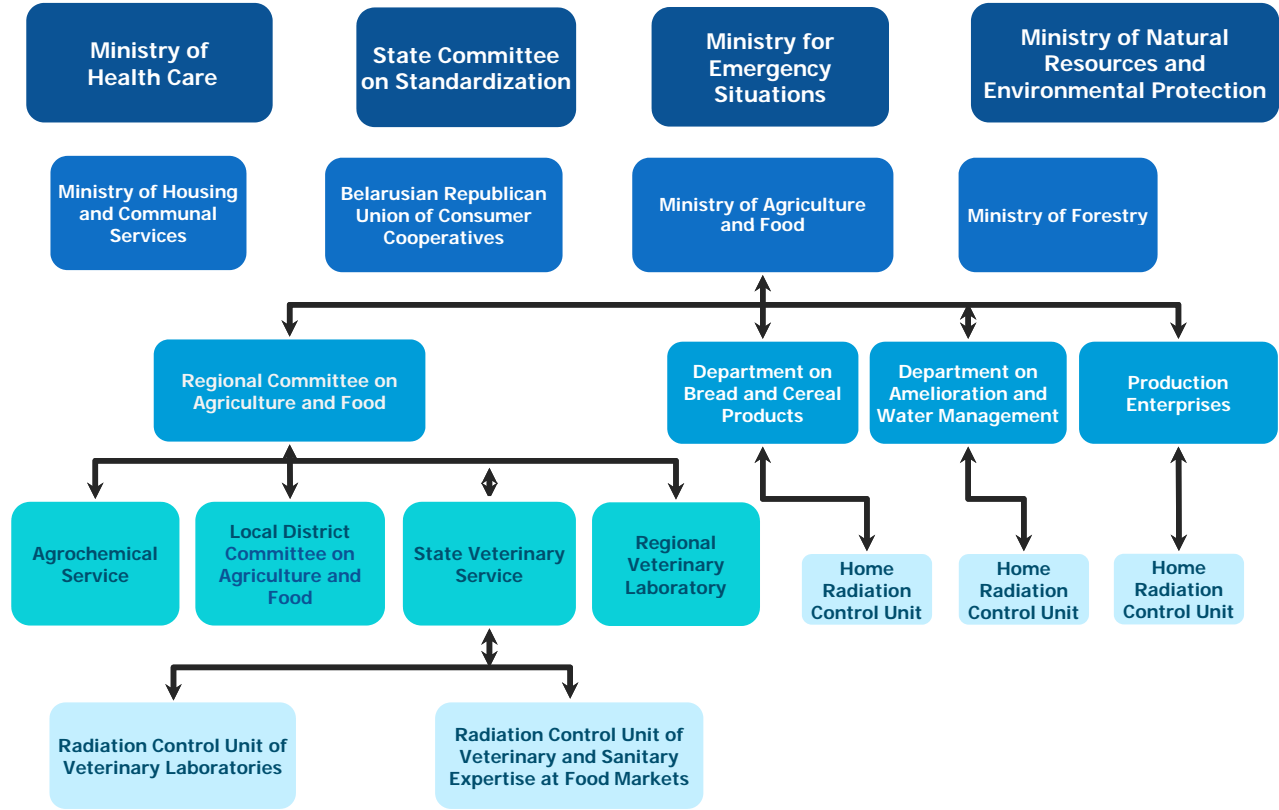
Ministry of Natural Resources and Environmental Protection



Belarusian Republican Union of Consumer Cooperatives

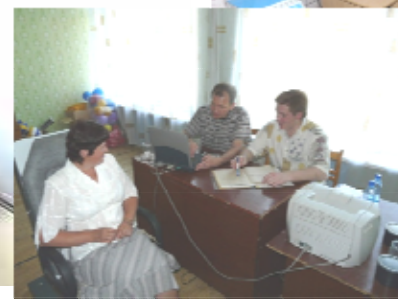
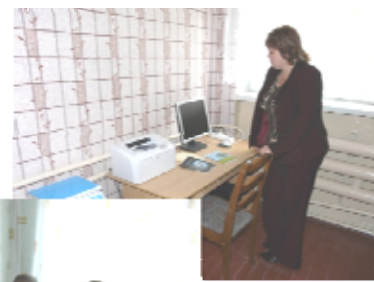


Network of Interrelations between State Radiation Control Authorities



Radiation Control System of the Republic of Belarus

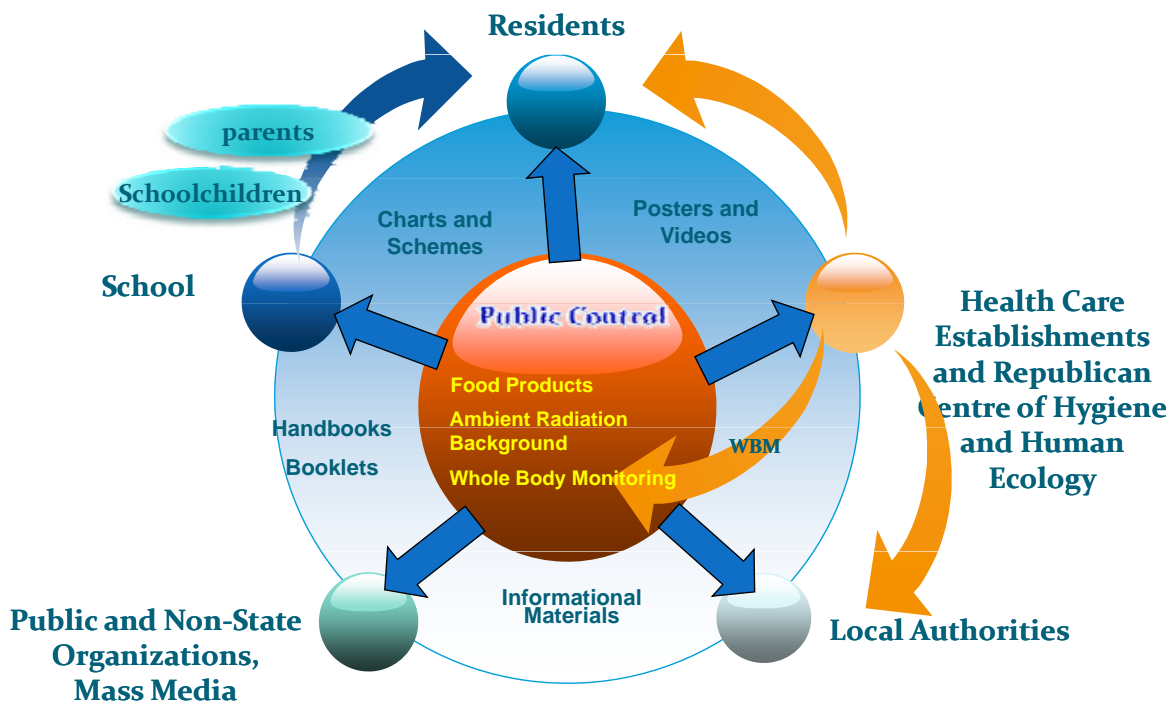
In addition to the State system of monitoring, food and environmental radiation control is also performed by **public and non-state organizations**





Network of Interrelations between Public Radiation Control Centers

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Instruments and Equipment of Radiation Control Units

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There are nearly **850 radiation control units** operating in the Republic of Belarus. More than **2000 items** of radiometry and spectrometry instrumentation are used for annual analyses of more than **11 million samples** for cesium-137 concentrations, and nearly **18 thousand samples** to determine concentrations of strontium-90.





System of protective measures for agricultural production in NPP emission area

Planning post-nuclear accident recovery actions may be subdivided into two phases :

1. Emergency actions straight after radioactive release and during the first post-accident year :
 - in crop production – to minimize secondary radioactive contamination and reduce radiation exposure to workers
 - in livestock production – to minimize radionuclide transfer to animal products via stable keeping, "clean" feeding etc.
2. Actions for securing the Republican Permissible Levels :
 - in crop production – agrotechnical and agrochemical measures etc.
 - in livestock production – to minimize radionuclide transfer to animals and animal products



Protective measures in agriculture

Choice of optimum strategies

Two categories of population must be distinguished when choosing the most appropriate strategy of protective measures.

For each, the countermeasures, aimed at internal radiation dose reduction, may have their own specifics :

Category 1 : Residents of a contaminated territory who consume foodstuffs produced on that territory

Criterion for countermeasure efficiency **assessment** : *reduction of individual effective dose* received through contaminated food consumption

Application target : *reduction of radiation doses* received by the





Choice of optimum strategies



Category 1 : People who live in clean areas, but consume foodstuffs produced on contaminated territories

Criterion for countermeasure efficiency **assessment** : *reduction of collective radiation dose* received through radioactively contaminated foodstuffs

Application target :



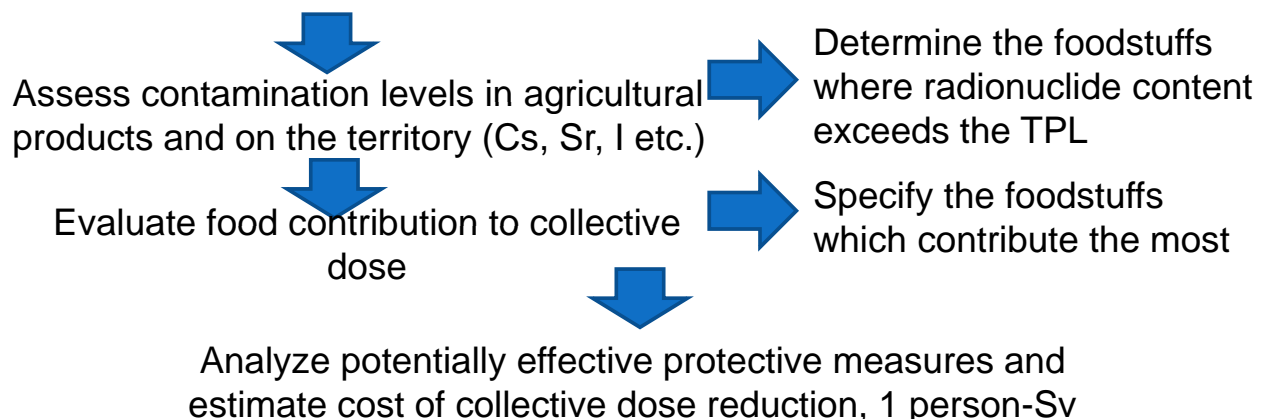
...se export from the ... contaminated territories



1. Radiological assessment

Countermeasures for agricultural production oriented for consumption out of the bounds of contaminated territories

The main objective at this stage is to evaluate the necessity of countermeasure application



Stages of countermeasure substantiation

1. Justification of potentially effective measures

Provided that application of countermeasures has been regarded reasonable, the most efficient ways of countermeasures application will then be determined



Analyze the determinants of radionuclide contamination of farm products and efficiency of countermeasures, including:



contamination levels of farmlands

soil properties

contamination levels of foodstuffs

potential efficiency of agrochemical and agrotechnical measures

cost of protective measures

When choosing the structure of land use and countermeasures to be applied it is important to evaluate heterogeneity of farmland contamination levels and characteristics of soil cover.

Permissible levels for ^{90}Sr concentrations in food

National standards of three neighbouring countries

Bq/kg, Bq/l

Food product	Republic of Belarus	Russian Federation	Ukraine
Drinking water	0.37	2	2
Milk and whole milk products	3.7	25	20
Bread and cereal products	3.7	70	5
Potatoes	3.7	60	20
Baby food of any type (ready-to-eat)	1.85	25-60	5



Internal radiation dose from ^{137}Cs and ^{90}Sr , mSv/year

(according to three national standards for radionuclide content in foodstuffs and the Unified hygienic requirements of Customs Union)

Radionuclide	Republic of Belarus	Russian Federation	Ukraine	Customs Union
Caesium-137	0.78	1.20	0.70	0.59
Strontium-90	0.08	0.93	0.33	0.96
Total dose	0.86	2.13	1.03	1.55