

Measures to Control Environmental Pollution Due to Agricultural Chemicals

■ Pollution due to agricultural chemicals

Environmental pollution due to agricultural chemicals is decreasing as fewer toxic active ingredients are available and toxic/persistent active ingredients are being phased out. In general, the use of agricultural chemicals involves the release of physiologically active substances into the environment. Thus, they should be controlled properly, with their risk assessed, to prevent adverse impacts on human health and the environment.



■ Guideline Values for Airborne Concentration

For aerial application of agricultural chemicals, Guideline Values for Airborne Concentration are in place for 10 active ingredients to protect human health.



■ Designation of Water Polluting Agricultural Chemicals

Some registered agricultural chemicals may cause severe water pollution when used extensively under certain geographical conditions. The Government ordinance, therefore, designates and regulates the use of Water Polluting Agricultural Chemicals that could have adverse impacts on humans or aquatic animals and plants. Benzoepin, Rotenone and Simazine are designated to Water Polluting Agricultural Chemicals.

■ Prevention of water pollution due to agricultural chemicals used on golf courses

The "Provisional Guidelines for the Prevention of Water Pollution Due to Agricultural Chemicals used on Golf Courses" are in place, with provisional guideline values set for 45 agricultural chemicals.

■ Agricultural Chemicals Use Standards

Standards that should be met by agricultural chemicals users are in place to ensure the safe and proper use of agricultural chemicals; the standards provide for some requirements for users such as being in compliance with instruction labeled on container (target crops, application period, the total number of applications, etc.)



■ Registration Withholding Standards of agricultural chemicals

The production, import, distribution and use of agricultural chemicals in Japan are strictly regulated by the Agricultural Chemicals Regulation Law to prevent adverse impacts on humans, livestock and the environment. The Registration Withholding Standards of agricultural chemicals apply to these agricultural chemicals, which should then be registered by the Minister of Agriculture, Forestry and Fisheries. The Minister of the Environment sets Registration Withholding Standards on 1) damage to aquatic animals and plants, 2) water pollution, 3) soil residue and 4) crop residue levels.

■ Standards on damage to aquatic animals and plants



Standards are in place to prevent severe damage to aquatic animals and plants due to agricultural chemicals, with their toxicity to fish, crustaceans, algae taken into account.

■ Standards on water pollution



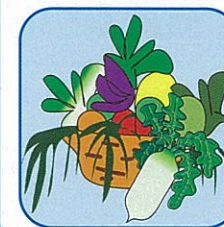
Standards are in place to prevent damage to humans and livestock due to water pollution, based on the maximum permissible levels for lifelong ingestion of water contaminated with agricultural chemicals (where agricultural chemicals flow into public water sources such as rivers).

■ Standards on soil residue



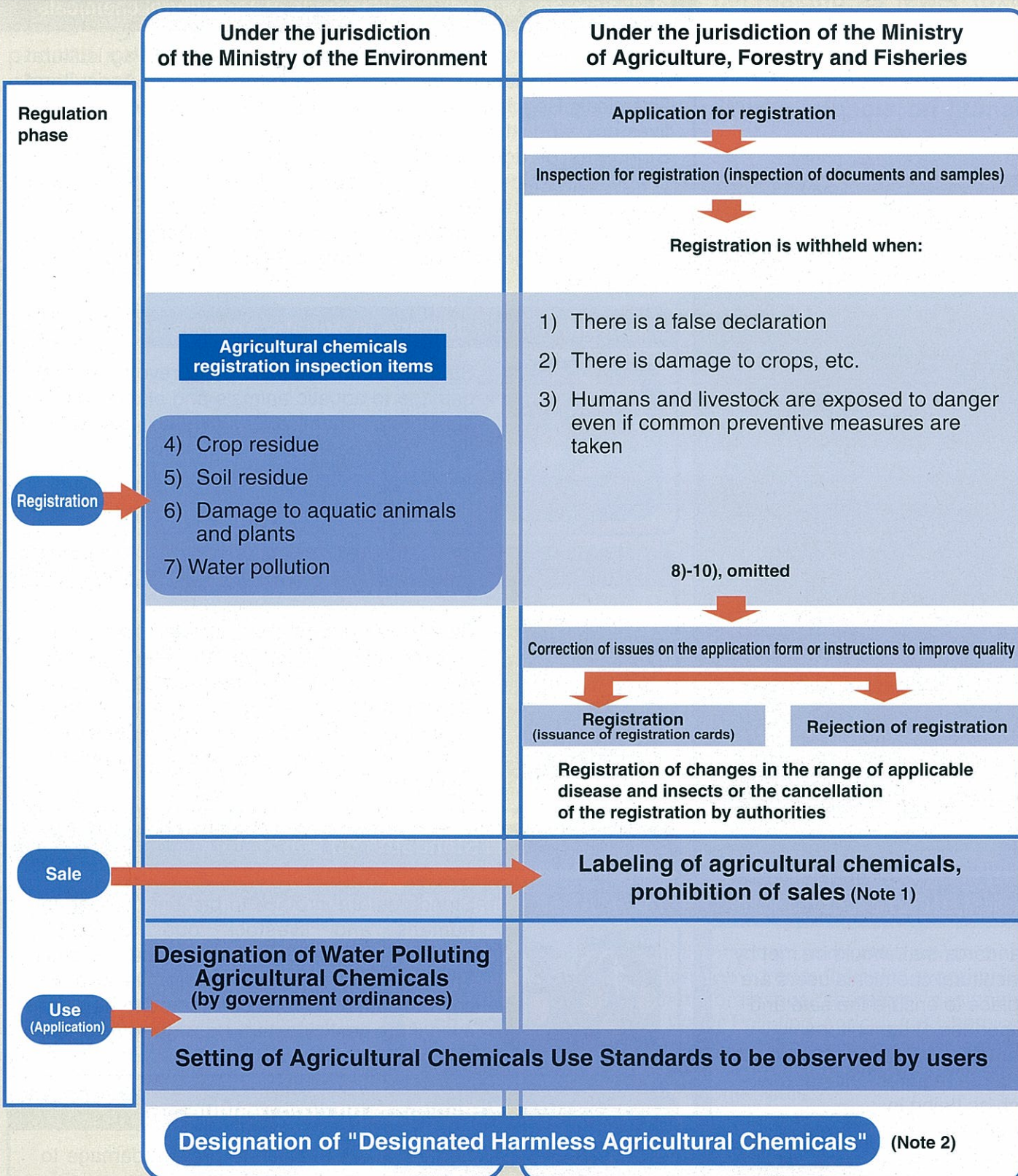
Standards are in place to prevent damage to humans and livestock due to crops contaminated by pesticide residues in soil. This standard is set to ensure the level of contamination of crops considered to be safe, even if the pesticides are transferred from soil to crops.

■ Standards on crop residue



Standards are in place to prevent damage to humans and livestock due to pesticide residues in crops; residue levels should be lower than Maximum Residue Limits specified by the Food Sanitation Law.

■ The Agricultural Chemicals Regulation Law



Note 1: The use of agricultural chemicals, distribution of which is banned under Article 9-2 of the Agricultural Chemicals Regulation Law, is prohibited according to Article 11 of the law.

Note 2: Registration is not required for agricultural chemicals designated by the Minister of the Environment and the Minister of Agriculture, Forestry and Fisheries (Designated Harmless Agricultural Chemicals) where those agricultural chemicals are considered to be harmless for crops, humans, livestock and aquatic animals and plants, given their ingredients.

■ Why are agricultural chemicals necessary?

People have striven to protect crops from pests, diseases and weeds ever since humans first began to engage in agriculture. Specific measures include the cultivation of pest-resistant varieties, cultural control (plowing, removal of crop remains to prevent the spread of pests and diseases, etc.), weed control (using plastic sheets, mulch by straw, etc.), physical control (sterilization of soil with solar heat, etc.) and biological control (using natural enemies such as spiders). At the same time, agricultural chemicals are used extensively because they are reasonably effective, while contributing to labor saving. The results of previous surveys show that, as far as general cultivation is concerned, crop yields drop dramatically without the use of agricultural chemicals for pest and disease control.

Examples (Japan)

Crop (number of surveys)	Average decrease in yields (%)
Rice	2.8
Wheat	3.6
Soybean	3.0
Apple	9.7
Peach	10.0
Cabbage	6.9
Radish	2.4
Cucumber	6.1
Tomato	3.9
Potato	3.1
Eggplant	2.1
Corn	2.8

Examples (U.S.)

Crop	Estimated decrease in yields (%)
Corn	3.2
Cotton	3.9
Peanut	7.8
Rice	5.7
Soybean	3.7
Wheat	2.4
Potato	5.7
Apple	10.0
Grape	8.9
Peach	8.1
Orange	5.5
Lettuce	6.7
Onion	6.4
Tomato	7.7

Source: Noyaku Gaisetsu (2005)

■ Treatment of stored underground agricultural chemicals

Persistent Organic Pollutants (POPs) should be properly stored and disposed of in accordance with the Stockholm Convention on Persistent Organic Pollutants. Thus, the Ministry of the Environment laid down the Provisional Manual for the excavation and storage of agricultural chemicals stored underground in December 2001 so that Pesticides containing POPs (POPs such as DDT) stored underground are properly excavated. This manual was revised in March 2005 based on scientific findings that came to light afterwards. In addition, demonstration studies are underway to ensure that POPs are disposed of properly. Note: The final version of the manual will be issued in 2007.

POPs such as PCBs and DDT are toxic, persistent substances that easily accumulate in living organisms, can drift a long distance and have adverse impacts on human health and ecosystems, thereby causing global pollution. For this reason, an intergovernmental conference held in Johannesburg (South Africa) in December 2000 came up with an internationally binding protocol to phase out POPs and reduce their release. Accordingly, the production, use and release of 12 substances (including PCBs and DDT) are either banned or regulated, their release are reduced and their waste and stockpiles should be properly disposed of. This protocol, officially adopted at a diplomatic conference held in Stockholm in May 2001, was concluded in August 2002 and took effect in May 2004 in Japan.

* 12 target substances

Aldrin (insecticide), Chlordane (insecticide), Dieldrin (insecticide), Endrin (insecticide), Heptachlor (insecticide), Toxaphene (insecticide), Mirex (insecticide, flame retardant), Hexachlorobenzene (fungicide), PCBs (electrical insulation oil and heating medium, etc.), DDT (insecticide), dioxins and furans

■ Data required for the registration of agricultural chemicals

Results of efficacy studies

Results of phytotoxicity studies

Results of general toxicity studies

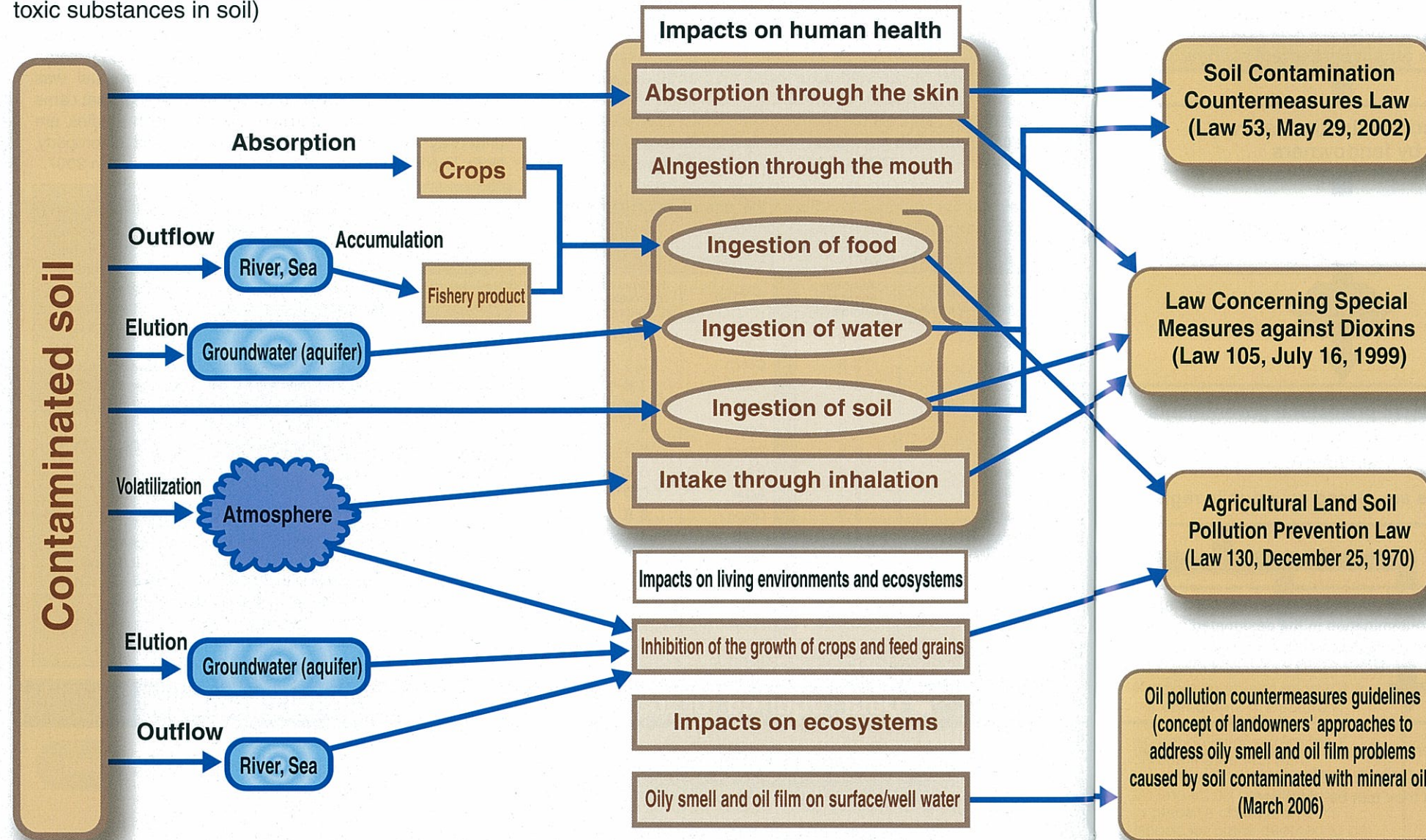
- ◆ Acute toxicity studies
- ◆ Medium- to long-term toxicity studies
- ◆ Studies for the in vivo degradation of agricultural chemicals and the chemical structures of degradation products
- ◆ Studies to evaluate impacts in the environment

Results of residue level studies

Conservation of Soil Environment

It is difficult to be purified for contaminated soil for a long time, in which toxic substances accumulate. Soil contamination has adverse impacts on human health, inhibits the growth of crops and plants and influences ecosystems

Specifically, such adverse impacts on human health involve direct risks (exposure to or ingestion of contaminated soil) and indirect risks (ingestion of groundwater contaminated with toxic substances in soil)

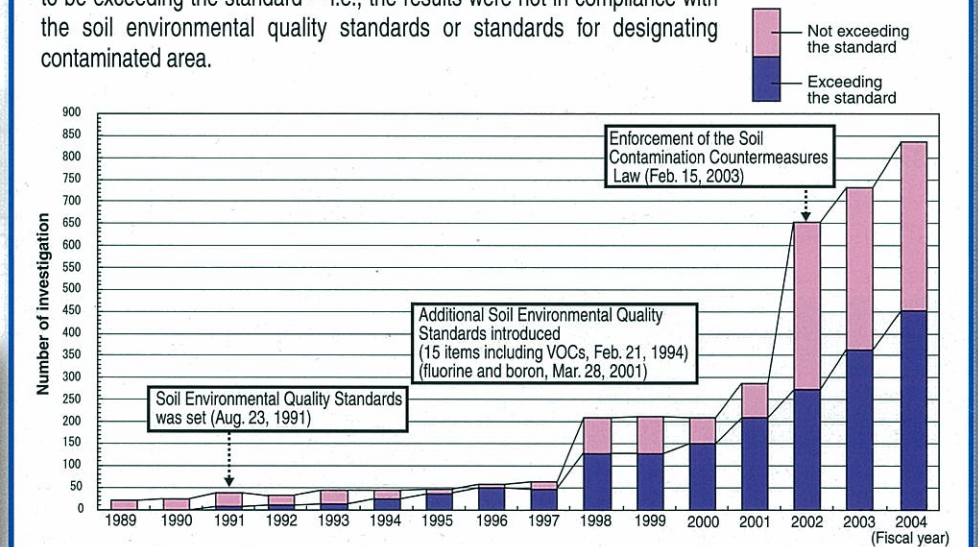


Outline of soil environment administration of the Ministry of the Environment

	Measures for agricultural lands	Measures for urban areas	Measures for dioxin control (Against soil contamination by dioxins)
Legal system	Agricultural Land Soil Pollution Prevention Law	Soil Contamination Countermeasures Law	Law Concerning Special Measures Against Dioxins
Standards, etc.	<ul style="list-style-type: none"> Soil environmental standards Requirements for the designation of agricultural soil as contaminated 	<ul style="list-style-type: none"> Soil environmental quality standards Standards for designating contaminated areas Soil contamination standard Soil leachate standard 	<ul style="list-style-type: none"> Environmental Quality standards Requirements for the designation of controlled areas
Major measures	<ul style="list-style-type: none"> Formulation and revision of methods to monitor and survey environmental conditions Formulation and revision of environmental standards through the collection, compilation and analysis of scientific data Formulation of soil pollution survey/control techniques Formulation of guidelines for technical measures Support for risk communication Financial support for remediation projects in controlled areas contaminated with dioxins 		

Soil contamination incidence is on the rise in urban areas

838 surveys in total were conducted in fiscal 2004 based not only on the Soil Contamination Countermeasures Law but also on relevant regulations/guidelines and voluntary approaches, each of which was notified to the competent prefectural and city government. Of these, 454 cases were found to be exceeding the standard – i.e., the results were not in compliance with the soil environmental quality standards or standards for designating contaminated area.



Number of Soil Pollution Surveys and Non-compliance Cases

Overview of health risks (the basis of the Soil Contamination Countermeasures Law)

The significance of health risks caused by soil contamination is determined by soil pollution levels and exposure levels to contaminated soil – which can be represented by the following formula:

$$\text{Health risks caused by soil contamination} = \text{The significance of the toxicity of contaminated soil} \times \text{Exposure levels}$$

When there is no exposure to pollutants (i.e., zero exposure level), there are no health risks caused by soil contamination. Such cases include where the population has not been exposed to contaminated soil or ingested polluted groundwater, and toxic substances do not leach out of contaminated soil into groundwater. Also, environmental risks associated with exposure to purified soil that meet standards are considered within acceptable levels.

Successful risk communication holds the key to soil contamination countermeasures



Approaches to address oily smell and oil film problems of surface/well water

Oily smell and oil film problems are occasionally reported on surface, well, pond and channel water in the areas where the soil is contaminated with mineral oil. Oil contamination control measures are thus in place in line with guidelines for surveys and countermeasures recommended for the landowners concerned.

