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NEW BOOKS

In September 2005, a regular publication of the Institute of Ecology of Tallinn University under the general title "**Environment and Oil Shale Mining in North-East Estonia**" (Editors *Valdo Liblik* and *Jaan-Mati Punning*, Institute of Ecology, Publication 9/2005, 226 pp) was published. The book is written in Estonian and has an extended Summary in English (10 pp).

Besides introduction, a brief survey of the study area and the methods used, and bibliography (217 references), the monograph consists of nine longer papers in which the main results of investigations carried out in North-East Estonia in 1998–2003 ascertain the impact of different factors on the environment. The following papers were published:

- Post-mining environmental impact of oil shale mines (authors: *V. Liblik, A. Toomik, and A. Rätsep*)
- Impact of oil shale mine closures on hydrological conditions of North-East Estonian rivers (*A. Rätsep*)
- Impact of wastewater discharges on the water quality of Purtse catchment *(A, Rätsep, E. Rull and V. Liblik*)
- Changes in the plant community on the deformed forest lands (*E. Rull, V. Liblik and M. Pensa*)
- Impact of underground mines on the exploitation characteristics of agricultural land (*E. Soovik*)
- Development of vegetation on reclaimed oil shale opencast mines (*H. Karu, A. Luud, M. Pensa, E. Rull and R. Vaht*)
- Blast vibration in oil shale mining (*A. Toomik*)
- Energetic potential of domestic energy sources in Estonia (*A. Luud, M. Ani*)
- Emission of pollutants and ambient air quality in the towns of Ida-Virumaa (*V. Liblik, K. Maalma*)

The attention is focused upon various effects of underground mining on the environment, which will continue for many years after closing the mines, and formation of hydrological and hydrogeological interconnections between catchment areas of rivers (Purtse, Rannapungerja, Pühajõgi and Vasavere) after closing and flooding of the Ahtme, Tammiku, Sompa and Kohtla oil shale mines. Some negative impacts may last for ever (depressed areas with subsidences of ground surface, quasi-stable undermined areas), while others are short-lived persisting for some years (5–10 years) after the closure of a mine (groundwater level and hydrological regime will be re-established, water quality will improve etc.). A varying correlation shows persuasively that in the observed area a new anthropogenic-and-natural water cycling has formed, where disturbed geological environment (Keila-Kukruse aquifer) acquires an

essential function. The most acute problems of mine water discharges into the Purtse, Kohtla and Ojamaa rivers as well as impact of wastewaters on the phytoplankton abundance until 2000 and in 2001–2004 are described.

The results of an investigation carried out by a working group of the Estonian Research Institute of Agriculture in 2001–2003 are presented. Oil shale underground mining in Ida-Viru County has affected exploitation characteristics of agricultural land in two main ways – positively by draining previously waterlogged areas, and/or negatively by producing artificial micro- and nanorelief of the land surface. To take into account changes in the soil water regime and land surface relief due to underground mining of agricultural lands, a mathematical model is presented.

Changes in the plant community on deformed forest lands are also described. The research of changes in vegetation has shown that ground deformations will generate drastic changes in plant communities in the areas where the hydrological regime would rapidly change after occurrence of depressions, largely as a result of local geological (natural) conditions. The development of new communities is subject to natural stabilisation in 15–20 years after the formation of the depressions. The subsided areas still represent an interesting example of landscape diversity in the mined areas.

Spontaneous succession is a useful technique for reclamation of small areas of the calcareous and stony spoils of opencast mines and may replace the typical reclamation technique of planting tree monocultures where diversity is the goal. Planting of broad-leaved tree species may enhance the performance of the herbaceous layer, while in coniferous stands the herbaceous layer may remain sparse

The environmental impact factors of blast vibration in opencasts and underground mines of the oil-shale deposit in North-East Estonia are described. The elaborated formulas to describe vibration velocity enable to calculate the weights of charges when cautious blasting is necessary near sensible objects. For underground mining the formulas for various depths of blasting and for various groundwater levels (water content) in overburden rocks are presented.

The results of comparison of the energy potential of oil shale as the main local energy source and different alternative resources of domestic energy (wind energy, biomass and peat combustion, and ethanol and bio-oil from agricultural crops) are described. For replacing fossil oil shale, imported gasoline and light oil with domestic biofuels, additional 18,000 km^2 are needed for growing straw material. Changes in the land use structure may cause a serious impact on the environment.

Also, data about the emission of pollutants in 1999–2003 by individual components, the organisation and results of monitoring atmospheric air in the towns (Kohtla-Järve, Narva) of Ida-Viru County are shortly described, as well as some future trends in this field. The actual role of road transport and hydrocarbons emitted by chemical plants in forming the air pollution level is not clear.