

## DEVELOPMENT OF WATER SUPPLY IN VILLAGE SHOLTOZERO FROM A PERSPECTIVE OF A NON-GOVERNMENTAL ORGANIZATION

### INTRODUCTION

Water is vital for life, but about half of Russian population has to drink water that does not fulfill quality standards. Water supply and services are living in a big transform and Federation has put a big effort to renew water services to enable better public health. (ВСЕРОССИЙСКИЙ УРОК ЧИСТОЙ ВОДЫ 2009) Rural areas are in danger to fall out from this development. Finland and Russia have a history of co-operation in the water sector in Karelia but Finnish Non-Governmental Organizations (NGOs) working in the environmental field in Russia have traditionally focused on forest sector (Tanskanen 2005). NGOs could have a big role in the development of water systems in rural areas especially by local action (UN 2009). In North people live in sparsely populated areas and water supply is usually based on small systems. Sanitary conditions and state of water services in the Republic of Karelia varies. Situation seems to be worst in rural areas but there are also big differences between villages. In Karelian Republic there are 54 schools with no proper sanitation facilities.

Global Dry Toilet association of Finland has worked in Karelia since 2008 by providing information about safe sanitation, arranging seminars, building dry toilets to public places and making basic surveys concerning sanitation in rural areas. As there was a clear need for more detailed information a deeper survey in Sholtozero village was done. This study was a qualitative case study aiming to find out present state and new development possibilities for water supply in rural areas of Karelia. The study was done by finding and analyzing factors affecting on water and sanitation on three different levels:

1. *Local factors*: quality of water in the village, health problems, villagers and their knowledge and behavior concerning water issues
2. *Technical and practical factors* concerning water supply including risk assessment step by step from catchment to consumer
3. *Institutional, administrative and economical factors*

## MATERIALS AND METHODS

This survey was done during year 2010. Bottom-up approach and a perspective of a NGO was applied aiming to understand the circumstances also from a local perspective. The main methods used in this survey were qualitative: observation, theme interviews and semi-structured form interviews. Observation was an important method on every step of the survey. Theme interviews were made to key persons concerning water, sanitation and hygiene in the village.

Semi-structured form interviews were made for villagers (n = 44) and to central public places (hospital, school and kindergarden, culture house and museum). 39 % of the villager-respondents lived in block of flats and rest in detached houses, which corresponds also real distribution in the village. Semi-structured form interviews were made in July 2010 by two NGO-workers.

Quantitative methods aiming to find out the quality of water in public wells (n=8) were used. Samples were taken directly to plastic sample bottles from the wells in July 2010. Samples were delivered to Finland and analyzed there in the laboratory of Tampere University of Technology. Analysis were made according SFS-EN ISO standards and High Performance Liquid Size Exclusion Chromatography (HPLSEC) was done according method described by Matilainen et al. (2002). HPLSEC gives information about the organic matter content of the water and possible nitrates. HPLSEC separates components of the material into molecular weight fractions. From the chromatogram the proportion of different molecular size fractions can be determined. (Szabo et al. 2009)

The analysis results of centralized water supply between January 2009 and January 2010 was received from the company providing water services. Different hazard identification and risk assessment guides (Vikman ja Arosilta 2006; Identification and description of hazards 2007; Isomäki et al. 2008) were used as help for risk assessment for centralized water supply. Risk assessment for wells was made with help of World Health Organization's basic sanitary survey by adjusting it to Karelian circumstances (Guidelines for drinking water quality 1997).

## RESULTS AND DISCUSSION

In the risk assessment of public wells, all wells fell into category of "high" or "very high" risk. Wells are situated poorly and many possible hazards (defective dry toilets, waste waters, rubbish, roads and surface waters) were detected near wells. Structures are poor and the quality of the water in most of the wells was worrying bad. The level of nitrate exceeded health-based limit (50 mg/l) in one well, anthropogenic influence was clear in 5 wells of 8. Also high levels of chloride,

sulfate and turbidity were detected. According Szabo et al. (2009) leaching of organic matter into well is clear if sum of peak heights in HPLSEC exceeds value 3 mAU. This value was exceeded in all well water samples.

The risk assessment that was done to centralized water supply generated a gathered list of possible hazards including 62 different hazards. The magnitude of risks varies. Some of the risks could be deleted with a small amount of money some would need bigger investments. There are possible hazards on every step all the way from catchment to consumer. Tap water exceeds limit values of sanitary norms.

Institutional and administrative problems are present as roles of community, metropolitan region and company providing services are unclear. Risk assessment and management is poor. Resources concerning finance, techniques, maintenance, staff and expertise are insufficient. Lack of education and information is clear. On the other hand arising tariffs in the village tell about a big positive change as low tariffs has been a major concern in the Russian water sector.

The general knowledge concerning water supply and its relation to public health is low on a local level. Waterborne diseases are discovered only with bigger outbreaks. When asking about the information needed, 52 % of the respondents told that they wanted to get more information concerning the quality of the water as they have at the moment no information about it. Most of the villagers had some idea about the possible diseases concerning inadequate water and sanitation but still most of the respondents thought that water was not harmful to their health.

Even though economical problems are a big concern in the water sector in Russia in general a lot could be with small amounts of money. There is a clear understanding, that water purification of centralized water is insufficient, but this knowledge does not transform into action. There are many simple ways to better centralized as also decentralized water supply. Concerning centralized water supply the usage of metering devices should be encouraged to minimize energy and water consumption and problems concerning invoicing should be sorted out. Instruction how to make simple risk assessment for centralized water supply would help water sector to analyze the situation and find ways how to better the system step by step. These kinds of methods would be very educative for local water supply workers.

A lot could be done in the villages by local action as wells are the base for water supply in rural areas. Most of all information and education about the subject is needed on a local level and there is a lack of material in Russian language (UN 2009). As a part of this project a simple analysis methods for wells of World Health Organization were adjusted to Karelian circumstances. Application of different participatory methods to better environmental

health in the rural areas should be tested as Environmental Health in the villages could be improved remarkably by local action.

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