

Women in Europe for a Common Future



Reducing effects of polluted drinking water on children's health in rural Romania

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*Setting: Village of Garla Mare, (pop.3000)
Mehendhiti province, Romania.*

1 | Rationale and objectives

Background

7 million people in rural areas of Romania get drinking water mostly from wells, in majority private wells. These wells are often polluted with nitrates, bacteria, and pesticides. Romania is not an exception in Eastern Europe and the NIS. In Ukraine 11 million people take drinking water from - often shallow - private wells. For other countries in the region the same seems to apply.

In Romania the national drinking water legislation has been consolidated with EU directives and sets quality levels and control mechanisms for public drinking water systems. The EU directive excludes however wells which provide less than 50 persons, or 10m³ per day from these quality and control mechanisms. For Romania that means that it does not cover the main source of drinking water for the rural population: private wells. The EU directive does state that in the case of small capacity wells the government should inform the population about the pollution and give advice about alternatives. But since in most villages there are no alternatives this is difficult. At the same time, connecting even 50% of the rural population to a central drinking water and sanitation system largely surpasses the Romanian government's budget possibility. The Millennium Development Goals – to increase by 50% the number of people who have access to clean drinking water and sanitation by 2015 – can in this way not be reached.

The cause of well-water pollution with nitrates, pesticides and e-coli bacteria and fecal-streptococci are latrines, waste dumps and agriculture. Health effects of this pollution are both long term (thyroid and brain dysfunction) and immediate (blue-baby-disease, diarrhoea, hepatitis) and can be lethal to small children.

The NGO Medium & Sanitas (M&S) together with its German and Dutch partners of Women in Europe for

a Common Future (WECF) have carried out a multi-stakeholder pilot project in a village of 3500 inhabitants, Garla Mare, to develop replicable low-cost short-term solutions to health effects from drinking water pollution among children. The project was funded by the MATRA programme of the Dutch Ministry of Foreign Affairs.

Objective and Target audience

The pilot project aims at directly improving the health of 500 children of the 2nd primary school in Garla Mare as well as the health of all new-borns in the village by reducing occurrence of gastroenteritis and blue-baby disease by education, better sanitation and clean water provision.

Selection procedure and preliminary water testing

M&S selected the village of Gala Mare as the health statistics showed that in this village many cases of methaemoglobinemia (blue baby disease) had occurred. The number of cases were even higher in certain villages in the Moldovan part of the country, but the access to these villages was more difficult, which was why Garla Mare was preferred as a location for a first pilot project. Blue baby disease is linked to high nitrate levels in water used for baby formula milk. Since several decades most Western-European countries no longer have cases of blue baby disease.

M&S and WECF started with an investigation of the water quality, since the water tests available from the sanitary services were not up to date and only had tested hardness and turbulence. Water tests were carried out of the 78 public wells in Garla Mare. Tests on microbiological pollution and pesticides were done in laboratories in Romania and Germany.

The water tests showed 3 types of pollution of the

drinking water: (very) high levels of faecal bacteria, nitrates and the pesticide 'atrazine'. None of the 78 wells tested had clean water (Nitrate levels average 120 mg/l with peaks over 500 mg/l, faecal-streptococci 5420/liter, atrazine up to 500 ng/l). The high faecal bacteria levels indicate that the primary cause of bacterial pollution are the latrines in people's gardens. These latrines are not sealed and not emptied, and the faecal bacteria and nitrates are washed into the ground-water aquifer.

Agriculture (or possibly a leaking pesticide storage) is the cause of ground water pollution with the persistent hormone-disrupting pesticide 'atrazine'.

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Approach

The pilot project of Medium & Sanitas follows the agenda 21 approach. A project committee with repre-

sentatives of all the social and ethnic groups, and a good gender balance, cooperates with the mayor of the village and Medium&Sanitas is developing solutions to reduce water pollution. A project information center/office was opened and a local coordination team of appointed (the nurse of the dispensary, a school teacher and a agricultural engineer). The project committee participated in the nitrate water tests (quick-tests exist which can be carried out on the spot, using colour indication, they are not to the milligram precise but give a good indication of the level of nitrates). The project committee and project staff organised a water-test day where the villagers could come with a sample from their well and test the nitrate levels. In this way the water testing became a very visible and convincing experience for the villagers who normally are wary of official statistics. A special 'women's club' was set up in the village through the



Discussing the nitrate test of one of the springs near the Danube (65 mg/l) with women of the village of Garla Mare, Romania.

initiative of the international project partners and the local coordinators. The women's club has met 5 times during the project period and has discussed how the women in the village can carry out activities to improve the standard of living. This led to the idea to set up a football club to keep the difficult unemployed teenagers from the street. They also are discussing possibilities to build a central cloth-washing place in the village. One of the meetings was dedicated to the advantages of breastfeeding when drinking water is polluted.



Example of a nitrate quick-test, this particular test showed the drinking water well had a level of nitrates exceeding 500 mg per liter (max. WHO level 50 mg/l).

2 | Planning and implementation

Time-frame

The project investigation and implementation phase runs from June 2002 till December 2003.

First project stage: research and investigation of alternatives

A survey was carried out by the M&S NGO staff among 480 inhabitants about their knowledge and experience with health effects from water pollution.

which showed that there was hardly no awareness about the link between polluted water and health (people think that if the water looks clean it should be clean – nitrates, bacteria and pesticides are not visible by the eye though). The survey showed that the Garla Mare inhabitants believed that the water quality of a water-spring down hill from the village near the Danube was better than from the wells. Many people walk up to 40 minutes down and up hill to get a bucket of water from the spring to use for drinking only. The 2 schools and 1 kindergarten in the village do not have functioning wells and do not have the possibility for

children to wash their hands after using the toilet. The toilets in the schools are pit-latrine, badly built as the floor-inclination is towards the entrance door, thus the children first have to wade through urine before getting to the latrine.

An in-depth socio-economic-gender analysis was carried out by focus interviews with a representative group of 20 inhabitants.

The socio-economic-gender analysis showed that the income level with most families was so low that they could hardly provide sufficient food (according to teachers a number of children often miss school when there was no money for their lunch box) and pay for the electricity bill. Additional money to pay for a private centralized drinking water system are not available. The analysis also showed that the governmental scheme which provides formula-milk to women who are unable to breast-feed was also used by many women who are able to breast-feed since formula milk was perceived as better and as a status-symbol. The women were using the polluted well water for making



The spring near the river is also used for washing curtains and carpets, but was mainly used for getting 'clean' drinking water. The water test showed however that the levels of pesticide (atrazine) are 300 – 500 ng/l (max 100 ng/l), nitrate levels are at 65 mg/l.



A drinking water well in Garla Mare. The crumbled protection around the well and the lack of cover increase the change of microbiological pollution.

the formula milk. The gender analysis showed that the women spend several hours a day dealing with water: going down to the spring, getting up to 90 buckets of water from the hand-wheel well in summer for the animals and the garden and washing the dishes and clothes. Only few families have an electric pump on their well. Most families have non-sealed pit latrines which are not cleaned, the latrine is moved when the pit is full. Families with a small garden clean out the pit latrines as they can not move them. Only the 10 richest families had installed water reservoirs on the roofs of their houses to provide water for a flush-toilet. Most flush toilets were not being used as they were continuously clogged.

A hydro-geological study

was commissioned with an engineering firm from Bucharest after the existing study which the regional authorities provided, proved useless. The hydro-geological study showed that the capacity of the shallow groundwater aquifer is probably not sufficient for a centralized water system. A deep test-well of 100 meters would need to dug to find out if lower groundwater levels would be able to supply the village with clean and sufficient water.

A public meeting

was organised in the town hall where the project staff presented the results of the investigation: the water tests and the results of the survey and socio-economic gender analysis. A number of experts presented possible solutions ranging from a centralized water supply connected to a large filter, to preventive measures such as eco-sanitation and organic farming. The presentations were followed by a discussion with the project committee and other participants in the meeting on priorities within the pilot project's financial possibilities. It was decided that the installation of a centralized drinking water system connected to a filter to take out the pollution was the best solution, but not financially feasible. The minimum investment costs started at 150.000 Euro (pumping up water from the source, 1 filter with 6 separate steps, 4 – 6 public taps in the main street). A good centralized system would include a waste-water system and also provide water to neighbouring villages and would cost over a million Euro. The project budget for this pilot project implementation was only 10.000 Euros. The villagers of Garla Mare do not have the financial strength to pay sufficiently for drinking water that a financial scheme with bank-loans and long-term payoff would be possible. The local project committee and the project staff in cooperation with the local authorities therefore decided to focus on 3 preventive solutions: a short-term emergency solution, a medium-term solution and a long-term solution.

Second project phase: implementation of practical improvement steps

The project has developed 3 main implementation activities:

Short-term solution: Clean water and better hygiene in the schools

One water filter was especially designed for the high-nitrate pollution in the village (it has a double nitrate cartridge). This filter has been installed in the school and all the villagers who have small children and other persons at risk at home, can come and get clean water. This filter – which can take out nitrates, bacteria and atrazine – has a multi-barrier-system and a mechanical bacteria filter which functions under pressure (2 or 3 bar). It was therefore necessary to buy a pump and install it next to the well. The filter was donated to the project by the German manufacturer. It is a small-scale filter which provides only 2,5 liters per minute, which is sufficient for the use of the school. The water from the filter has been tested and it takes out all the bacteria and pesticides and reaches a very low level of nitrates (2mg/l - in nature the average levels are about 7 mg/l). After this positive test, another 2 filters are being installed, in the other school/kindergarten and in the dispensary. It will thus be easier for women with babies and small children to come and get drinking water from one of the filters (when the schools are

closed in summer, they can go to the dispensary). In both schools the project built **6 hand-washing basins** in a covered area (so that it doesn't freeze in winter). The pump provides the water from the well. The children can finally wash their hands after using the toilet. Educational material has been published on how to use the filtered water (only for drinking, not for washing etc). Posters have been put on the public wells in the village showing their level of pollution and warning about health effects for children. A children's drawing contest has been organised by the 2 schools on the theme of clean drinking water and the winning pictures have been used for a calendar-poster (Din A-1 format). 8 leaflets on hygiene, nitrates, pesticides, bacteria, their health effects, well-maintenance, organic agriculture and dry-toilets have been written and are being printed.

Medium-term solution:

hygienic toilets which do not pollute the ground-water 6 'luxury' dry-separation toilets (separated collection of the urine and faecal material) have been built in the one of the village school (Aug-Sept 2003) and 2 'low-



The wash basins installed in the schools in Garla Mare. It was possible to build them after the pump had been installed for the filter.



The water filter for school is small but effective. It works under pressure, has an additional nitrate-elimination cartridge, and takes out pesticides, bacteria and nitrates.

cost' dry-separation toilets have been built in 2 private homes (the toilets could not be built in the second school because the local authorities are in a court-case with the former owners). These toilets will serve as an example of how easy, low-cost and comfortable dry-separation toilets are. Dry-separation toilets – also-called Eco-sanitation or Ecosan toilets - have 3 major advantages over flush-toilets; they are cheap (8-10 dollars in local production for low-cost model), they don't use (drinking)-water for flushing, and they avoid faecal



School-boys play on the "eco-san" toilet house with 6 toilets build in Garla Mare.



A conventional latrine.

material getting into the ground-water and polluting it. An additional advantage is that the 'product' – a high quality fertilizer – can help to close the nutrient loop. For the villagers in Garla Mare these toilets are a great improvement over the pit latrines as they do not smell, don't attract flies and can be build inside the houses in a heated room, so no need to go outside into the cold winter. The practical implementation of the eco-sanitation toilets receives support from the Technical University of Hamburg-Harburg and the NGO network "Women in Europe for a Common Future". One engineer from the Technical University and 2 students from a university in Bucharest have spent between 2 and 4 weeks in Garla Mare helping the local building company and project team to built and install the school's toilets properly and to do outreach work with the school children and their families about the new eco-san toilets, the relationship between water pollution, sanitation, hygiene and health.

A contract has been made with a private person of Garla Mare to maintain the toilets for the next 5 years (as the toilets have a double-vault system the



School-girl shows the dry "eco-san" toilet.

urine and faecal tanks need to be emptied only every 6 to 12 months). A contract is being made with a farmer in Garla Mare who will compost the faecal material and store the urine so that it becomes pathogene-free and can be used as fertilizer. Education material has been published to explain the benefits of the dry-toilets, how to use them and how to built them (for private families).

Long-term solution: addressing agricultural pollution

The project staff and project committee have initiated a cooperation between the farmers in Garla Mare and organic farmers in Constanza and the Netherlands. Organic farming does not pollute the ground-water, is better for the health of the villagers and is more interesting from an economic point of view as there is a demand from importers of organic produce from Western-Europe who are willing to pay premium-prices and pay in advance.

The project staff and project committee have organised a training visit for 20 farmers from Garla Mare (10 men, 10 women, mixed socio-economic background) to the organic farmers in Constanza.

A second visit is planned to organic sheep farmers in Sibiu. If sufficient interest exists an organic-farmers-cooperative will be created in Garla Mare and contracts made with importers from Germany and the Netherlands. The long term health effects will be reduced exposure to pesticides of the villagers in Garla Mare (in their work and in their drinking water).

3 | Output

500 children of the first school have **improved hygiene conditions** (toilets and washing basins) and access to clean drinking water (filter nr 1). The children of the second school/kindergarten will have wash-basins and clean drinking water (October 2003). The patients visiting the dispensary will benefit from clean water (October 2003). The project staff have asked the village medical doctor to provide statistics on the number of ill children and the type of illness and to follow the development to see if the project effects on the children's health in the village can be quantified. So far the doctor has not been able to provide these figures. However, no new cases of blue baby disease occurred during 2002. Two cases occurred in 2003. As qualitative result the project has led to an improved knowledge among the villagers off the link between health and environment.

Education and media material are an output of the project. Apart from the publications (mentioned above)

the project team also obtained funding to make a 15 minute documentary film, which was presented at the World Water Forum in Kyoto in March 2003. WECF engaged a French filmmaker, Marina Galimberti of Rap-sode Productions, who has experience with women's environmental projects, to film the project in Romania. The film is being subtitled in Romania, French and Dutch for wider use as an educational tool.

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Workshop on eco-sanitation in the school of Garla Mare.



Making the documentary about the project.

4 | Lessons learned

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The key factors to success: The project in Romania involves a high degree of educational activities of the local NGOs as well as multi-stakeholder debates and cooperation. The project is carried by the local community and addresses direct and urgent needs of the local population. The project has helped to increase public participation in decision-making on drinking water and sanitation policies and investments.

Replicability: At the end of the project in December 2003 an evaluation study will show how this project can serve as an example for short-term development of better quality of water and sanitation in rural areas of Eastern Europe and the NIS. Eco-sanitation is probably a very easily replicable solution to sanitation-related health problems in rural areas of Eastern Europe and the NIS. If the positive experience from the pilot project in Romania (and new pilot projects starting in Ukraine and developed in Bulgaria) becomes better known, a demand from the population might lead to broad replication.

The challenges were many-fold. It was difficult to obtain data at the start of the project which meant a lot of time was spent on water testing, surveys and finding a good hydrogeological study. It was difficult to obtain the cooperation of the 2 opposing political parties in the village and to have them all work together. It was difficult to find the right building materials and storage tanks for the eco-san toilet building. It was difficult to have the pump and filter installed correctly (took 6 months!). But all challenges were overcome with good research, good work contracts and with lots of time and lots of discussions.

The pilot project results will last beyond the end of the project. The toilets, filters and hand-washing basins will continue to create a better hygienic and health situation for the children in Garla Mare. The project committee and women's club have said they want to continue

to develop new activities, including developing organic agriculture further. In December 2003 as existing project partners have already promised continued cooperation, in particular the Technical University of Hamburg and Women in Europe for a Common Future. WECF is trying to help the local authorities and NGOs to try and find sponsors for a centralized water supply system.



26 citizen's from Garla Mare village on a study visit to an organic farm near Sibiu .

Conclusion:

This case study shows that with low-cost preventive measures immediate improvements in the health situation of children in areas with polluted drinking-water from wells can be achieved. It is essential to involve all sectors and to give women and children the opportunity and tools to take action themselves. It is also important to address the problems from a preventive perspective, water filters alone are not sustainable in the long term, reduction of water pollution at the source is sustainable. CEE and NIS governments should develop policies to promote investments in dry toilets (eco-san) for the majority of the rural population not connected to a central drinking-water and sewage system. Governments should also promote organic farming to reduce nitrate and pesticide pollution of drinking water.

