

Women in Europe for a Common Future



Sustainable Development for All

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

Case Study
July 2006

WECF, The Netherlands
Women in Europe for a Common Future



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and enlarged edition
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Margriet Samwel

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„Reducing effects of
polluted drinking water on children's
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The following case study related publications are available on the website of WECF: www.wecf.org/publications:

Romania Gender Socio Economic Analysis Report

A report on a short survey of the socio-economic and gender situation in Garla Mare, Romania, 2004

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

2004

Safe Drinking Water in Romania

The January Report on the Romania safe Drinking Water Project, 2004

Experience in Roma District

An insight into the safe drinking water project in Garla Mare, Romania, 2004

Ecological sanitation and Associated health Risk

An overview of existing policy making guidelines and research, 2004

No Drinking Water

Documentaries on Women and Water, CD-rom/DVD, 2004

Ecosan- a step towards sustainable rural development in Eastern Europe

Paper to the 3. International Conference on Ecological Sanitation, 2005

Health – Water – Romania – Citizens Information

Various information leaflets on water and related issues, 2005, in Romanian

Ecosan a New Sanitation Approach

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Women in Europe for a Common Future is a network of organisations and individuals working for sustainable development, protection of human health and environment, and poverty reduction. Our international network consists of members and partners in Western and Eastern Europe, the Caucasus and Central Asia.



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1 | Rationale and Objectives

Setting: Village of Garla Mare
(pop.3500), Mehedinti province, Romania

1.1 Background

In the World Health Organisation (WHO) European Region, 120 million people do not have access to safe drinking water, and even more lack access to hygienic sanitary facilities, resulting in waterborne diseases such as hepatitis A, diarrhoeal diseases and typhoid fever. Microbial contamination has been recognised as a prime concern throughout the European Region. Better management of water and sanitation would prevent over 30 million cases of water-related disease per year in the region (WHO Press release 03.2005).

Romania is just one of the European countries with an inadequate wastewater management system and inadequate means of protecting the groundwater.

In Romania more than 10 million people lack adequate sanitation (WaterAid 2005).

Poor sanitary conditions, latrines, the mismanagement of waste dumps, and agricultural waste cause the groundwater and surface water to be polluted with nitrates, pesticides and faecal bacteria, such as E. coli and streptococci. Health effects of this pollution are both long term (thyroid and brain dysfunction) and immediate (blue-baby-disease, diarrhoea, parasitic diseases, hepatitis) and can be lethal to adults, but in particular to newborn babies and small children.

Seven million people in rural areas of Romania, for the most part, get their drinking water from wells, the majority of which are privately owned. These wells are often polluted with nitrates, bacteria, and pesticides. Unfortunately, Romania is not an exception in Eastern Europe and the NIS (Newly Independent States). In the Ukraine, 11 million people take their drinking water from wells. In other countries in the region, the same seems to apply.

In Romania, the national drinking water legislation has been adapted to conform to EU directives, which set quality levels and control mechanisms for public drinking water



systems. However, the EU directive excludes wells, which provide less than 50 persons or 10m³ per day, from these quality and control mechanisms. That means that it does not cover the main source of drinking water for the rural population in Romania: 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. However, in most villages there are currently no alternatives for obtaining unpolluted water.

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 capacity. The United Nations Development Programme's

Millennium Development Goal (MDG-7) – to increase the number of people who have access to clean drinking water and sanitation by 50% by the year 2015– cannot, in this way, be reached. To address the mentioned MDG, the Romanian 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 from November 2001 to February 2004 in a village of 3500 inhabitants "Garla Mare". The goal was to develop replicable, low-cost, short-term solutions to health effects from drinking polluted water among children. The pilot project „Safe Drinking Water“ was funded by MATRA a programme of the Dutch Ministry of Foreign Affairs. (MATRA is an acronym for the Dutch words, maatschappelijke transformatie, or social transformation.)

2 | Pilot project „Safe Drinking Water“

2.1 Objective and Beneficiaries

The pilot project aimed at directly improving the health of 400 children in one of the primary schools in Garla Mare as well as the health of all newborns in the village by reducing occurrence of gastroenteritis and blue baby disease through education, better sanitation and by providing access to clean water.

2.2 Selection procedure and preliminary water testing

Medium & Sanitas selected the village of Garla Mare because health statistics showed that many cases of methaemoglobinemia (blue baby disease) had occurred there. The numbers of cases were even higher in certain villages in the Moldovan part of the country, but access to these villages was more difficult, making Garla Mare the preferable location for the first pilot project.

Blue baby disease is linked to diarrhoeal, intestinal or stomach infections in combination with high nitrate levels in water used for baby drinks or food/formula. Affected infants develop a peculiar blue-grey skin colour and may become irritable or lethargic, depending on the severity of the condition. The condition can progress rapidly to cause coma and death if it is not recognised and treated appropriately. (Environmental Health Perspective, 01/2001)

Due to strict water purification regulations and better hygienic conditions, most Western-European countries have had no cases of blue baby disease for several decades. M&S and WECF started with an investigation of the water quality, since the water tests available from the government sanitary services were not up to date and had only tested hardness and turbidity. Water samples were collected from the 78 public wells in Garla Mare and were then tested for nitrate and partly for microbiological pollution, metals and pesticides in laboratories in Romania and Germany. The water tests showed three types of pollutants in the

drinking water. There were very high levels of faecal bacteria, nitrates and the pesticide 'atrazine'. None of the public wells tested had clean water (Nitrate levels averaged 120 mg/l with peaks over 500 mg/l, faecal streptococci averaged up to 5420/100ml, and atrazine was up to 160 ng/l). In the water from the spring an atrazine concentration of 500 ng/l was found. The acceptable levels in drinking water as established by the EU directive for drinking water for nitrate is 50 mg/l, for faecal streptococci is 0/100ml, and for atrazine is 100 ng/l.

The high faecal bacteria levels indicated that the primary cause of bacterial pollution were the conventional pit latrines in people's gardens. These latrines were neither sealed nor emptied, and the faecal bacteria and nitrates were washed into the groundwater.

Agriculture or possibly a dumping of pesticides was the cause of groundwater pollution with the persistent hormone-disrupting pesticide 'atrazine'. Atrazine is mainly used in agriculture as an herbicide in the cultivation of maize.



A public well in Garla Mare.

2.3

Approach

The pilot project followed the “Agenda 21” approach, a comprehensive plan of action to be taken globally, nationally and locally by organisations of the United Nations system, governments, and major groups in every area in which humans impact on the environment. A project committee with representatives of both genders and from all the different social and ethnic groups cooperated with the mayor of the village and Medium & Sanitas in developing solutions to reduce water pollution. A project information centre/office was opened and a local coordination team was formed to which the nurse of the dispensary, a schoolteacher and an agricultural engineer were appointed as members. 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. For water testing, quick tests with colour indicators were used which are not precise to the milligram but give a good indication of the level of nitrates. In this way, the water testing became a very visible and convincing experience for the villagers who were normally wary of official statistics.

2.4

Research, planning and implementation

2.4.1

First project stage: research and investigation of alternatives

A survey was carried out by the M&S staff among 480 inhabitants about their knowledge and experience with the health effects from water pollution. It showed that there was hardly any awareness about the link between polluted water and health (e.g. a majority thought that if the water looked clean it should be clean—even though nitrates, bacteria and pesticides are not visible to the eye.). The survey also showed that the Garla Mare inhabitants believed that the water quality of a water-spring downhill from the village near the Danube was better than from the wells. However, this water was severely polluted with

pesticides. The two schools and one kindergarten in the village did not have functioning wells and provided no means for children to wash their hands after using the toilets. The pit-latrines in the schools were badly built with the floor sloping towards the entrance door. The children thus had to first wade through wastewater before getting to the latrine.

An in-depth gender-balanced socio-economic analysis was carried out using focus interviews with a representative group of 20 inhabitants. This analysis showed that the income level of most families was so low that they could hardly provide sufficient food and pay for the electricity bill. Additional money to pay for a private centralised drinking water system was not available. The analysis also showed that the governmental scheme, which provides formula-milk to women who were unable to breast-feed was also used by many women who were 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 formula milk or for preparing tee. The gender analysis showed that the women spent 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 garden and for washing the dishes and clothes. Only few families had an electric pump on their well. Most families had non-sealed pit latrines which were not emptied. When the pit was full, the latrine was simply moved. Families with a small garden cleaned out the pit latrines since they could 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



Example of a nitrate quick-test: this particular test showed that the drinking water well had a very high level of nitrate.



The wash basins installed in a school in Garla Mare.

toilets were not being used since they were continuously clogged. An engineering firm from Bucharest conducted a new hydro-geological study after an existing study, which was provided by the regional authorities, proved useless. It showed that the capacity of the shallow groundwater aquifer was probably insufficient for a centralised water system. A deep test-well of 100 meters would need to be drilled to find out if the deeper groundwater 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, the results of the survey, the hydro-geological study and the socio-economic analysis.

A number of experts presented possible solutions ranging from a centralised 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 means. It was decided that the installation of a centralised 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 centralised water supply system would include a wastewater 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 since it would involve a financial arrangement with a bank for loans that would involve unaffordable long-term payoff plans. Therefore, the local project committee and the project staff, in cooperation with the local authorities,

decided to focus on three preventive measures: a short-term emergency solution, a medium-term solution and a long-term solution.

2.4.2

Second project phase: implementation of practical improvement steps

The project committee developed three main implementation activities.

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

One water filter was specially designed for the high-nitrate pollution in the village. This filter was installed in the school and was made accessible to all the villagers who had small children and other persons at risk at home. It has a multi-barrier-system and includes a mechanical bacteria filter, which functions under pressure (3 bar). It was therefore necessary to buy a pump and install it next to the well. The German company Provitec donated the filter to the project. It is a small-scale filter which provides 2,5 litres per minute, which is sufficient for the use of the school. The filter is specially developed for households that depend on private wells with insufficient water quality. It has a double nitrate cartridge and can take out nitrates, bacteria and atrazine. The water from the filter was tested and found to take out all the bacteria and pesticides and to reach a very low level of nitrates, less than 10 mg/l. After this positive test, another two filters were scheduled to be installed in the other school/kindergarten and in the dispensary. It thus became easier for women with babies and small children to come and get clean drinking water from one of the filters (when the schools are closed in summer, they could go to the dispensary).

Connecting the filter in the dispensary with an appropriate well was problematic because the dispensary well was extremely polluted and the properties of other proposed wells were not clearly defined. In the 2004 the filters were functioning and used in both schools. However, in the dispensary the filter was not connected because the filter was out of order, probably caused by improper storage. In the meantime the filter has been repaired. In both schools, the project built six hand-washing basins



Girls with a new toilet.

in a covered area. Additional washbasins were installed by the county on the first floor of the kindergarten. The pump provided the water from the well. The children could finally wash their hands after using the toilet. Educational material was distributed on how to use the filtered water (only for drinking, not for washing etc). Posters were put on the public wells in the village showing their level of pollution and warning about the health effects on children. Unfortunately the posters soon disappeared. A children's drawing contest was organised by the two schools on the theme of clean drinking water and the winning pictures were used for a calendar-poster (Din A-1 format). Eight leaflets were written and printed on hygiene, nitrates, pesticides, bacteria and their health effects, well-maintenance, organic agriculture and dry urine diverting toilets. Due to the difficulties with developing and printing, the leaflets were only ready for dissemination at the end of the project. However, the people are becoming more and more aware of the poor quality of their drinking water. In the town hall the people can test their water for nitrates. The doctors also inform the pregnant women and advise them on water consumption for their babies. For young mothers, water that is low in nitrates for their babies is provided, but older citizens feel that they are used to their water and do not have money to buy bottled water.

• **Medium-term solution: hygienic toilets which do not pollute the groundwater**

A toilet facility with 4 double vault dry urine diverting toilets and 3 waterless urinals were installed in August and September of 2003 at a primary school with approx. 200 pupils (aged 6–10 years) and 7 teachers. For hygienic reasons, urine diverting squatting slabs were chosen. During the planning stage for the new toilets, there was a common agreement between the doctors and the teachers that the public toilets should not be a seat model,



Children in front of their new toilet building. The building has 4 toilet rooms, and 1 room with 3 urinals.

because of the risk of infection. The practical implementation and installation of the Eco-sanitation toilets was supported by the Institute of Wastewater Management of Hamburg University of Technology (TUHH) and WECF and was intended to serve as an example of how to improve sanitation and protect groundwater in an affordable way even if there is no connection to a sewage system or water system for flushing. Ecological dry urine diverting toilets – also called ecological sanitation or Ecosan toilets - have three major advantages over flush toilets: they are inexpensive (8-10 dollars in local production for a low-cost model), require no connection to a sewage system, do not use (drinking)-water for flushing and avoid faecal material or urine from getting into the groundwater and polluting it. After proper treatment and sanitation, the waste matter becomes a high quality fertiliser and can help to close the nutrient loop since urine is rich in nitrogen, potassium and other nutrients. For the villagers of Garla Mare, these toilets are a huge improvement over the pit latrines since they do not smell or attract flies and can be built inside the houses in a heated room, so there is no need to go outside in the cold winter. In ecological sanitation, wastewater is considered as a resource and is recycled after sanitising. The Ecosan toilets in the school are designed so that the urine and faeces are separated at the source, stored and treated to eliminate pathogenic micro organisms. Urine and faeces are not mixed with water. Instead, the faeces are covered with soil, ashes, or wood dust, which effectively reduces the smell, and zero smell is achieved through ventilation pipes. For each toilet, there are two easily accessible faeces cham-

bers (vaults) of 0,9 m³ each with a sealed floor and separated by a dividing wall. Only one chamber is in use at a time. If the in-use chamber is filled, the diverting slab is turned and the second chamber is used. After the second chamber is also filled, the first chamber is emptied and can be used again. The size of the chambers is chosen so that they only have to be emptied after a storage time of two years. In that time period, pathogens are eliminated. Composting/storage times tend to vary according to the climate of the region. During that storage or composting time the faeces is transformed into a hygienic product that looks and smells like soil or humus. While school toilets are considered as public toilets, the urine is stored for at least 6 months in a 3 cubic meter reservoir that is buried under the soil. Eventually pathogens will be eliminated during that storage time. The sanitised urine is used as a fertiliser and the sanitised faeces are used as soil conditioners. Since continual maintenance of the toilets is required, as with every toilet, a contract was made with a private person of Garla Mare to maintain the toilets until the year 2009. (Since the toilets have a double-vault system, the urine tank only needs to be emptied every year and the faecal chamber only every 24 months). In the spring the urine is applied as a fertilizer to the field intended for maize cultivation. Since the maize production has increased remarkably, the farmers were very happy with this new kind of fertiliser. Education material was published to explain the benefits of the dry-toilets and how to use and

build them. One engineer from the Hamburg University of Technology and two students, studying environmental management at a university in Bucharest, spent between 2 and 4 weeks in August 2003 in Garla Mare helping the local building company and project team to build and install the school's toilets properly and to do outreach work with the school children and their families about the new Ecosan toilets, the relationship between water pollution, sanitation, hygiene and health. Workshops about how to use and maintain the Ecosan toilets were also organised for teachers, parents and the children attending the primary school where they were installed. Finally, in November 2003 the toilet facility for the pupils and teachers of the primary school was officially opened for use.

• **Long-term solution: addressing agricultural pollution**

In general, organic farming does not pollute the groundwater, is better for the health of the villagers and is more interesting from an economic standpoint since 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 organised a training visit for 20 farmers from Garla Mare (10 men, 10 women of a mixed socio-economic background) to the organic sheep farmers in Sibiu.



Meeting of project team and experts in Garla Mare.



Citizens' participation in community projects.

2.5 Community mobilisation

The main goals of the MATRA project "Safe Drinking Water" were to increase citizens' participation in community projects and "democracy building". Although a project committee was established, it was difficult for the committee members to develop their own initiatives for the project or to establish a women's group.

Until this project started, the people involved had very little experience in forming community based organisations, and it was difficult for them to determine what their tasks and responsibilities should be. It is often necessary to mobilise the community first, to initiate citizen's participation and to continually monitor how the community committee is functioning. In order to increase citizens' participation in the project it may be necessary to organise women's meetings or to establish a women's group in order to engage them actively in the decision-making process. With this aim in mind, a fifth year student at the Wageningen University for Life Science in the Netherlands worked with some citizens of Garla Mare, most of whom were women, for a period of two weeks in September 2003 and two weeks in November 2003.

Another student from the Dutch University of Groningen lived in Garla Mare for five weeks to conduct an investigation on the pollution of the wells. She was also involved in the process of community mobilisation. It was beneficial that both of these students spoke Romanian.

As a result of the visits from these two Dutch students, a small committee of women, who were very motivated to work on environmental topics, was established. The students stayed in separate places in Garla Mare. One student lived with a Romanian family half of the time and

with a Roma family the other half of the time.

Although the Romanians had warned her that it would be a very bad experience to live with a Roma family, this did not turn out to be the case, much to the surprise of the Romanian villagers. Initially the Dutch students made an effort to have Roma and Romanian members in the women's group, but it soon became evident that the women from different cultures were not comfortable working with each other in one common women's group.

2.6 Lessons learned in the implementation stage of the project

The key factors to success: The project in Romania involved a high degree of educational activities of the local NGOs as well as multi-stakeholder debates and cooperation. The project was carried out with the involvement of the local community and addressed 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.

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 hydro geological study. It was difficult to obtain the cooperation of the two 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 (It took 6 months!). All the challenges were overcome with careful research, good work contracts and with lots of time and discussions.

The time frame of two years was too short

The start of the project was difficult, but on the end of the project a good base for cooperation with the community was created.

The start of community mobilisation was made, but for their development more support was needed. Also for monitoring and supporting the implemented pilot projects more time was needed. The existing good contacts between the community of Garla Mare and the implementing NGOs, University and students stimulated a continuation of cooperation.

3 | Evaluation and new project „Sustainable Development for All“

Time frame February 2004 – September 2006

After the MATRA project was officially finished in February 2004, WECF kept in contact with the authorities and citizens of Garla Mare, supporting further developments in the village and monitoring the Ecosan toilets and filters. WECF and the Hamburg University of Technology have continued monitoring the toilets after they were installed. Urine and faeces samples were collected to analyse the concentration of the nutrients and micro organisms, and the farmers were instructed and assisted on how to apply the urine to their fields. In autumn 2005 the farmers were visited and asked about their experiences and the fields were inspected. No clear data about the harvest was obtained, but the farmers were very content with the results. The maize ears on the urine-fertilised fields were visibly bigger than the ones on the non-fertilised fields. A student came back to Garla Mare and supported the women group in their efforts to found an NGO and with solving the bureaucratic and organisational obstacles meet.

3.1 In-depth survey on experience with Ecosan toilets

After one year of experience with the Ecosan toilets in Garla Mare, school children, teachers, the toilet caretaker and local residents were interviewed about their experiences with the new Ecosan toilets¹. The main aim of the survey was to gain insight into the level of acceptance and to get an overall reaction to the eco-toilets, the toilet facilities and the methods for using them properly.

The maize ears on the urine-fertilised fields were visibly bigger than the ones on the non-fertilised fields.



Additional information was obtained regarding toilet-type preferences, the willingness or ability to invest in future sanitation projects and the willingness to use the human waste from the Ecosan toilets as a fertiliser.

Method: WECF, in cooperation with the Hamburg University of Technology, developed different questionnaires: one for the children, one for the teachers, and another for the villagers. In the primary school 32 children of the approximately 200 children using the dry urine diverting toilets were interviewed. Four of the seven teachers were interviewed along with a random sample of 40 residents.

3.2 Lessons learned from the Ecosan experience

3.2.1 Improving sanitation in school

All of the children interviewed in the final survey had a conventional pit latrine at home. Three-quarters of the children interviewed used the Eco-san school toilets daily for urine and a little over three-fifths daily for defecation

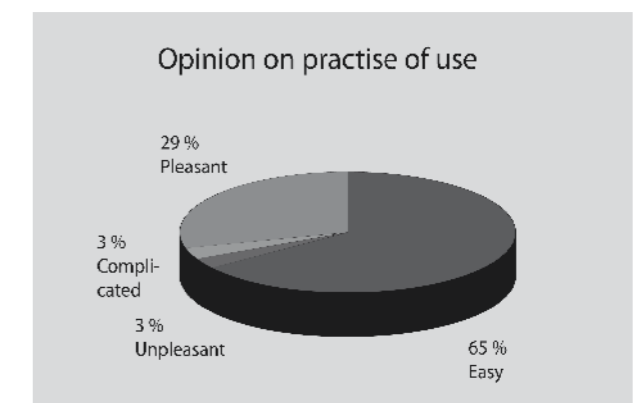


Fig. 1. Children's opinion on the practice of use of urine diverting toilets.

with the girls reporting a slightly higher rate of usage. The vast majority of the children thought that the toilets were easier, cleaner, better designed, and more pleasant to use than the conventional pit latrines and also better for the groundwater. Only a handful of children reported that they found them complicated and unpleasant (see fig 1.)

Of the four teachers interviewed, all reported also liking the design and found the toilet easy to use.

Two teachers thought dry diverting toilets should be used in every school in Romania; the other two thought they should only be used in rural areas since the waste material could be used for agriculture.

The Ecosan toilets turned out to be very positively viewed: Pupils and teachers are content with the Ecosan toilets and find them easy to use and clean. The proper use of the Ecosan toilet by the pupils shows that Ecosan toilets can be implemented at schools with young children.

Typical problems found with a pit latrine, such as flies and bad odours, are virtually non-existent in the new toilet room. After one year of experience with the Ecosan toilets, a majority of the pupils would prefer an Ecosan toilet at their school and home.

3.2.2

Sanitary conditions of households

The average size of the households of the residents interviewed was 3,6 members and all had a conventional pit latrine in their yard, although there was one respondent who also had a water flush toilet in addition to a conventional pit latrine. Given the opportunity, almost all of the

residents interviewed said they would prefer another type of toilet other than a conventional pit latrine. The many disadvantages of the conventional pit latrines that were described included bad odours, the nuisance of flies, and some mentioned the process of emptying the pit (see fig. 2). Taking these disadvantages into account, it is not surprising that the majority of the respondents also prefer their toilets to remain outside in the garden.

When asked which toilet was best for the school, a little under three-quarters of the interviewed residents said they would prefer a dry urine diverting toilet and a little over a quarter preferred a water flush toilet. It became evident that at least half of the people interviewed would ideally prefer a water flush toilet at home. However, the existing poverty among the villagers prevented most respondents from considering investment in their sanitary conditions.

3.2.3

Education on hygiene and environmental care

It is not clear what citizens define as hygienic or environmentally friendly. No one spontaneously mentions bad hygiene or groundwater pollution as a disadvantage to latrines. Citizens don't mention hygienic risks when using composted human waste either.

On the other hand, almost all of the citizens surveyed find the Ecosan toilets better for their children's health, which



Almost all of the citizens surveyed find the ecosan toilets better for children's health.

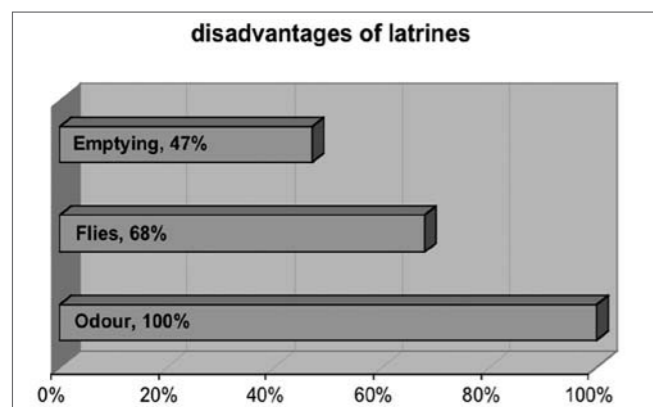


Fig.2 Disadvantages of pit latrines.

suggests that people are at least aware of the unhygienic situation of the previous toilets and the potential danger for their children's health.

3.2.4

The use of Ecosan products as fertiliser

For the future construction of more urine diverting toilets in the village, it is important to have some insight into the willingness of the citizens to use the Ecosan products as a fertiliser and compost in agriculture.

The attitude towards using urine collected from the school toilets, as fertiliser is fairly positive since 60% of the respondents wouldn't mind using it on their fields. However, they were more reluctant about using faeces on the fields: 43% would want to do this and 40% answered with an absolute 'no', others were undecided.

3.2.5

The Importance of Women and Children

Many citizens heard about the new toilets from children, showing that it is possible to reach private households through the education of children. The results show a gender specific pattern: women prefer Ecosan toilets while men prefer water flush toilets. Women are also more willing to use the fertiliser in their fields and gardens. Therefore, women could play an important role in motivating others to use Ecosan toilets. They might also be more open to receiving education. From all this, we can conclude that women and children play an important role overall in motivating and educating people about the use of Ecosan toilets.

3.2.6

Conclusion

Most citizens in Garla Mare are unhappy with their pit latrine at home. The latrines cause problems with bad odours, flies and groundwater pollution. Under current circumstances, dry urine diverting (Ecosan) toilets provide a hygienic and environmentally safe sanitary solution. After building and using Ecosan toilets at the primary school in Garla Mare, the pupils hardly have any problems with bad odours, flies or cleanliness. The Ecosan toilets improved the sanitary conditions for the pupils, and the children at the school are satisfied with the new toilets. Since people are more willing to use the fertiliser in fields

than in gardens, future projects might focus on the use of fertiliser for cultivation of corn and other bulk crops.

3.3.

Development of civil society in Garla Mare

3.3.1

First NGO in Garla Mare is founded

The women's group, consisting of five members, was motivated to found a non-governmental organisation. After a lot of discussion, they decided to work on the topic of solid waste and to clean up their village from plastic and manure. The rationale behind this decision was that the women, and many other villagers, thought that their village and its surrounding could be suitable for attracting tourists, and tourism would naturally be a good source of income. Due to the bureaucratic barriers and internal struggles in the village it took one and a half years (summer 2005) before the women succeeded in being registered as a NGO with the name FVC: "Femei pentru un Viitor Curat" - "Women for a Clean Environment". Since then, some former members have left and new members have been attracted. The group is led by a teacher of the primary school and is a former member of the project committee. In spring 2004 two women of the women group made some efforts to start ecological agriculture. A field was prepared and sowed with legumes. In the summer, information was gathered by the women for an official control and registration of their fields as organic. In the end, it was very difficult to find the appropriate Romanian control and registration body, and the contacts were not developed because the costs for a field visit (200. €) were too high and unaffordable for the women. However, the women want to continue to practice environment-friendly agriculture, but without any official control, support or certification.

3.3.2

A second NGO in Garla Mare is founded

A second group of activists was established. This group is led by a twenty-three year old woman. The group decided that this NGO should be open to all of the villagers – both men and women—but in particular to young people. Again due to the bureaucratic barriers, it took eight months

How can the inhabitants of Garla Mare be provided with affordable and permanent access to safe drinking water?



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before the NGO with the name GEOSAN was registered in the autumn of 2005 as a non-governmental organisation working on environmental topics.

3.3.3

Garla Mare at the multi stakeholder conference WfWfW WECF and the Dutch NGO “Women for Water-for Women (WfWfW)”organised an international multi-stakeholder conference in February 2005 in the Netherlands.

During this conference, experts on drinking water supply, financing strategies, wastewater management along with universities, banks, civil and governmental organisations participated. The mayor of Garla Mare, Medium & Sanitas director, the leader of GEOSAN, and a representative from the national Romanian water Agency Apele Romana participated as well. The aim of the conference was to find solutions to the problems in Garla Mare or at least to work towards a sustainable and affordable water and wastewater management system.

The main questions that came out of the conference about Garla Mare were:

- How can the inhabitants of Garla Mare be provided with affordable and permanent access to safe drinking water?
- How can the existing polluted groundwater be cleaned?
- How can further pollution be prevented?

During the conference, the option of providing Garla Mare with water by a connection with the neighbour village Pristol was discussed. In Pristol, a village approximately 15 km from Garla Mare, investments were made in a central water supply system (CWSS) in 2003 through a EU project.

In this village of 2000 inhabitants the connection costs were €70 per household, and the delivery costs of one m³ water was 20 euro cents. However, a sewage system was not planned. Few houses were connected to the central water supply in Pristol, as the connection costs were too high for the citizens, and they still had their own wells with water that was free. However, they were not aware of the well water quality. In December 2004, the CWSS started delivering water to some public taps in Pristol. The project started off late because of a lack of money. The electricity needed to run the pumps had to be paid for by the community that lacks the money to do so.

Finally by September 2005, the water supply system was not working because the water quality was insufficient. The situation that occurred in Pristol clearly demonstrated that it is necessary to improve the affordability of the system and to involve the citizens in finding a way to increase the water and sanitation conditions in such a way that installation/equipment, operation and maintenance are affordable for the local citizens. The main drawbacks are that there is no experience with technical public installation (operation and maintenance) or public services and the majority of the citizens are not able to contribute to the costs.

During the conference, several problems and solutions were identified and discussed:

Drinking Water:

• **Cost per cubic meter too high?**

It seems, that the price of one cubic meter water (20 euro cent) is too much when taking into consideration the average monthly salaries of the inhabitants. Instead, a system for cross-subsidies should be developed, more villages should get together, and a water utility should be appointed.

• **Cost for connection too high?**

The cost of € 70. per household for a connection to the central water supply system seems too high. Would the citizens in Garla Mare be willing and able to pay this since the water from private wells, although heavily polluted, is free? At least there should be a way to pay in several instalments over several years.

• **Share cost of infrastructure with a neighbouring village?**

With EU funds, the neighbouring village of Pristol has built a drinking water well, a reservoir, and central pipes into the village. This system was completed two years ago, but is not in use since, at least so far, villagers are not willing or able to pay. The water quality is not good enough to invest money into for a connection since the nitrate concentration is far over the fixed limit.

Protection of groundwater:

Since it will probably be many years until a new drinking water system will exist in Garla Mare, it is essential that the current quality of drinking water from the wells improve. Also in the future, many Romanian villages will rely on groundwater from a CWSS and groundwater pollution knows no borders.

Promotion of Ecosan toilets, as was done in the MATRA project, was seen as one of the ways to protect groundwater from infiltration of human excrement. Although only some few flush toilets in Garla Mare exist, (connected to a septic tank), the option of septic tanks was discussed. The main problems observed with septic tanks or septic reservoirs are that they do not separate the faeces, which contain most of the pathogens. Due to the distance to waste water treatment plant and costs of transportation, the septic tanks are costly to empty, and are therefore often not emptied when needed, and overflow into gardens and streets, causing a public health risk, and groundwater pollution. and they are not emptied in time and overflow into gardens and streets, causing a public health concerns and groundwater pollution.



To inform the citizens about the new project a party was organised in the school yard.

Financing infrastructure and income generating activities:

To develop local income generating opportunities, the water infrastructure needs to be paid in one way or another. There have been EU programs targeting smaller municipalities such as the EU’s SAMTID programme. The problems mentioned were that the state budget does not allocate enough funds for rural development. A Rabobank Foundation representative explained how micro-credit schemes could help the citizens of Garla Mare to raise their level of income and well-being. For example, micro-credits can be used to create small enterprises and to raise the income of the community so that they are better able to pay for water charges. There should be a lobby for a national financing scheme for rural development in Romania, including more than just water and sanitation infrastructure.

3.4

Next steps towards

„Sustainable Development for All“

In September 2005, WECF together with the NGO GEOSAN of Garla Mare, started a new one-year project called “Sustainable Development for All” (SDA), with the financial support of the French Foundation Ensemble². The aim of the project is to continue the strategies, which were developed during the first project in Garla Mare during discussion with the citizens including improving the direct living conditions in rural areas by an improved waste and water management system and by developing access to affordable and hygienic sanitation (ecological sanitation).

3.4.1

New project launched with a „Citizens Party“ in the schoolyard

To inform the citizens about the new project and to give all the citizens the occasion to see and to try out the dry urine diverting toilets in the school, a public party in the schoolyard was organised. This was the first activity implemented by the local NGO GEOSAN. In addition, GEOSAN developed and provided educational materials on Ecosan toilets. At least 300 citizens, old and young, Roma and Romanian attended the party, enjoyed the free drinks and snacks and had the opportunity to visit the dry urine diverting toilets.

² www.fondationensemble.org/

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3.5 Developing and implementation of activities

3.5.1 Are there possibilities for environment-friendly (eco) tourism in Garla Mare?

The citizens of Garla Mare view the development of tourism as a way to increase their income. As the mayor of Garla Mare stated, tourism can also be seen as the initial push needed for wider development since tourism goes hand in hand with regional development.

Although he recognised that tourism in Garla Mare might foster a feeling of competition from other villages in the region, he saw this as positive aspect because Garla Mare would be forced to develop more interesting attractions for tourists than the other villages. The initiation of a solid waste management in Garla Mare would be a natural step forwards developing tourism in the village.

However, the question still remains as to whether there are enough opportunities and facilities to attract tourists from Romania or from abroad and what has to be done to provide visitors with suitable facilities for recreation and accommodation.

To get an overview, WECF commissioned a team of six Dutch master students from different disciplines at the University of Wageningen to carry out a study on "Small-Scale Environment-friendly Tourism on the Border of the Danube - Opportunities and Chances for the Villagers in Romanian Garla Mare"³

Two of these students, accompanied by members of GEOSAN, visited the area for one week and had discussions with several resource persons and local citizens. The other students contacted other resource persons per email and collected information from the university. Considering all of the information gathered, the project team became convinced that tourism would be possible in Garla Mare. But tourism can only be developed if certain conditions are met. For example, there should be good accommodation facilities and the road to Garla Mare has to be well marked with signs.

³ http://www.wecf.de/cms/publications/2005/tourism_gm.php



Tourism on the border of the Danube could be an opportunity for Garla Mare.

Organisation

- A local committee should be established in order to arrange tourist activities centrally. The committee should create a tourism program, which would encompass all existing traditional activities.
- In order to promote tourism in Garla Mare, a website could be set up.
- With the help of the English teachers from the schools and the people who already speak English, more villagers could learn to speak English.
- It was recommended that use be made of the established relationship that the villagers have formed with WECF since WECF has successfully gained the trust of the villagers.

The ideas for developing eco tourism have been adopted quite well by the villagers and mayor.

A list with people who are ready to host guests, and a list of people who are ready to offer some services like car rental, trips in the surroundings, boat tours, translation, horse cart tours, etc. was voluntarily prepared by a local woman.

The mayor, a women and student took part in a conference about rural tourism in the Mehedinti district.

The minister of tourism, the prefect and some people from national tourism organisations and people who were in the business in Garla Mare were present. The mayor of Garla Mare was the only mayor present from the villages although all were invited.

**3.5.2
Developing a suitable solid waste management system**
In co-operation with GEOSAN, a student will do an investigation on solid waste management in Garla Mare to find out suitable and affordable options, barriers and existing regulations at the local, national and EU level. The results of this study, which focus in particular on the circumstances in Garla Mare, should serve as a basis for future decisions on solid waste management in Garla Mare. Because many households have pigs, the focus will mainly be on manure and compost management. In addition solution for managing plastic waste and the illegal waste dumps, located on the border of the village will be investigated. During seminars and workshops, the findings will be discussed with all stakeholders and with the involvement of all stakeholders a strategy for a suitable and affordable solid waste management system will to be developed.

3.5.3 Improving the sanitary facilities and quality of groundwater

According to the publication "The State of the World's Toilets 2005", from Wateraid (www.wateraid.org) Romania ranks 34th in the world for the worst sanitation. In Romania, 10,4 million people lack adequate sanitation, whereas country has 21,7 million inhabitants.

In response to a question about the biggest problems facing the schools, the school inspector of the district Teleorman spontaneously answered: "toilets". The survey on "From pit latrine to ecological toilet" showed, that all households had a pit latrine in their yard and that the citizens complained about bad smells and the nuisance of flies. The survey also made it apparent that the quality

of the available sanitary facilities in Garla Mare was woefully inadequate. Taking the high contamination of the wells with faecal bacteria and nitrate into account, we have to assume that the current level of sanitation is environmentally unfriendly, which causes health risks for everyone, but in particular, for vulnerable groups. Plans are in place for the SDA project to construct more examples of dry urine diverting (Ecosan) toilets in Garla Mare, for example, a public toilet will be constructed in the area of the town hall. The mayor and GEOSAN will be responsible and organise the planning, authorisation and construction. In September 2006, the construction of these public toilets should be finished and accessible for the visitors during the opening times of the town hall.

Local workers will be instructed on how to build and how to assist households with an Ecosan toilet, with the aim that this will motivate and engage the citizens to improve their sanitary conditions in an environmentally friendly way. In order to ensure the affordability of an Ecosan toilet for the poorest families a parallel action is to be undertaken. Some individual participants of the WfWfW conference showed their willingness to 'adopt' an Ecosan toilet for the village. In addition the municipal council of the village will provide tax-incentives for private families and businesses investing in non-polluting toilets.

⁴ *From pit latrine to ecological toilet, www.wecf.org/publication*



Developing a solid waste management system in Garla Mare is very necessary, currently citizen's dump their waste on the outskirts of the village.

3.5.4

Education and awareness raising

The women's NGO FVC of Garla Mare, identified the topic of education as one of their future goals. More specifically, they would like to focus on environment and health education in the schools and for adults, in particular for women. For the adults, in particular for the young mothers, leaflets and brochures will be produced with input from the medical professionals (doctors and nurses) in FVC. For young people, meetings on the risks of smoking, taking drugs and consuming alcohol are also planned. In the springtime of 2006 a seminar on ecological sanitation will be organised by FVC for teachers and authorities of the Mehedinți County.

In the school of Garla Mare plants and flowers will be used as a tool to make the children more aware of the need to protect their environment and to make the school a more pleasant and friendly place. Other activities at the school will include waste collection, sorting and composting.



*Improved sanitation:
from pit latrine
to dry urine diverting
toilet.*



4 | Outputs and lessons learned

4.1

Impact of the MATRA project

Since the MATRA project started, several changes have been observed in Garla Mare. The citizens got more aware of their capacity, their environment and the relation between polluted water and health. Citizens got more aware of the possibilities to improve their sanitary facilities.

Although access to safe drinking water has hardly improved for most citizens, safe drinking water is now available for babies and children. During the last two years, there were no new cases of blue baby disease in the village.

There was the implementation of pilot projects, which should serve as examples for possible ways to solve existing environmental problems. Affordable, replicable and environmentally friendly solutions were the goal. The construction of a central water supply system was not the aim of the project; rather, capacity building in order to strengthen the society to get involved in policymaking and to get them active was the overall aim. This aim was reached during the implementation of the project.

4.2

Strengthen civil society

As a result of the MATRA project in the village Garla Mare the civil society was strengthened: since 2005 two non-governmental organisations are registered and active. The citizens and children are motivated to improve their environment, aware of how to improve sanitation facilities and aware of the groundwater pollution and the causes of it. Both NGOs have the willingness and the strength not only to recognise the need for sustainable development, but also to understand the potential possibilities and barriers.

In the future, a central drinking water supply for Garla Mare should be a goal and the citizens of the village will probably be more involved in the future process of planning and

implementation of a CWSS. Public meetings and workshops involving the local community will be held in order to find the best and most affordable way to clean up the surroundings of Garla Mare from illegal waste dumps, to collect the solid waste and to store and treat the waste. The participation of the citizens in the decision making process would make the final solution more acceptable. As a result, they would be more willing to support and contribute to the implementation of an affordable waste management system.

4.3

The pilot project results went beyond the end of the MATRA project

The toilets, filters and hand-washing basins will continue to create better hygiene and health for the children of Garla Mare. The dry urine diverting toilets were a success. The children using them in the schools are happy with the toilets, and there are hardly any complaints about bad smells or flies. The hygienic circumstances have been improved and the groundwater has been protected against the infiltration of excreta from the school toilet.

The first attempts for using the urine as fertiliser in maize cultivation were successful and the University (TUHH) tests showed that the urine was well sanitised and appropriate for use in agriculture.

The two new-founded local NGOs are motivated to improve the environmental circumstances in Garla Mare, to educate and raise awareness on local and regional level. A new project on rural development with the topics solid waste management, drinking water and sanitation is going on now. This project is based on the results of the MATRA project.

Raising awareness: Information about the water quality of the wells, and the causes of pollution has been shared with the citizens of Garla Mare. Providing information and

raising awareness is still continued by the local NGOs. In the town hall and in the dispensary the possibility exist to test citizen's well water on nitrates. Information about the MATRA project has been shared on both a national and international level. The inadequate sanitation, the dramatic groundwater pollution, the inability to pay for water services and the Ecosan school toilets of Garla Mare were presented all over world: from Japan to Brussels and New York and from Bucharest to Teleorman, Romania. The urine diverting toilets are now being replicated in the Ukraine, Armenia, Uzbekistan and Afghanistan.

4.4 Education and media material are an output of the project

Apart from the publications, leaflets and poster, 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 Rapsode Productions, who has experience with women's environmental projects, to film the project in Romania. The film is subtitled in Romania, French and Dutch for wider use as an educational tool.

4.5 Replicability

This project can serve as an example for short- and long-term development of better quality of water and sanitation in rural areas of Eastern Europe and the NIS. Eco-sanitation is a very easily replicable solution to sanitation-related health problems in rural areas of Eastern Europe and the NIS. The Ecosan pilot project of Romania is already replicated in Ukraine and will be replicated in 2006 in WECF projects in Bulgaria, Uzbekistan and in Armenia.

In April 2006, a Romanian delegation of mayors, representatives of the County School Inspectorate, school principals, contractors, and representatives from Teleorman County Council will visit Garla Mare in order to see how the Ecosan project had been implemented there as an example of good practice. In 2006 the Province of Overijssel will finance the implementation of the Ecosan project in one or two schools in the rural area of Teleorman and in 10-20 households in rural places. The Association of Municipi-

palities from The Netherlands, VNG, funds this project called "Teleorman Water Project" and is carried out by the Dutch provinces Overijssel and Gelderland in the Romanian county of Teleorman.

4.5 Rural development

Citizens can now see the potential for developing tourism in Garla Mare and its surroundings, which could have a positive effect on their income. In order to attract the tourists and to offer accommodation, the sanitary services have to be improved and the environment cleaned-up. These two goals can be realised with the input of the local authorities, NGOs and citizens, without a loss of their identity or culture and without high investment costs. The attractions, barriers and activities have been identified to develop this idea of environmentally friendly tourism. In particular an appropriate solid waste management and improved sanitary facilities are needed to attract tourists

4.6 Time frame of the project

The Dutch Ministry of Foreign Affairs financed the MATRA project for two years.

This time period was extremely fruitful and established room for potential development. Of course challenges such as the identification and solving of problems, capacity building, and the development of pilot projects are also a concern in rural areas like Garla Mare. Therefore projects should focus on long-term support.

With the help of WECF, the French Foundation Ensemble, the involvement of students and a lot of volunteer work, it was possible to continue supporting the citizens of Garla Mare after these initial two years.

Conclusion

The pilot project results will last beyond the end of the project. This case study shows, that in rural areas immediate improvements in the inadequate sanitary conditions and with low-cost preventive measures 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 since water filters alone are not sustainable in the long term, but reduction of water pollution at the source is. Eastern European, Caucasus and Central Asian (EECCA) Governments should develop policies to promote investments in dry urine diverting toilets (Ecosan) for the majority of the rural population not connected to a central drinking-water and sewage system.

More than ten million people in Romania have inadequate sanitary facilities. However ecological sanitisation is in European countries so new, that few countries, cities or towns today have any regulations that refer to Ecosan. The regulations are often written based on systems using water for transporting human excreta.

Therefore regulations on Ecosan systems, on sanitising and recycling of human excreta are needed. The World Health Organisation intends to publish new guidelines on the use of human excreta in agriculture in 2006. Governments should adopt these regulations and promote Ecosan as a safe, sustainable and affordable system, in particular for rural areas.

Governments should also promote organic farming to reduce nitrate and pesticide pollution of drinking water.

Finally, more national and international attention should be paid to the poverty of the Romanian villages and the environmental situation. Affordable long-term solutions should be found and implemented in such a way that the citizens can afford to be connected to a safe drinking water supply system.