

## ***Co-operation for Sustainable Rural Development***

Involving citizens and local authorities in rural Ukraine in improvement of drinking water, sanitation and agriculture

### **Report on first project period**

In the 1st period of the project 'Sustainable Rural Development' a great amount of activities were carried out in the three pilot areas, the villages of Vorothka (Yarameche, Ivanofrankivsk oblast), Bobrik (Verjevka, Nizhin) and Gozhuly (Poltava). In this period the activities 1 and 2 were carried out,:

- The project inception, including:
  - the launch meeting with all the team from MAMA-86 and WECF
  - the setting up of the webpages,
- the inventory and setting up of local project structures
  - carrying out 3 gender-economic-social analysis
  - 3 gender workshops
  - at least 10 detailed laboratory water test and app. 50 rapid tests in the 3 target areas
  - the development of the educational brochures (not yet printed)
  - hydrogeological background and health data were obtained from authorities
  - 3 project teams were set up

#### ***3.1.1. Progress of the Rural demonstration project - Vorokhta***

##### ***The following activities were carried out:***

- As a first step for this MATRA project, the local authorities carried out an engineering and business plan for the development of a central water supply, based on the requests by MAMA-86
- First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003
- one Water test on pesticide, 36 metals and several micro biological tests and rapid nitrate tests were carried out, water quality better then expected, but high turbidity and non-stable sources,
- hydrogeological information, not-complete, were obtained
- A clean-up action to take away waste from the river banks ?? carried out,??is an additional planned activity
- Gender-Economic-Analysis was carried out, which identified problems, priorities and social-economic conditions
- A public-event was organized to discuss the preliminary results of the engineering and business plan
- The preliminary business and engineering plan was analysed and questions discussed with the local authorities, which first lead to a slight crisis situation as the LAs did not appreciate very much the criticism inherent in the questions, but a solution has been found

##### **As a first step for this MATRA project, the local authorities carried out an engineering and business plan**

MAMA-86 Yeremche has been telling the local authorities of Vorothka for the past years that it is necessary to do something about the drinking water supply and waste management in this

tourist village which is located inside the Carpathian national park. The water distribution system was built in 1880 and renovated once, in 1948. Since then, it has been slowly deteriorating. The 5 sanatoriums have water, but it is often turbulent. The most citizens have no central water supply. Several flats which used to receive water from a factory, no longer get water. The inhabitants have to carry buckets of drinking water up the stairs, and buckets of waste water down the stairs. For drinking water they have to walk 1/2 kilometer or they take it from a near-by small river. The existing centralized water pipes leak and some inhabitants have flooded land where the central pipe passes and can no longer use it for horticulture. The 2 central water taps in the street stopped functioning last year because the pipes broke. There are a few businesses in the town which want to get better drinking water as well as a sewage system. The sports club takes drinking water directly from the river Prut. The schools drinking water well and latrines are in very bad condition. Vorothka has 4000 inhabitants.

The local authorities became interested when first discussions started for this MATRA proposal. They agreed to address the situation and co-finance at least 15% of the funds (ca. 4500 Euro) which would be spent by this MATRA project in a 'pilot project', and wrote this in the letter of support for this project. Then, even though the project had not even started, the LA's invested 18.000 hrvna (ca. 2850 Euro) for an engineering and business plan for the renovation of the old water supply system. The institute of DIPROMISTO of Ivano-Frankivsk started with the study, and first results were discussed at the meeting with the authorities in November 2003. The first draft of the engineering and business plan was discussed firstly at the public meetings organised by MAMA-86 and the local authorities on 6 and 7 April 2004. The fact that this study is being carried out can be considered a great achievement of this project.

### **First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003**

Immediately after project start the project team from MAMA-86 and WECF visited the 3 project locations. This included a meeting between MAMA-86 Yaremche's director Martha Korchemlyuk, and WECF's water and sanitation expert Margriet Samwel. In this meeting with the authorities first results were presented, a figure of some 500.000 hrvna's for rebuilding part of the water supply system was mentioned, as well as a first time frame, which showed that the authorities plan 2 phases, one will connect 1 sanatorium, maybe also 4 others, as well as a few hundred people, figures of 700 or 900 people were mentioned. When asked the authorities did not seem to have information about the capacity of the mountain spring source which would be used. MAMA-86 asked to get results of the bacteriological tests and promised the results of the nitrate, metals and pesticide tests done by WECF.

### **25 Water test were carried out, water quality better then expected, but high turbidity and non-stable sources**

20 nitrate tests were carried out in the first 6 months, these show that nitrate levels are good for most of the wells and the centralized drinking water. The pesticide and (heavy) metals tests of the centralized drinking water and mountain spring show that the quality of the water is very good.

The only problem with the water of the centralized water (mountain spring) is, that it is surface source of water and therefore changes with the weather. When there has been rain the water become more turbulent (less clear) and micro biological contamination increases. The local authorities did not yet provide the results of the bacteriological tests, which seem to be done regularly by the sanatoriums. Bacteriological pollution might be a problem as the pipes and reservoir are very old and the installations have not been regularly maintained. As bacteriological tests have to be carried out within a few hours of sampling they have to be done locally (Yaremche or Ivano-Frankivsk).

### **Hydrogeological information, not-complete, were obtained**

As part of the business plan some first hydrogeological data was gathered, but this data is so far no more than a soil-characteristics overview. There is no information about existence, capacity, seasonal influence, flow-direction of aquifers and how the type of soil, such as karst, could influence drinking water quality.

### **A clean-up action to take away waste from the river banks?? Is dat zo?**

Vorothka's main sight-seeing attraction is a waterfall. Heaps of plastic bottles and plastic bags are sewn on the banks of the waterfall and continuing stream. 3 municipal workers are in charge of keeping the river clean but don't manager. MAMA-86 organised a clean-up action of the Prut river. The effects will only last a few weeks or months, but it served to raise awareness on the problems of waste.

### **Gender-Economic-Analysis was carried out, which identified problems, priorities and social-economic conditions**

A gender-economic-analysis was carried out by WECF's expert Catherina Bentvelsen from FEM-consult. The results will be published in a report in the next period.

### **A Stakeholder- and a public-event were organized to discuss the preliminary results of the engineering and business plan**

On 6 April MAMA-86 organised a stakeholderevent and on 7 April a public meeting in Vorothka to discuss the preliminary plans emerging from the business plan. 40 people participated, from different sectors, business, housing committees, sanatorium, sanepid.

An introduction to the stake holder meeting was given by Anna Tsvetkova of MAMA-86 Kiev and Martha Korchemluk of MAMA-86 Yeremche, giving the project background and aims, followed by the town head council of Yaremche and three other authorities, who were involved in renovating the old water supply, They presented the actual state and plans of implementing and their concerns. The state of the sewerage system in the Vorokhta: problems and perspectives were explained by the inspector of the Ivano-Frankivsk regional department of natural recourses; The public meeting was opened with introductions of Marta Korchemluk and Anna Tsvetskova, giving the background and the aims.

This was followed by a presentation by Margriet Samwel of WECF on water source and surface water protection, the legislation and science (different types of protection zones, the cleaning capacity of different types of soils etc). The different types of pollution found in drinking water and their sources, water treatment and disinfection possibilities were presented. The presentation of Margriet Samwel was followed by a presentation on the aims and uses of doing a gender analysis as part of a social-economic analysis by Catherina Bentvelsen.

This was followed by presentation was by Franzisca Meinzinger of the Hamburg university of Technology presenting the available technologies for waste-water treatment from conventional and high-tech, to alternative and low-cost. She explained the disadvantages of the conventional system (no separation of types of pollution, very high costs) and the possibilities and limitations of alternative systems such as planted waste-water ponds and eco-sanitation toilets.

Both meetings were followed by a long and animated discussion. In particular the limitations of the proposed plan, which would not address the most needing people first (eg the flats without water), but only in a second phase. A further point discussed was the lack of financial strategy, it was unclear how the costs were calculated, who should pay for the estimated 700.000 hrvnas – as the local authority has so far only set aside 100.000 hrvnas – and how much inhabitants will have to pay in water fees to pay back investment costs and maintenance costs.

In this moment there is no clear concept for a waste water treatment available. Regarding the geological difficult area and the unstable electricity equipment, a high interest in decentralised waste water treatment and ecological sanitation was observed.

### **The preliminary business and engineering plan was analysed**

Once back in our respective offices the MAMA-86 and WECF teams got further advice from experts and put together an analysis of the business plan. MAMA-86 Kyiv send a list with questions to MAMA-86 Yaremche who presented it to the local authorities. WECF send a report with further questions and suggested that it might be better to start with demonstration projects in the sanitation area as it would take time to improve the business plan for the central drinking water. WECF experts suggest that not only one option, that of using the surface-water fed mountain springs are investigated as source for the central drinking water system, but that a more stable ground-water sources should be investigated as well. While in the region exist almost no agriculture, there could exist a good quality aquifer at 12 meters depth, but the cost of drilling a well might be hardly more expensive then preparing the mountain spring. The aquifer might also have a much better capacity then the mountain spring which, with it's estimated 150 m3 perday, can never supply all the village and the 5 sanatoriums. The authorities mentioned a second mountain source for water supply, but no dates of properties were available. More investigation on the water reserves in Vorokhta has to be done.

To conclude, not that the municipality has spend the first 18.000 hrivna, it looks as if this project, suggested by MAMA-86, might grow out to be much bigger then just a demonstration project. This is of course very good news. It is certain that the project in Yaremche has departed with such speed, that all the village is talking about it. Public interest is assured. Public participation has started with the first meeting in April. In the next period, a project team will be further developed.

### **3.2.2. Progress of the Rural demonstration project - Bobryk**

#### ***The following activities were carried out:***

- First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003, another village was selected
- 40 Water, soil and food tests were carried out, no radioactivity found, but high levels of nitrates in well water
- Health data (not-complete) were obtained
- Gender-Economic-Analysis was carried out, which identified problems, priorities and social-economic conditions
- A public-event was organized in the schools of Bobryk and Vertijivka

#### **First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003, another village was selected**

Immediately after project start the project team from MAMA-86 and WECF visited the 3 project locations. This included a meeting of the local authorities of Nizhyn on 10.11.2003 with MAMA-86 Nizhin's director Valentina Chshokina , MAMA-86 Kyiv water coordinator Anna Tsvetkova, WECF's project coordinator Annemarie Mohr and WECF's water and sanitation expert Margriet Samwel. The audience was very interested and the issue ecosan had lot of attention and interest mainly by the administrator, the teachers and headmasters of different schools.

In a following meeting with the MAMA-86 Nizhyn team the change of administration in the village Kolisnyky was discussed. The new administration - who was working in the administration of the

city Nizhyn – was sent against his interest to this village and he is not very cooperative and is not interested in the MATRA project. MAMA-86 Nizhyn therefore suggested to change the target village.

On 12.11.2003, the MATRA project team visited "Vertijivka" and a small village "Bobryk" (around 400 inhabitants) which is an administrative part of Vertijivka. They met with the new and very active administrator, Alexandra Ivanivna. This woman has been fighting against corruption and injustice in Vertijivka for the last years and that is why she was elected as the new administrator by the village population. She is very happy that we want to implement the MATRA project in her villages and confirms to be ready to support the project by all means. She presented the village schools in both villages (school with 400 children and a school with 47 children). In addition the project team met several inhabitants of the villages and discussed their problems (Nitrates in their private wells, health problems, economic situation...).

From the meetings with the administrator and the villagers, a first portrait could be drawn of the situation in Vertijivka and Bobryk. The area was well known for the production of cucumbers (cucumbers of Nizhyn). Now a day a lot of land is not cultivated, due to the leave of young people from the villages. There is still a cooperation for grain planting, but the condition of tractors and combines is very bad. The unemployment is high: one third of the population does not. The hospital is reorganized to be an old people's home. Ill people are not treated well. Tuberculosis (tb) is a problem, in Vertijivka are 47 people with tuberculosis, some of them have open form. There was in Nizhyn a tb hospital, but it is closed now. According to the data search of MAMA-86, Nizhyn district has the highest cancer rate of the province. Breast, womb and stomach cancer, heart diseases and high pressure, thyroid gland diseases are known illnesses.

### **Several Water, soil and food test were carried out, no radioactivity found, but high levels of nitrates in water**

At the start-up meeting the project team took 2 samples of water and soil, different foods and tested them on metals, pesticides and radioactivity. Several (at least 10) private wells were tested on nitrate As Nizhyn is located in the rayon closest to Chernobyl, there is a general fear of the population for radiation. WECF took soil samples in a field of Bobryk, water sample, often eaten food samples like potatoes, red beet and lentils and tested them on radioactivity in a German laboratory. The results are good. In soil samples low levels of radioactivity were found of 30 bq/kg cesium, whereas the maximum admissible level for Europe is 600 becquerel per kilo food (and 370 for products used for baby food). The other samples were under the detection limit. The nitrate water test varied greatly, some wells have over 500 mg/liter of nitrates, others less than 10 mg/l, but the majority of wells tested have levels well above the max. admissible level of 50 mg/liter. The results of the pesticide and (heavy) metals tests were good, no triazine-, uric derivatives herbicides or chlor-organic pesticides were found, no heavy metals exceed the fixed limits, but too high levels of manganese were found in 2 tested wells. High levels of manganese are not good for babies.

### **Health data (not-complete) were obtained**

According the teachers and the administrator most dwellers of Bobryk have real health problems MAMA-86 Nizhyn interviewed the main doctors of Nizhyn's hospital and tried to obtain health data. After lots of probing they finally obtained main health indicators for the last 3 years (which is not enough, but a beginning). These indicators show that Nizhyn rayon has a very high mortality. That there is an increase in birth defects. And that there is an increase in domestic violence (based on complaints from divorced women, married women seem more reluctant to denounce their violent husbands). MAMA-86 Nizhyn asked the local authorities for hydrogeological studies but it is not sure that any such study exists. For the village of Bobryk

there does not even exist an official map of the village nor a cadastre. WECF and MAMA-86 have drawn an unofficial map with all the streets and houses.

### **Gender-Economic-Analysis was carried out, which identified problems, priorities and social-economic conditions**

Catherina Bentvelsen of FEMconsult Netherlands, together with Solomiya Babyak, student of environmental resource management at the university of Amsterdam and native of Lvov Ukraine and currently intern with WECF Netherlands, spend 1 week in the village of Bobryk to carry out focus interviews for the gender-economic-analysis. Solomiya Babyak stayed for an additional 2 weeks to do a detailed health survey of the population. The preliminary results of the gender-economic-analysis were presented at the 2 public events in Bobryk and Vertijivka on 12 and 13 May 2004. The main results concerned the social-economic indicators and are:

- Poverty in Bobryk is the highest of any of the 3 pilot project areas of this MATRA project. Several families live with less than 15 Euro's per month income.
- There is no agricultural equipment available (e.g. combines) so that a lot of agricultural land is not used and most of the people rely on growing potatoes, which don't need mechanical equipment. Due to this, the Colorado bug has become a main problem for the farmers. They try to deal with this by spraying up to 10 times more than the indicated amount of pesticides (in particular 'regent') but this seems to have no effect.
- The prices for potatoes and vegetables on the market in Nizhyn continue to fall. Market prices for potatoes are 0.37 hrivna per kilo (5 euro cent) and even less for vegetables and barley. Milk prices are at 0,7 hrivna per liter. Farmers from Bobryk used to travel a few times a year to Kyiv by train to sell their produce. This no longer pays as the new trains are more expensive and they have less space for goods. Therefore, more and more villagers have become subsistence farmers, living of what they grow on small plots of land without any hope for the future.
- Cows suffer leucosis disease, a viral infectious illness, which cause tumours. Dependent on the stage of leucosis, infected cows have to be isolated, slaughtered or destructed. Milk of infected cows can endanger human health.
- There are only few families with children in the village and it is a new policy of the national government to close down small village schools. Bobryk's school is planned to close down. The villagers are upset about this, and say that this will certainly mean the death of the village.
- Ill health is a problem in the village; cancer, TB, thyroid gland diseases and leucosis' cow' disease, which also affects humans are cited. The school director says that most of pupils are not healthy.
- According Bobrik dwellers children should be contaminated with lead, which was used in Chernobyl to decrease the radio activity fall out
- The school in Bobryk had no water pump and the pupils have to carry buckets of water from the well to the school canteen (where they pay 1 hrivna per meal).

### **A public-event was organized in the schools of Bobrik and Vertijivka**

On 12 May 2004 a public meeting was organized in Bobrik's school with the local authorities and 30 villagers. Presentations were given by the project team of MAMA-86 and WECF and by Catherina Bentvelsen on the gender-economic-analysis and Stefan Deegener on alternative sanitation systems. The participants were very interested and asked questions. The oldest inhabitant of the village, Mr Malkovitz, 85 years old, gave several examples of traditional farming which used to be common in Bobryk before communism as his father had still taught him, among others crop rotation and leaving land un-cultivated to recuperate. Under communism it became forbidden to leave land uncultivated.

On 13 May 2004 a public meeting was organized in the school of Vertijivka with some 50 participants. About 26 participants had followed MAMA-86 request and had brought samples of their well water, which were tested on the spot during the meeting. The results showed that almost all wells have far too high nitrate levels: more than 100 mg/l. 50 percent of the wells between 250 – 500 mg/liter. In Vertijivka only 3 (deep) wells had less than 50 mg/liter. In general the participants seemed to know little about health and water and education will need to be a main focus of the project. According to the director of the school only 25% of the children are healthy. The participants asked many questions and were again very interested especially in new farming methods and eco-sanitation, they liked the 2 example toilets, which WECF had brought. The project team visited the school toilets, which are in a terrible state, the smell is so bad that several of the team did not manage to get close to the building.

## **Progress of the Rural demonstration project – Gozhuly, Poltava**

### ***The following activities were carried out:***

- First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003, another village was selected
- Visit of the new village, Gozhuly
- 5 detailed chemical water test were carried out. In private wells very high nitrate and fluoride levels, Deep aquifers much better quality
- Health, gender and hydro-geological data (not-complete) were obtained
- One Gender-Economic-Analysis was carried out, which identified problems, priorities and social-economic conditions
- Two public-events were organized in the town hall of Gozhuly and the university of Poltava
- Cooperation started with the national technical university of Poltava

### **First fact-finding visit and first international expert meeting with the local authorities was carried out in November 2003, another village was selected**

Immediately after project start the project team from MAMA-86 and WECF visited the 3 project locations. This included a meeting of the local authorities of Poltava on 7.11.2003 with MAMA-86 Poltava's director Olena Kovalyova, MAMA-86 Kyiv water coordinator Anna Tsvetkova, WECF's project coordinator Annemarie Mohr and WECF's water and sanitation expert Margriet Samwel. There were 18 participants from the local authorities.

### ***New village selected***

WECF and MAMA-86 therefore decided not to confront this problem in the framework of this MATRA project. The local partners presented the village of **Gozhuly**, that has similar problems like Miloradovo.

Gozhuly is situated 5 km from the city of Poltava, very close to an old discharging lamp company (producing Neonlamps) on the border of Poltava city. The administration of Gozhuly combines four villages, but we concentrated only on one part of it: "Gozhuly"

A first visit of the village including a meeting with the head of the village administration (present where also the assistant of the head, the bookkeeper and the headmaster of the village school) gave us the following characteristics of Gozhuly:

- Gozhuly has 1600 households with 4000 inhabitants

The main problems of Gozhuly are fluoride and nitrate in the drinking water. The water test of a private well, carried out by Mama-86 show fluoride levels of 86 mg/liter, where as the

maximal admissible level of WHO and EU is 1,5 mg/liter. As a result all the villagers have yellow teeth, even the children, and their teeth fall out after some years. Interviews with dentists in Poltava confirmed this, whenever they see yellow teeth they say 'aahh, you're from Gozhuly!'. High fluoride intake affects also the bones. There is no ready made solution against this problem, and WECF will look at the different possibilities to address this problem. Additional analyses will clarify if other aquifers provide water with a lower fluoride concentration. Fluoride is a very small molecule and therefore even active-coal filters might not be able to take it out of the water, only reverse osmosis filters (high energy use, expensive).

- The 26 water tests carried out in Gozhuly by MAMA-86 show very high nitrate levels. The results of the microbiological test should be ready soon. Latrines, illegal and inadequate dumping of waste water, leaking sewage system and overloading septic tanks pollute the relative shallow groundwater layer.
- The waste water treatment system is completely broken down. While the pumps of the waste water collector are in a very bad condition, there are regular floodings in the outskirts of village and the waste water then flows into a lake where the villagers and visitors from Poltava swim in summer time. The authorities often don't have enough money to empty the collector with a tanker
- Additional wastewater is leaking through the old sewage pipes or discharged close to a the drinking water catchments area of the 220m. deep aquifer. The old waste water treatment plant is not working any more, waste water is just discharged. While the treatment plant is close to the water catchment area, water supply authorities will disconnect the village from the water supply, if the waste water problem is not solved soon.
- When the treatment plant doesn't work, which is regularly, people with septic tanks for their toilets, dump the contents on the agricultural land which is a source of bacteriological pollution. Some villagers with septic tank don't have enough money to clean them regularly and the contents overflow into their gardens or on the public paths
- Part of the village are connected to 2 central drinking water systems which get water from some 200 meters depth. This water should be very clean, but the villagers say that it often is dirty and stinks This might be caused by broken pipes or 'dead' parts of the part system where water is not renewed and has started to 'rot'. Another reason might be infiltration from sewage pipes. This last winter, the central water system was closed down for 3 months as someone had stolen the electricity cables of the pump.

### **5 Water test were carried out, high levels of fluoride and nitrates**

WECF and MAMA-86 took 5 samples and tested them on fluoride, chloride, 36 metals, and pesticides. App. 20 wellwater samples were tested on nitrates (Magriet, graag aanvullen)

Triazine and uric derivatives or chlor organic pesticides were not found in private well water. All the tested metals were under the fixed limit. In private well water (app. 12 m deep aquifer) mama-86 found a very high fluoride level of 89 mg/l (limit 1,5 mg/l), but in the 200 and 600 m deep aquifer samples we found fluoride levels under the limit.

With few exceptions nitrate concentration between 100 and 500 were found in private wells

Soil test on heavy metals, especially mercury were carried out, while a neon-lamp factory is close to the village. After Soviet time has this factory only occasional a very low neon lamp production. Except zinc, we did not find limit-exceeded heavy metals.

### **Health, gender and hydrogeological data (not-complete) were obtained**



MAMA-86 Poltava obtained first studies from the local authorities which give indications about gender differences (e.g. much higher mortality of women), about health (yellow teeth which fall out) and about the hydrogeological situation (they obtained a soil-profile for Gozhuly, no hydrogeological data so far).

### **Two public-events were organized in the school of Gozhuly and the university of Poltava**

On 15 May 2004 a public event was held in the school of Gozhuly with presentations by the project team and by Catherina Bentvelsen (FEMconsult) and Stefan Deegener (Hamburg University of Technology). The participants were very interested and concerned about the bad health condition of the children. After the meeting Stefan Deegener and the project team visited the school and identified the best place to build an eco-san toilet house for the school. It will be built against the school wall and a door will be made so that the toilets will be inside the school and can be heated in winter. Wash basins will be close to the ecosan toilets. Now children of the primary and secondary school use dirty latrines outside of the school. Measurements were taken and plans made for the building of the demonstration toilet house already in the summer of 2004.

Mama 86 identified already at 5 families with interest in a private ecosan toilet

One of the participants in the public meeting, a professor of the national technical university in Poltava, invited the project team to come to the university the next Monday to repeat the presentation. There were 15 waste water scientists, who participated and they were very interested in alternative sanitation concepts presented by Stefan Deegener, especially the planted soil filters and eco-san toilets.

### **Cooperation started with the national technical university of Poltava**

At the end of the meeting in the university the project team and the university agreed on a cooperation. The university of Poltava will cooperate with MAMA-86, WECF and THUU on the implementation of the demonstration projects in Gozhuly. They can help to build the ecosan toilet house summer 2004 and in developing a sanitation strategy for the entire village.

### **Serious solid waste and waste water problems were identified**

Due to lack of money of the administration and the citizens, the village has no solid waste collection system. Near to the water catchment area and the old waste water treatment plant, there is a waste deposit, where waste is partly burned, but also in the village are several illegal waste dumping places.

The citizens mentioned, that waste and waste water is a real problem

Mama 86 organized a solid waste clean-up action in a part of the village.

Our wastewater expert visited with the local water and waste water technician the treatment plant and the waste collector in the village. To avoid more wastewater overloading, the pumps should be repaired or renewed as soon as possible and sewage pipes in the water catchment area repaired. A concept for the whole waste –water treatment system should be made and funding for the implementation should be found.

For households, who are not connected to the sewage system alternatives for their wastewater treatment should be found.