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**Prut riverwater management project
Health and awareness component
TACIS ENVREG 9701**

Report on the first survey on water use and beliefs

TNO Prevention and Health

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1 Executive summary

The majority of the rural inhabitants in Moldava obtain drinking water from shallow wells. This project shows that a large number of these wells are polluted by microbiological contamination and nitrates.

The objectives of the present study were to assess the conditions for hygiene education and social marketing of good hygiene practices. Knowledge, attitudes and behaviour with regard to drinking water resources were assessed in two regions typical for the Prut river basin: the region of Carpineni and the region of Balatina. In total 500 persons were interviewed: 200 from Carpineni and 300 from Balatina. The respondents were selected in a randomized way.

For 81% of the respondents the only sources for drinking water are wells. A great majority does not treat their drinking water (90%). Only 7% of the population think that the quality of their drinking water is insufficient. More than half of the population is convinced that their drinking water has no negative influence on their health. On the other hand most of the people want to take some action when analysis would show that the drinking water they use is polluted. It is alarming that the pregnant women and nursing mothers more than others believe that the drinking water can not influence their health. Their inclination to take action when the drinking water is polluted is not different from the rest of the population.

The majority of the population cleans their well regularly. Cleaning the well means for 77% of the population that the water is taken out of the well and the walls are cleaned. The cleaning of the wells is done less than once a year. Approximately one third of the population did clean their well last year. The wells are not chlorinated yearly.

The majority of the households do not have their own well. The well is frequently situated in the street and it is shared with the neighbors. This emphasizes the necessity of a community approach to ameliorate the quality of the drinking water.

Most wells have a lid or a roof and/or the area around it consist of a cement or slab ground.

The latrines of most of the villagers consist of an unprotected hole in the ground (93%). For approximately 30% of the population the latrine is situated at a distance of less than 25 meters from the well: a latrine must be situated at least 25 meters from the well to prevent human excrements from polluting the ground water. The majority of the population believes that the latrine can not influence the quality of the water in their well. Most of the villagers also do not clean their latrine pit. Now and then they cover the pit with soil and dig another one (nine out of every 10 villagers) but almost half of them did this more than three years ago.

Almost a quarter of the population keeps their cattle in a distance of less than 15 meters from the well. Besides half of the population let the cattle walk free.

The villagers usually pour their wastewater (water used for washing and the laundry) on the ground in their yards (55% of respondents), 26% pour the wastewater into the gutter in the street, only 6% have a sewage system. The gutter often consists of a non-insulated gutter in the ground parallel and just next to the street. Most of the wells are also situated along the street: the gutter therefore does not prevent the wastewater from penetrating the groundwater.

The rural population is aware of measures that can protect their wells, but these measures are mostly focussed on the outside appearance of the well: the availability of a roof, a lid or a slab near the well. Most of the wells in Moldova are protected by these external appearances. The not so visible, but important factors such as the influence of the latrine, stable and garbage heaps on wells are mentioned by just a few persons.

The majority of the respondents has not learned how to treat water before drinking or how to keep their well and their water in good condition. A majority, though, thinks it is necessary that the population is educated about the proper treatment of their drinking water and their wells.

The study leads to the following conclusions:

ABOUT THE USE OF WELLS:

- A majority of the population depends on a well for their drinking water: one well is mostly used by several households and is fit with a roof or a lid and the area around it consist of a cement or slab ground.
- A majority has a non-insulated pit latrine, that does not prevent the human excrements from penetrating the ground water level.
- There is no adequate solution for the disposal of garbage and wastewater.
- The cattle can often walk free in the yards.

KNOWLEDGE

- The majority does not believe that the drinking water is polluted and does not use a treatment for their drinking water.
- The majority does not believe that cattle, latrines, garbage or wastewater can influence the quality of their drinking water.
- A majority also does not believe that their drinking water can influence their health.
- A majority has never been informed about the correct treatment of their wells and drinking water.
- A majority is inclined to take some action if analysis shows that their well is polluted
- Adults with little children or pregnant women are not more aware of the quality of their water and do not show a different behaviour pattern than the average population.

Community participation is the process by which individuals and families assume responsibility for their own health and welfare and for those of the community, and develop the capacity to contribute to their and the community's development.

The results above lead to the following community based interventions to be undertaken in Moldova.

SOFTWARE RELATED INTERVENTIONS (by the health sector)

Relatively inexpensive interventions like hygiene education, social marketing of good hygiene practices on rural community level. Special attention for groups at risk; like children under 5-year old, pregnant women, nursing mothers, persons with a disease related to a insufficient water quality and the elderly people is needed.

HARDWARE RELATED INTERVENTIONS (by the public works sector)

Community programs should be developed so that in a village the community (the local authorities combined with the population) can undertake cost-effective measures to ameliorate the quality of their drinking water like latrine building, garbage disposal, well construction. Because underground pollution crosses private property boundaries community participation is important. Also most of the wells are used by several households and are often not situated on somebody's own property but in the street. The most crucial in these community programs is to learn the local population how to ameliorate the construction of their latrines (for example ventilated insulated pit latrines), to support the construction, and to find solutions for the disposal of household garbage and wastewater.

2 Introduction

Water can represent a serious danger for health in the event of its contamination with pathogenic agents or toxic chemical substances. The principal sources of the pollution of surface water are: process wastes, residual household water, diffused erosion, rainwater, dumps.

The infection with pathogenic agents can often be determined through a simple organoleptic examination. Muddy water, with suspensions, smelling bad should always be suspected of microbial contamination. Intestinal infections like dysentery, salmonellosis, viral hepatitis and other infectious diseases are transmitted from man to man first of all through contaminated water.

Public water supply in rural areas has the following two distinguishing features: the lack of means for the sanitary protection of sources of water, and improper conditions of water treatment. During the selection of sources of water, preference should be given to the deep underground ones and only in the absence of those should there be used sources of surface water. The water from underground sources used for public water supply in rural areas is in most cases consumed without preliminary treatment, while in the places where disinfecting is envisaged it is either inefficient or is not practiced permanently.

Over the past 6-7 years a tendency for the aggravation of the state of health of the population of Moldova has been observed. At present, life expectancy in Moldova constitutes 66 years, which is one of the worst indexes in Europe. All-age death rate is on the average 50% higher than in the developed countries of Europe.

The death rate for the age category of under 50 years old was 20% in 1997 in Moldova and forms the fifth part of the total population, which is the second largest after Russia where it constitutes 22%.

The health state of women and children is deteriorating too. The death rate of children under 1 year old is 3 times higher, while the death rate of women is 4 times higher than the average European level. Pregnant women, young mothers and children do not receive rational nourishment; the possibilities to render assistance to the growing number of invalid children are becoming more and more limited.

The epidemiological situation of communicative diseases in general remains very tense in spite of the improvement registered for certain infectious diseases.

The year 1997 was characterized by the aggregate growth of the incidence of acute intestinal diseases from 322.2 to 362.1 per 100,000 people, on the account of the incidence of dysentery, which is approximately 12% more compared with 1996.

The incidence of acute viral hepatitis remains a serious social-medical problem for the health of the population as well as for the economy of the Republic.

It has been registered that the territorial spreading of infectious diseases, especially of acute hepatitis A and the intestinal diseases, is non-uniform in Moldova. Epidemiological investigations effected over the past 5 years have demonstrated that in the area of the river Prut the morbidity rate of acute intestinal diseases is 1.3 times higher, and of acute hepatitis A – 1.4 times higher than the corresponding average rates for the whole of the Republic.

It is also necessary to mention that the number of people examined for helminthes have increased substantially. Most of the children (under 14 years old) infected with helminthes do not receive the proper treatment.

The ill-health of the population the Republic of Moldova depends in a large measure on the economic situation

3 Methods

3.1 Objective

The objectives of the study were to reveal the behaviour patterns of rural population concerning drinking water, the state of maintenance of water sources, knowledge of the population of the necessary sanitary rules, etc., to study the factors influencing the behaviour, knowledge and health of rural population.

3.2 Development of the Sampling

The sample constituency for the sociological study was determined to be 500 persons, in accordance with the mutual agreement and the peculiarities of the region. As said in the introduction young children are especially at risk when it concerns health effect from polluted water. Therefore it has also been chosen to select a group of pregnant women and mothers with children under 2 years old, in the amount of 100 persons.

The sampling was done following a randomized method. The calculation of the sampling was performed on the basis of the last population census (1989) and the latest data of the state statistics (The Statistical Dictionary of Moldova. Special statistical edition. The Department of Statistics of the Republic of Moldova).

1. At the first stage it was determined to work in the region adjacent to the Prut river, in two geographical areas: Carpineni and Balatina.

As the population of the Carpineni area exceeds that of the Balatina, the respondents were distributed in the following fashion:

- the Carpineni area – 300 respondents;
 - the Balatina area – 200 respondents.
2. The poll points and the distribution of the respondents per villages were randomly determined – proportionally to the specific weight of their population. The following six villages were selected in the Carpineni area:

Carpineni area	6 villages
Carpineni	60 respondents
Crasnoarmeiskoie	60
Minjir (replaced with Horjești)	40
Negrea	40
Ciadăr	60
The Balatina area	5 villages:
Balatina	50 respondents
Hîjdieni	40
Braniște	40
Cobani	30
Cuhnești	40

3. The respondents (observation units) were selected from the list of voters of a given village in accordance with the following formula:

$A = N/n$,
 A = the sampling step;
 N = the number of voters in the village registered per the respective lists at the Mayor's Office
 n = the number of respondents in this village.

A separate list with respondents was prepared taking into account the reserve, constituting 10 percent of the total number of the respondents.

3.3 Preparation and monitoring of the interviews

During the study the network of operators and interviewers of the Institute of Social and Marketing Studies "Atitudine" was used. The preparations for the interviews were made in April and the beginning of May 1999. For example, during the period of April 10 through April 25, 1999, trips were effectuated to the areas of Carpineni and Balatina. The objective of these trips were to inform the operators of the villages, to select the necessary personnel, to analyze the problems and potential difficulties of the forthcoming sociological interviews, to study the necessary literature, to gather the pertinent statistical information, etc.

From May 4 to May 10, 1999 in every village of the Carpineni area, and from May 15 to May 20 in every village of the Balatina area one-day seminars on the issues of the realization of the sociological study were organized and conducted with the operators and interviewers. With as objective to increase the quality of the study, a detailed analysis of its methodology was effectuated. Each of the interviewers received no more than 10 questionnaires. All through the period of the interviews its organizers were in the field rendering assistance to the interviewers, effectuat-

ing the proper control over their work in the field. In each of the villages 15% of the questionnaires were checked with the purpose to increase the reliability of the primary information.

A number of incomplete interviews were discovered which forced the interviewers either to visit the respondents once again or to replace them with those from the reserve. The percentage of success at the first visit of the respondents reached 80%.

The interviews started on May 5 and ended on May 29, 1999. It is necessary to mention that the data collection was realized in a nervous and difficult atmosphere. The reason was that on May 23 the elections for the local organs of power were held and in some cases the interviewers were mistaken for agitators of political parties. It took additional efforts to explain who our collaborators actually were and what the objectives of their application to the population were. As a result of these qualified and sensible explanations almost all the respondents would agree to answer the questions of the questionnaires. But there have occurred cases when, for example in the village of Minjir, employees of the Mayor's Office refused to provide the lists of voters saying that they were not obliged to do that. As a result we were compelled to replace the village of Minjir with the nearby village of Horjești.

4 The results of the investigation

4.1 General characteristics of the sample of 500 respondents

Forty-nine percent men and 51% women were interrogated. Twenty two percent are under the age of 30 years, 59% are 30 – 59 years old, and 19% are 60 years old or more. In table 1 is shown what the educational level of the respondents is. All persons seem to have had an elementary education and about 60% also completed a secondary education. Finally 9% had also followed a higher education.

Table 1 Educational level

	Balatina N=200 %	Carpineni N=300 %	Total N=500 %
Elementary education	20.5	11.7	15.2
Incomplete secondary education	18.5	30.0	25.4
Complete secondary education	30.5	26.7	28.2
Secondary special education	23	22.3	22.6
Higher education	7.5	9.3	8.6

Forty three percent of the population have a job, 22% are retired, 17% work for themselves in their own households, 8% have a private business or produce agricultural products for sale, 7% are unemployed (want to work, but can't find it), and 3% said something else.

Most of those polled work in agriculture 60%. 84% of the respondents experience their income as poor or very bad. The self-estimation index for income is - 0.63 (-1 is lowest appreciation and +1 is the highest appreciation), and for the respondents older than 60 even -0.78: the economical situation of retired persons is the worst.

4.2 The sources of drinking water

The majority of the villagers use water from wells (95% of the respondents) for drinking. 10% of the respondents use springs, 7% use a water pipesystem, 2% take drinking water from the water pump station, 2% collect rain water. 500 of respondents named 585 sources of drinking water, so it was named 1.17 sources of water per person. So, the most part of village population uses drinking water only from one source.

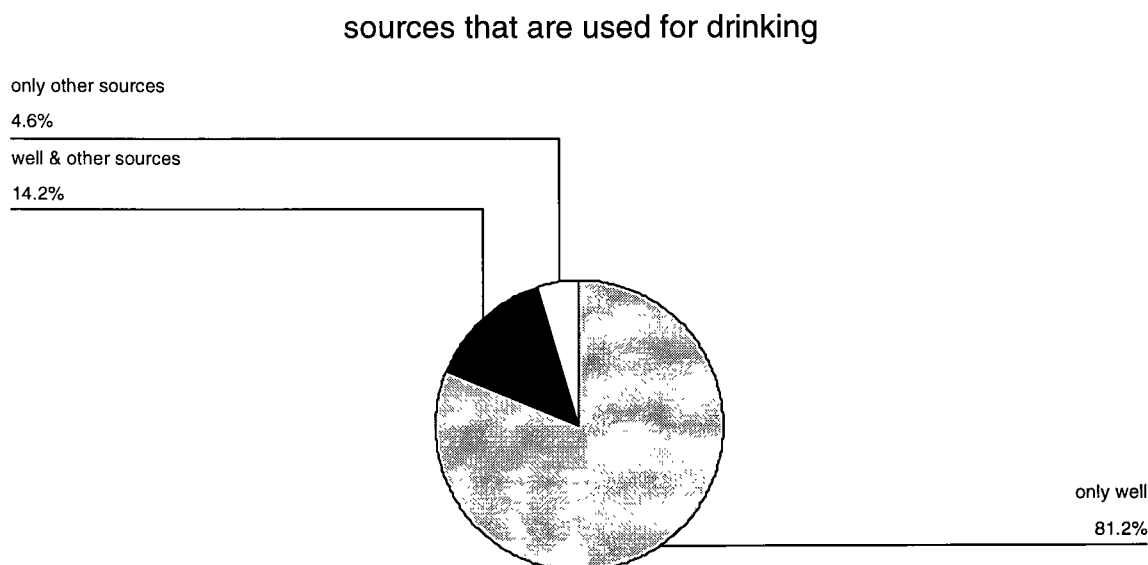


Figure 1 Sources that are used for drinking water

45% of the respondents use the same water for drinking and washing, 29% use different sources, 26% sometimes use the same, sometimes different sources. The sources with a lower quality of water are used for washing when they are nearer to the house than the well with drinking water. Sometimes people take water from a source at a greater distance especially for washing if they think that this water is better for this purpose. In Carpineni zone people more often use different sources of water for drinking and for washing than in Balatina zone (33% and 22%).

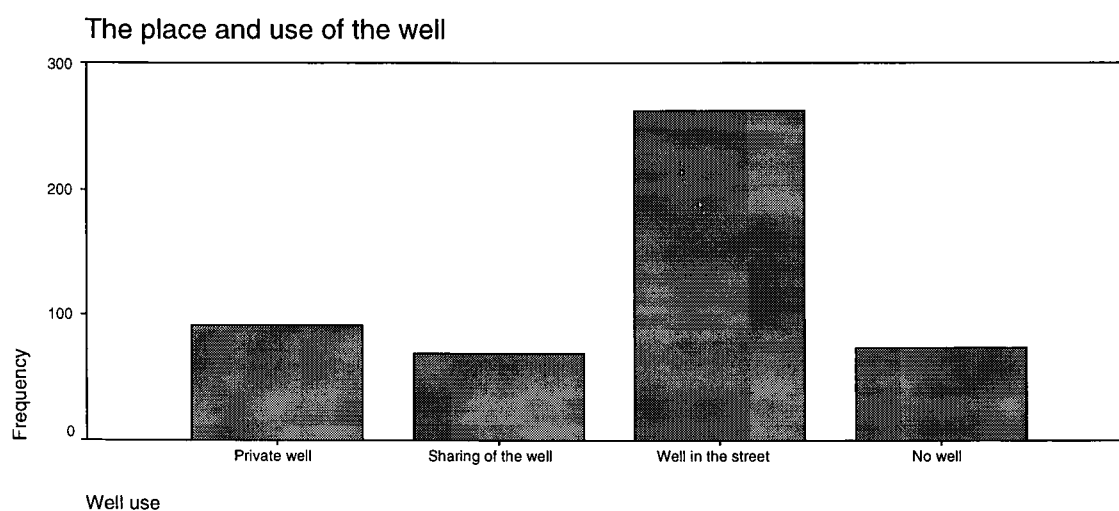


Figure 2 Place of the well used for drinking water

More than half of population uses the well situated in the street (52%) and 14% shares their well with one or two neighboring families. Hence 2/3 of the rural population have the well in a collective use, they have to cooperate in arrangement and keeping the well. 15% mentioned that they have no well, 10% from them sometimes use somebody else's well and 5% do not use well water at all. Only 18% have a private well in their yard.

The educated people more often possess a private well and do not take water from a common well: among those with elementary and secondary education approximately 10% have a well in their yard, among the respondents with complete secondary education 21%, secondary special education 27% and higher education also 27%. In the Balatina region people more often have a private well or share the well with one or two families than in the Carpineni region (respectively 42% and 25%). In Carpineni people more often use a common well in the street, or deal without well at all, using springs or water pump stations.

More than half of the villagers suppose that the water in their well is good (57%). Only 7% of those polled suppose that their water is of bad quality. There is a large group of respondents who have doubts about the quality of their drinking water, 31% of respondents say that it seems that the water is good, transparent, but they are not sure whether it is useful for health. The other respondents could not give a certain answer. A high amount of respondents who cast doubt on the quality of their drinking explains that only analyses can show the real quality of the water. At least this part of the respondents is ready to percept the new information during an awareness campaign. The quota of those who have questions about the quality in their well is higher among the people of middle age groups (from 30 to 59), they estimate the quality of their drinking water lower than the youngest and the oldest. The indexes of water quality estimation among the 18 - 29 year old respondents and among the persons older than 60 are +0.57 and + 0.59, among 30 - 59 old they change from + 0.39 to +0.48 (-1 quality is very bad, +1 quality is very good). Pregnant women and nursing mothers do not worry more about the quality of drinking water than the other respondents: their index of water estimation is high (+0.60).

The more educated people are more critical about the quality of their drinking water. Among those with elementary education 67% think that the quality of the water they usually consume is of a good quality, while among the respondents with a higher education this is 42%; 21% of respondents with elementary education suppose that the water is good, transparent, but they are not sure it is good for health, among the respondents with the higher education - correspondingly 44%.

The quality of the drinking water

Only 7% of the population think that their water is of a bad quality.

People of middle-aged groups and the more educated people are more concerned with the quality of their drinking water and will probably be more susceptible to the information about the problems with the quality of the water.

In the region of Balatina the population have much better opinion about the quality of the potable water than in Carpineni. The corresponding indexes are +0.38 in Carpineni and + 0.67 in Balatina.

As a logical consequence of the results described above the villagers rarely named any disadvantages of their drinking water. The complains most often mentioned are that the water is too hard, contains too much salt (14%), is not transparent (6%), there is rubbish floating in it (6%), has an unpleasant taste (2%). 2% named other disadvantages - strange colour of water, usually yellow, unpleasant smell, sometimes people saw gasoline or mazut on the surface of water.

In the region of carpineni the disadvantages such as the water has unpleasant taste, is not transparent, and is too hard are mentioned more often than in the region of Balatina one.

Not many respondents said that they use a treatment for their water. In total 9% treats their water sometimes or rarely (Figure 2): 4% boil their drinking water, also 4% let the water stay still for some time, 1% chlorinate their drinking water, 0.2% uses water filters.

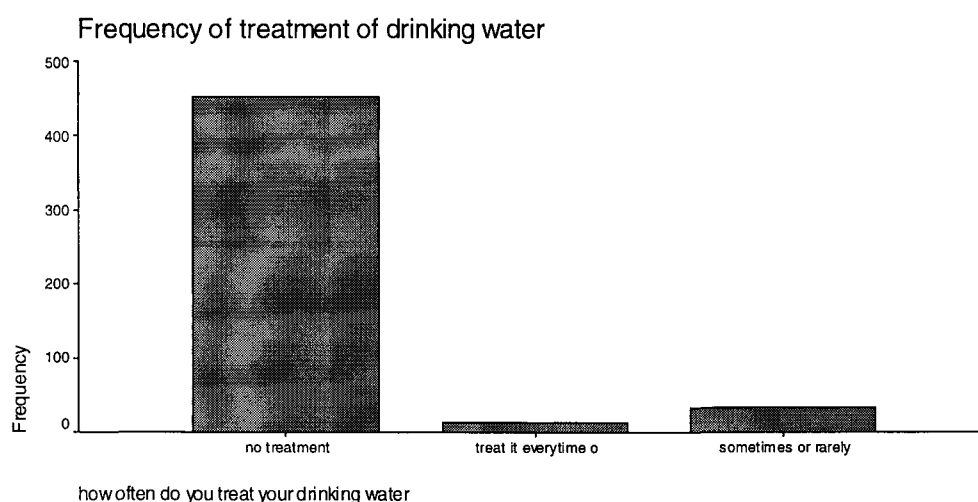


Figure 3 Frequency of treatment of drinking water

Pregnant women and nursing mothers treat the water just a little bit more often than the total population. Among pregnant women and nursing mothers 82% use water without treatment, Among those who have children under 2 years old 88% use water without any treatment, only 7% boil water, only 4% chlorinate drinking water.

It stands to reason that the quota of those who treat water is higher among the most educated people. But this tendency is only slightly expressed. Among those with elementary education 95% of the respondents consume water without any treatment, among those with incomplete secondary education - 90%, with complete secondary education - 89%, with secondary special

education - 92%, with higher education - 84%. The group of respondents who do not treat water before drinking is extremely high even in the group of the most educated people

Among those 10% who treat drinking water in some way, only 2% do it every time they drink it. Other do it sometimes, or even rarely. Even among the pregnant women and nursing mothers only 5% treat water every time they drink it. Among the respondents who have children younger than 2 years only 3% mentioned that they treat drinking water every time they use it, 6% treat drinking water "sometimes". Nobody of them mentioned that they treated drinking water every time they gave it to children.

In the region of Carpineni the percentage of those using water without any treatment is a bit less (88%) than in the region of Balatina (94%). The main reason for this difference is that in the first region the population more often refers to the complaint that their water is not transparent than in the second region. They let their water stay still for some time so that it becomes more transparent.

4.3 The maintenance of the well

Most of the respondents stated that their well is periodically cleaned (88%). Five per cent mentioned that their well is not cleaned yet because the well is new. 3% stated that their well is not cleaned at all. The others could not give a certain answer.

The respondents were asked when their well was cleaned the last time. The modal answer is "1 -2 years ago "(30% of respondents). The well of 37% of the respondents was cleaned less than a year ago (from 1 month to 1 year). The wells are cleaned much rarer than required in Moldova. 13% state that their well was cleaned 3 - 4 years ago, 5% - 5 or more years ago and 6% even can't remember when it took place.

In Balatina zone the wells are cleaned more often than in Carpineni zone. In Balatina zone 50% of those polled told that their well had been cleaned within the year before the sociological investigation, in Carpineni only 28%.

The cleaning of the well is usually done in an appropriate way: all the water is taken out and the bottom and the walls are cleaned (73% of those polled mention this). 7% of respondents mention that the walls of the well are cleaned without pooling out all water and 3% said that only the rubbish is taken out. The others do not know how it is being done.

Only 26% of the respondents are convinced that the water in their well is chlorinated. 30% say : "It is being done very rarely" and 35 % suppose that it is not done at all. Other respondents did not know it for sure.

70% of the respondents fetch themselves water from the well. Every fourth respondent says that also children get water. 66% of pregnant women and nursing mothers also say that they usually do it.

16% of the respondents have a water pump. 5% have no water pump, but often lend it from their neighbors. So, every fifth villager does not have to take the water manually from the well. Educated people more often have water pumps: among those with elementary and incomplete secondary education 11% have a pump, among those with complete secondary and secondary special education 19%, and among higher educated persons 23%. Of course the availability of a pump depends on the income of the respondent. Among those with a "normal" income 26% have a water pump, among those with a very bad income - 14%. In Balatina the respondents more often use a water pump than in Carpineni (respectively 20% and 13%).

Hygienic conditions for a good well.

- The well must be situated at a maximum distance from the toilets, garbage pits, sewage system, stable for cattle and other sources of pollution, preferably not less than 25 meters. The wells should not be constructed at places where the floods from rain and melting snow pass.
- The walls of the well should be of brick, stone, or (reinforced) concrete. The walls should be without chinks. When the above materials are absent it is possible to use other materials, such as wood.
- For a good protection it is necessary to make a layer of clay, washed and rammed of and 1 m width. Also a concrete layer of 2 meters width inclined from the well.
- The well is required to be guarded by enclosure. To protect a well from waste water and the water from floods the special gutters should be arranged. These gutters will take aside the waste water. In order to prevent objects or droppings of birds from falling into the well it is necessary to cover the well with a lid or roof.
- In order to avoid dirty water ponding near the well, it is necessary to strew a layer of clean sand or road-metal with 20-30cm. height.
- The way of taking water from the well is also important. It has been proven, that the water in the well can be polluted when using different buckets. Therefore it is better to use only one bucket or arrange a manual pump.
- Washing close near the well should be avoided: observe a distance of at least 10 m. Waste water should be poured into the ditches or sewer systems that lead it away from the well and the village. Never pour the wastewater away near the well.
- Drinking places for cattle should be constructed only at a safe distance from the well (at least 15 m, but preferably more).
- Don't allow cattle or poultry to stay close to the well.
- At least once a year it is necessary to check, clean and disinfect the well with solutions containing chlorine (100-150g of active chlorine per 1m³ of water from the well). If necessary the well should be repaired.

Possession of roof of lid for the well

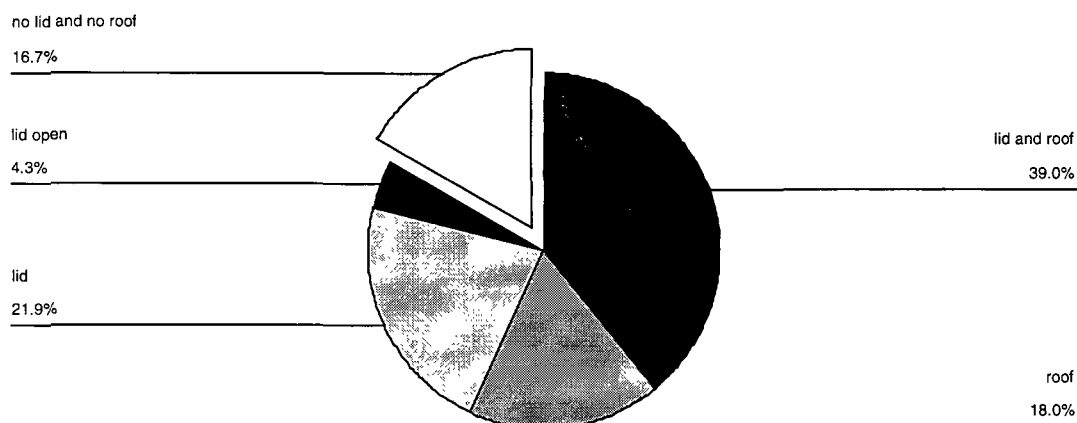


Figure 4 Possession of roof or lid

Seventeen per cent of the villagers that use a well for drinking water have neither a roof nor a lid for their well. The reasons for this are a lack of money, a lack in the ability to construct it, and robbery. Though the respondents usually explain the absence of roof or lid by their poverty, there are no significant differences in possession according to the level of income. There is though a difference between the regions of Balatina and Carpineni. In Balatina 76% of the population responded positively on the possession of a roof and in Carpineni 45%. In Balatina 80% got a lid against 47% in Carpineni.

Many respondents have noticed mud, rubbish, etc. in the well they take drinking water from: 36% sometimes saw it, 6% saw it only once and 4% saw it very often. 51% of the respondents have never noticed it. Women are more observant in this field than men: among men 56% have never observed mud, rubbish, etc in the well against 46% among women. Since in the region of Balatina the construction of the wells is of a better quality, the percentage of those having ever seen mud or rubbish in their wells is lower than in the region of Carpineni (respectively 44% and 62%).

70% of respondents say that the area near the well is usually dry, and 21% say that it is wet when it rains or when the snow is melting, only 7% say that it is usually wet. In Balatina zone it is more often dry near the wells than in Carpineni one (respectively 88% and 60%).

86% of those polled confirm that their well has a slab or a cement ground, 10% that it has none, and the remaining population either did not pay attention to this or did not answer the question.

Despite all these drawbacks in keeping the well most of the villagers believe that the maintenance of their well is good. 12% say that it is very good and 70% "good enough". In the area of Balatina the index of estimation of the well maintenance is higher than in Carpineni (respectively +0.51 and +0.34): this means that in Balatina the population more often think that the maintenance of their well is good than in Carpineni. The estimation of well maintenance corresponds to the description of it in both regions.

4.4 The observance of hygienic norms

Half of the villagers (50%) suppose that the children observe the hygienic norms when taking water. 37% think that children sometimes do not observe these norms, and 11% that they usually don't do that. Villagers say that the children leave the lid open (7% of respondents), a same amount say that the children throw foreign bodies into the well. 4% mentioned that children pour water near the well, 3% that they put the common bucket on the ground. A significant part of the villagers (13%) mentioned as a violation of the hygienic norms that the children play near the well, run near it, eat sunflower seeds etc. and could not specify what harm in particular the children inflict to the well. The adults in Carpineni comparing with the adults in Balatina more often believe that the children usually do not observe the hygienic norms when they take water from the well (respectively 14% and 6%).

A little better is the opinion of the villagers about the observing of hygienic norms by the adults: 5% say that adults usually do not observe the norms.

According to the respondents the most disseminated infringements of the hygienic norms are:

- Leaving the lid open (4%),
- Giving water to animals from the common bucket (2%),
- Pouring water near the well (2%),
- Not having a common bucket (2%),
- Drinking from the common bucket (1%).

4.5 The influence of the latrine on the water

The latrine of most of the villagers consist of a non-insulated hole in the ground (93%), only 4% consist of a hole protected by cement. One per cent has a toilet inside the house. Other villagers said they had another construction of the latrine, in particular the hole, protected by metal or wood. The most educated people have a hole in the ground less often: among the respondents with a higher education this quota is 81%. They more often than the others protect the hole with cement (1% among the respondents with elementary education, 2% with incomplete or complete secondary education, 7% with secondary special education and 9% with higher education). Also it is done more often by the respondents with "normal" income (13%), than by the respondents with bad or very bad income (4% and 2%).

The modal distance between the well the villagers take their drinking water from and the nearest latrine is 21 - 30 meters (24% of respondents). Almost a same part of villagers (23%) have a latrine at a distance of more than 50 meters from the well, 9% at a distance less than 20 meters, 7% less than 15 meters, and 3 % even less than 10 meters. Approximately 30% of the population have a latrine at less than 25 meters from the well. The standards accepted in Moldova presume that this distance must even exceed 50 meters. In that case 3/4 of the rural households do not observe these norms.

More than a half of the respondents believe that the latrine does not influence the quality of water in their well (33% are convinced in it and 26% suppose so, but they are not sure). The index of estimation of the toilet influence is - 0.22, which means that in general the rural population does not realize the negative effects. The respondents with a higher education have displayed much more concern about this problem. The corresponding index in this group is +0,06. It is not high, but much higher than in the other groups of respondents. In the group of respondents with elementary education, for example, this index is only -0.36.

In Balatina the corresponding index is -0.34, in Carpineni it is - 0.14. So, in Balatina more people are convinced that their latrines have no impact on the water quality than in Carpineni.

The respondents believed that the latrine could not influence the water in the well because of the following reasons:

- 38% stated that the toilet was far enough from the well,
- 15% supposed that the contents of the toilet couldn't penetrate the groundwater level,
- 9% said that their ancestors had the latrine at the same distance and had been healthy,
- 6% never thought about this possible influence.
- One respondent explained that the well was situated higher than the toilet and therefore the toilet could not influence the water.

Most of the villagers do not clean the pit latrine. They cover the pit with soil and dig another one (nine out of every 10 villagers). Those who clean the latrine and empty the latrine pit usually put wastes into the place especially designated for it (3%), in agricultural place outside the yard (3%), in the plot or in another place in the yard (2%). Those who put the wastes from the toilet into agricultural place outside the yard also keep it for some time in the yard.

People do not clean the latrine or build a new one very often. 20% of the respondents did it less than a year ago, 34% two to three years ago, 19% four to five years ago, 10% 6 to 10 years ago, 4% more than 10 years ago and 11% never cleaned or rebuild their latrine.

In the region of Balatina people clean the latrines more often. During the three years preceding our investigation in this region 64% of respondents either cleaned their toilet pit or changed it for a new one, in Carpineni - only 49%.

4.6 The influence of husbandry on the quality of drinking water

27% of the respondents keep their animals at a distance of more than 50 meters from the well, 6% have no animals at all. Therefore presumable in 1/3 of households there should not be a negative effect of animals on the quality of drinking water. 40% of those polled keep the animals at a distance of 21 to 50 meters, 9% within 16 to 20 meters 10% within 10 and 15 meters and 7% even less than 10 meters. So, at least in 17% of the households there may be a negative effect of the stables on the quality of drinking water (according to the standards the cattle should be at a distance of 15 meters).

In Balatina zone the modal distance between the stable and the well is 21-30 meters (20% of those polled), in Carpineni zone - more than 50 meters (33%). In average in Balatina zone the stables are situated nearer than in Carpineni zone.

Most of the villagers throw the manure and the other wastes from animals into special places - rubbish heaps. These rubbish heaps usually are situated within the village. 27% throw it away in the agricultural place in their yard, 12% to the fields far from their yard, 8% to another place (some places in the yard, the holes in the yard, "near the fence" etc., or other places within the village, into the nearest ravine, etc.). This means that manure and other wastes from animals influence the drinking water in the main part of the households. Some respondents said that they mixed manure with the straw and made the bricks, then they dried them and used for heating.

The situation is aggravated by the fact that in 1/4 of the households the cattle and poultry usually have the possibility to walk free in their yards, in another 1/4 of households it occurs sometimes.

According to the opinions of more than a half of the villagers the manure and other wastes from animals can't worsen the water in the well : 30 % of those polled are convinced in it and 28% think so, but are not sure. 24% suppose that it may worsen and 10% are sure there is a negative effect. The most educated people more often assume the influence of animal breeding on the quality of drinking water. The index of the estimation of manure influence on the quality of drinking water for the whole group of respondents is -0.22, for the people with the higher education it is +0.05. That means that a significant part of the respondents with the higher education understands this influence.

In Carpineni zone people are less confident that manure and other wastes of animals do not influence the drinking water than in Balatina zone (the corresponding indexes are: -0.13 and -0.35).

4.7 The influence of other sanitary factors on drinking water

Many villagers put garbage, rubbish from their households to a special place - rubbish heap (76%). These rubbish heaps usually are situated within the village. 16% said that they export

garbage to some places not far from their yard and 4% bury it in the yard, also 4% put the garbage in some other place, mainly in the latrine. In the region of Balatina the percentage of those who export garbage to a rubbish heap is higher than in the region Carpineni (88% and 69%). In Carpineni the quota of those who keep garbage not far from their yard is higher (23% and 6%). Therefore in Carpineni people pollute their yards more intensively with the garbage than in Balatina.

Villagers usually pour the wastewater from washing and laundry on the ground in their yards (55% of respondents). Among the poorest group of respondents even 64% of respondents do so. 26% pour the waste water into the gutter in the street. Only 6% have a sewage system. The educated respondents more often have a sewage system: among those with elementary education - 1%, with incomplete secondary education - 3%, with complete secondary education - 8%, with secondary special education - 10%, higher education - 12%. Those who studied in the city often construct the sewage system in their household. 17% gave another responses: they have a special hole in the yard especially for wastewater; pour wastewater to the place where the manure is kept; some respondents mentioned that they pour the wastewater into the toilet. In general the investigation has shown that the respondents, including the most educated do not pay sufficient attention to the hygienic aspect of this subject.

Every fourth respondent said that the distance between the place where they throw their wastewater and the well was less than 20 meters: 11% pour it at a distance of 16 - 20 meters, 9% at a distance of 10 - 15 meters and 6% even at a distance less than 10 meters. The others either pour the wastewater farther, or have a sewage system.

4.8 Sanitary and health conceptions of the population

From the point of view of the respondents the most important measures to protect the well are the following (the opinions were ordered according to the level of their dissemination):

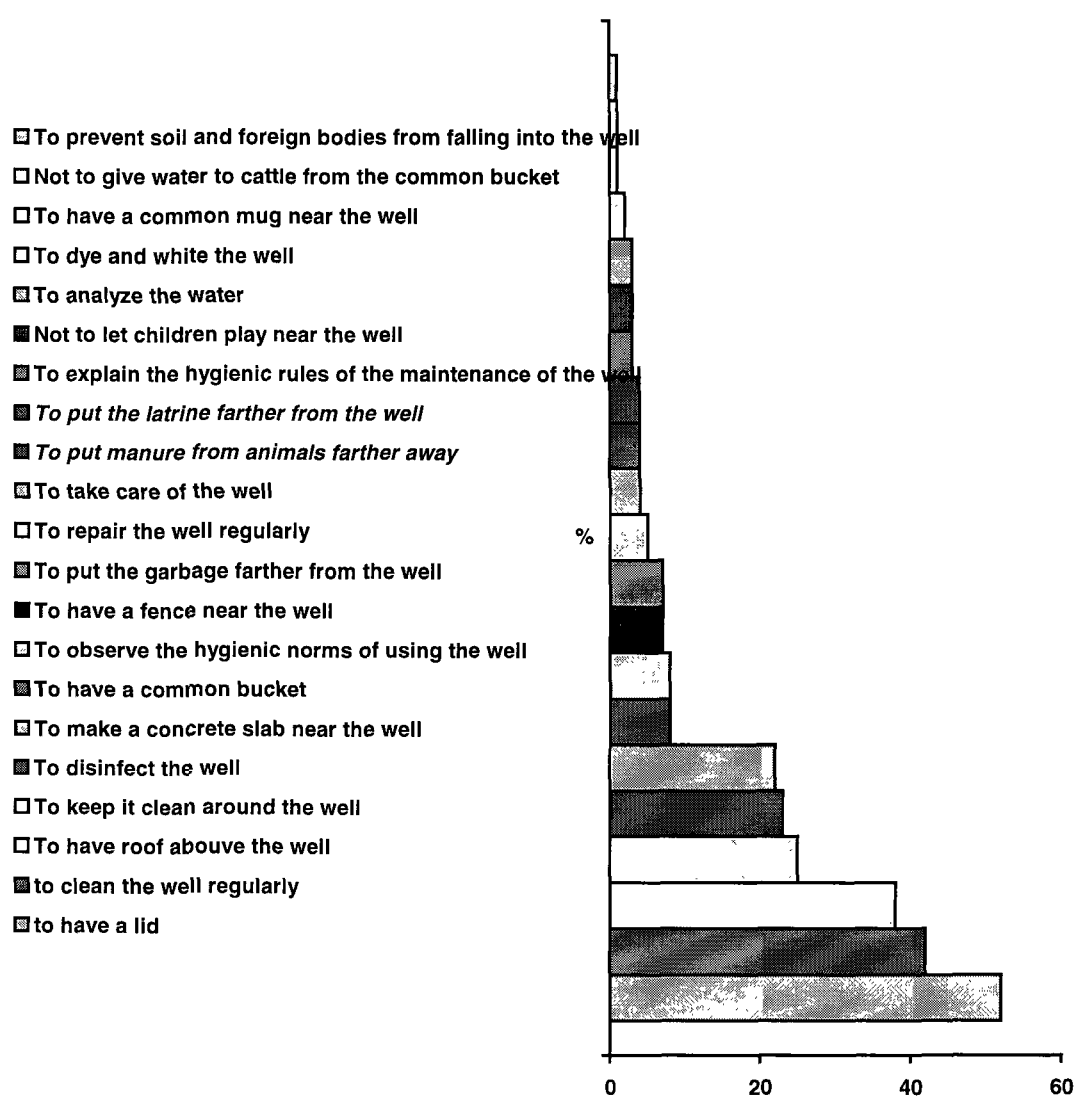


Figure 5 The measures that can protect the well according to the population

Other measures, named by less than 1% of respondents each, were the following: not to pour water near the well, use less chemicals on the agricultural plot, to pay those who take care of the well, to have a water pump, not to wash cars near the well and not to allow parking of cars near

the well, the common bucket should not be leaky, to celebrate "the day of the well", every well should have a host who should be paid for the maintenance of the well, the well should be situated at a higher place, to have a drainage gut near the well, to construct a special arrangement for giving water for cattle, to stigmatize those who don't observe the hygienic norms of using the well, to plant trees near the well, not to arrange the well near the cemetery.

The rural population knows many measures to protect the well. But it is obvious that the villagers pay more attention to the outward appearance of the well : the availability of a roof, a lid, a slab near the well, than to other not so apparent, but important factors such as the influence of the latrine, stable, garbage heaps.

Approximately half of the population (53%) has never been taught by the specialists how to keep their well correctly, 20% has been taught, 17% said that they had been taught, but it was a long time ago, other could not give the certain answer. It stands to reason that the most educated more often told that they had been studied how to keep their well correctly. Among those with elementary education 12% were taught, among those with higher education - 33%. Among those who have a job or a private business every fourth was taught, among the unemployed 14%, and among the retired 12%. Therefore the most ignorant are those who do not work and stay at home.

Most often the villagers were taught how to keep their well correctly at school (15%), significant part of the respondents got the information from the mass media: TV 13%, radio 9%, press 8%, at a polyclinic 7%, and a same percentage at the working collective body. Four per cent had been educated about the maintenance of the well by the old people in the village or by neighbours and relatives. Therefore to some extent the enlightenment of the population in this field was organized. The most educated people mentioned more frequently that they had been taught about it at school, at the collective body, through press and TV . For example, 4% of respondents with elementary education got the information from the press and 7% from the TV: among those with higher education this was respectively 17% and 27%.

A majority of the respondents (60%) have never been taught how to treat water before drinking or did not know if they had been taught: 24% have been taught, 14% have been taught a long ago, the others couldn't give a certain answer. Among the pregnant women the quota of those who had information is higher (40%), but not sufficient. It was also increased among the villagers with a higher education (37% was informed) and among the respondents with a better income (32%). The least informed are the unemployed (11%) and retired persons (14%).

The information about treating drinking water was given by the following media:

- | | |
|---|-------|
| • Did not have or do not know if they had any information | 59.6% |
| • At school | 17.2 |
| • At the polyclinic | 10.6 |
| • From television | 8 |
| • From the press | 6.2 |
| • At my working collective | 6.0 |

- From the radio 3.3
- Another opinion 2,4
- Special lectures by specialists 0.4

A few respondents mentioned that they learned how to treat their drinking water by their parents. Pregnant women and nursing mothers more often than the other groups got the information at the polyclinic (21%).

82% of the respondents suppose that it is necessary to inform people about the correct treatment of drinking water, only 9% percent are convinced it is not necessary. Among the pregnant women and nursing mothers 90% believe that it is necessary. Among the respondents with a higher education even 95%.

Though in the region of Balatina the wells are already better maintained in this region the percentage that believe that people should be informed about it is higher than in Carpineni zone (88% against 78%).

More than half of those polled (53%) are convinced that the water from their well or from another source they use for drinking has no negative effect on their health, 45% believe it can have negative consequences. Among pregnant women and nursing mothers the percentage that think that the drinking water can not have a negative effect on the health is even higher (65%).

It goes without saying that among those who have serious diseases and often feel bad themselves the quota of those who believe that the water in their well has a negative effect on their health (56%) is higher than among the practically healthy persons (42%).

The diseases that are mentioned by the respondents are presented in figure 6

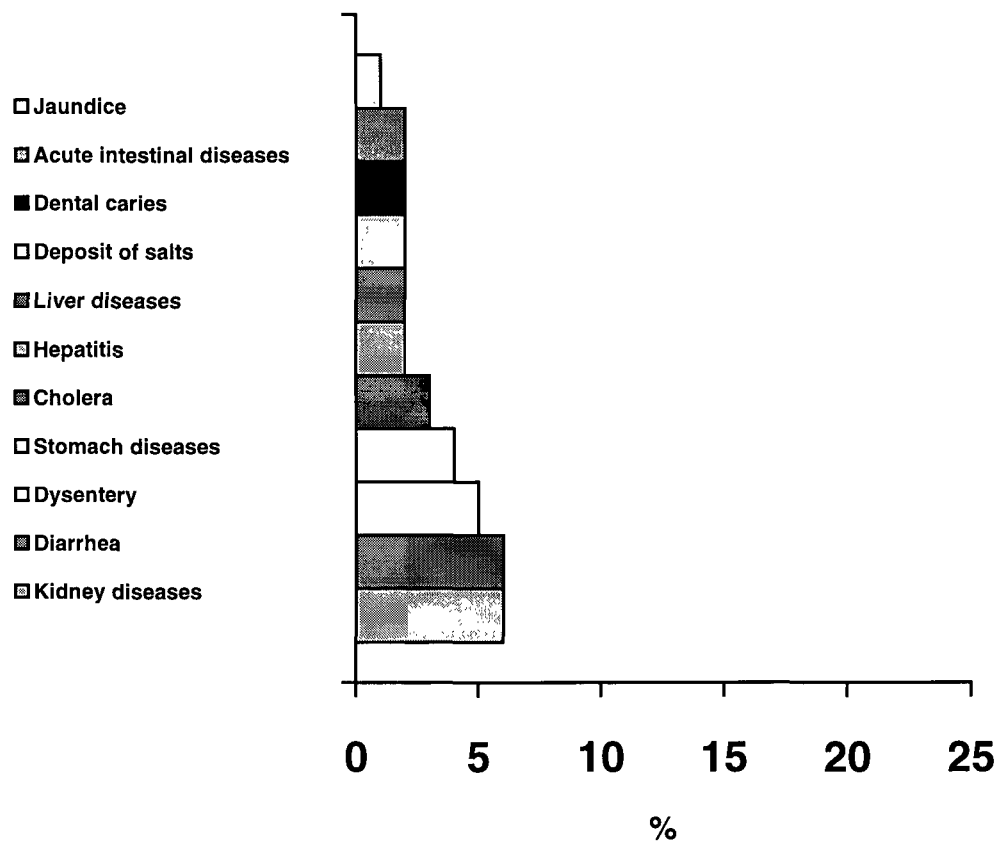


Figure 6 The health consequences of drinking polluted water, according to the population

Thus a minority of the villagers understand that diseases may be caused by imperfect drinking water, but they do not exactly know which diseases.

In case the analyses show that the potable water is polluted, most of the villagers will clean and disinfect their well (53%). 35% will take water from another well, 6% will take water from a spring, and 2% from a pump station. Nobody mentioned that in this case they would take water either from the river or from a brook. Only 6% said that in this case they would do nothing, they will continue to use water from their well.

Pregnant women and nursing mothers are less willing to take water from another well in case of pollution of their drinking water (28%), and more willing to clean and disinfect their own well (60%). The respondents with the children under 2 years will act in the same way as the other groups of respondents.

The education of the population

It can be concluded that informing people of the results of the analyses of drinking water could motivate a majority of the population to undertake some actions or to change the source of water. The villagers should therefore also be informed about what is the right treatment, while there can be some misunderstanding about what is the right treatment is: so education should not only focus on informing but also on giving some good alternatives and actions for clean potable water.

The possibilities of people to get water from another well are confined. 49% of respondents agree to walk for another well not more than 10 minutes, 23% - not more than 20 minutes, 11% not more than 30 minutes, 6% - less than one hour, 5% are ready to walk even more than one hour. In general two third of the population will not walk more than 20 minutes for clean drinking water. Only 2% of the respondents have possibility to use a bike or a car for this purpose. Those who have children under 2 did not manifest more willingness to walk in order to get clean water. Also those who have little children have transport vehicles rarer. Therefore the possibilities of those who have little children to get water from distant wells are less. In practice the recommended source of clean water should be situated not farther than a distance of 1-2 kilometers from the household.

4.9 Perceived health

68% compared to 81% in the Netherlands of the respondents consider themselves as being practically healthy, 14% had serious diseases but now are practically healthy, 16% have serious diseases and often feel bad themselves, 2% are invalids. The perceived health of men is better than that of women. Among men 75% (84% in the Netherlands) of respondents said that they are practically healthy, among women only 61% (78% in the Netherlands). Among men 9% have serious diseases and among women - 23%. A majority of the pregnant women and nursing mothers (89%) esteemed their health as good.

28% of respondents often or very often worry about their health, 37% rarely or never worry about it. The remaining respondents worry about their health sometimes. Women worry about their health more often than men. The perceived health index in the group of women is +0.12 and in the group of men -0.14. On the contrary the group of pregnant women and nursing mothers

usually don't worry about their health, the corresponding index is -0.15. In Carpineni zone people worry more about their health than in Balatina. The corresponding indexes are +0.05 and -0.09.

Among the respondents who have minor children 12% said that their children had diarrhea last month and 2% did not know whether it took place. Thus diarrhea is widespread among the rural children.

5 Conclusions

The sociological study has confirmed that the wells are the main source of drinking water in the rural area. Usually the wells are shared among several households. Therefore the quality of drinking water in the rural area highly depends on the joint efforts of the villagers and on the character of their social relations.

Significant part of the wells is not maintained in the right way. Also the sanitary situation in the villages in a whole is unsatisfactory: in many households the latrines and stables are situated too close to the wells, the unprotected latrine pits usually are not emptied, the garbage and the wastes from animals often are not exported from the households or villages. The main reasons for this sanitary situation are the shortages in financial resources, the lack of knowledge among the population and the drawbacks in the social organization.

Nevertheless the main part of the rural residents are satisfied with the well maintenance and the quality of water in their wells. In general the rural residents do not realize the problem of drinking water pollution. They understand the importance of cleanness and the observance of hygienic rules for the maintenance of the well, but their attention is directed only on the well itself and the small area around it. An overwhelming majority of the rural residents do not understand the importance of sources of pollution of drinking water such as latrines, stables, waste water and garbage heaps.

There are many cases of violation of the sanitary norms by the children when taking water from the well, and in some cases even among the adults. Bringing water is the usual task of rural children. There is a special necessity of the sanitary enlightenment among the children.

The problem of polluted drinking water is aggravated by the fact that rural residents, including pregnant women, nursing mothers and the little children consume drinking water without any treatment. As a result diarrhea and other water born diseases are widespread among the rural population, especially among the children (12% of the children had diarrhea in the last month).

Most part of the villagers were not taught how to maintain their wells correctly and how to treat drinking water. They want to be better informed about the quality of water in their wells and on the factors influencing the quality of water. Significant part of them feel that their knowledge on this subject is not enough. A minority of the villagers is afraid that the water they drink may have a negative effect on their health.

The investigation has revealed the differences in attitudes and water using behaviour between the educational groups. The most educated villagers are more critical about the quality of water they drink, are better informed how to keep their well correctly, how to treat their drinking water, more often convinced in necessity of sanitary enlightenment in this field. There are some differences in their behaviour patterns : they more often respect sanitary rules for the protection of the

water sources and more often treat the water before drinking. But these differences are not very significant, they are only slightly expressed. The most educated do not understand the dangers of the sources of water pollution situated in the yards of the villagers (latrines, stables, garbage heaps) either.

The sociological study has shown that the residents of the region of Balatina take more care of the correct maintenance of the wells, more strictly observe the sanitary rules in keeping their latrines and stables, etc. Nevertheless the latrines and stables in the region of Balatina are also situated too close to the wells, like in the region of Carpineni, sometimes even closer. The hygienic standards of behaviour in Balatina zone on the whole are higher than in Carpineni one. The Carpineni zone residents have a lower opinion about the quality of their drinking water, and have more complaints on this subject.

In general the attitudes of the villagers towards their enlightenment in the field of improving the quality of their drinking water, well maintenance and water treatment are positive. The sociological study has shown the necessity of the enlightenment of the rural residents in this area and their readiness to take in the new information in this subject.

Appendix A The calculation of the indexes

The indexes were calculated according to the formula:

A - number of positive answers

B - number of partially positive answers

C - number of partially negative answers

D - number of negative answers

E - number of neutral answers.

1. For the index calculated on the basis of the question N51 (Income self-estimation)

A - number of respondents marked the answer 1

B - the answer 2

C - the answer 3

D - the answer 4

E - the answer 5

2. For the index calculated on the basis of question N3 (Estimation of water quality)

A - number of respondents marked the answer 1

D - number of respondents marked the answer 2

E - number of respondents marked numbers 3 and 4

B and C = 0

3. For the index calculated on the basis of the question N 45 (Health anxiety)

A - number of respondents marked the answer 1

B - the answer 2

C - the answer 4

D - the answer 5

E - the answer 3

4. For the index calculated on the basis of the question N24 (Estimation of toilet influence on the quality of drinking water)

A - number of respondents marked the answer 4

B - the answer 3

C - the answer 2

D - the answer 1

E - the answer 5

5. For the index calculated on the basis of the question N 31 (Estimation of manure influence on the quality of drinking water)

A - number of respondents marked the answer 4

B - number of respondents marked the answer 3

C - the answer 2

D - the answer 1

E - the answer 5

6. For the index calculated on the basis of the question N 20 (Estimation of well maintenance)

A - number of respondents marked the answer 1

B - the answer 2

C - the answer 3

D - the answer 4

E - the answer 5

Appendix B Frequencies

Frequencies (%)

The representative sample of 500 respondents

1. What sources of water do you usually use for drinking?

- 1 - well 95.2
- 2 - spring 9.8
- 3 - water pipe 7.2
- 4 - water pump station 2.4
- 5 - river 0.0
- 6 - brook 0.4
- 7 - I collect rain water 1.6
- 8 - other sources 0.4

2. Do you have a private well in your yard?

- 1 - yes, we have a private well in our yard 18.4
- 2 - we share our well with one or two neighbouring families 13.8
- 3 - we use the common well situated in the street 52.4
- 4 - we have no well 15.0

3. What do you think about the quality of the water you usually use for drinking and cooking?

- 1 - the quality is good 57.0
- 2 - the quality is bad 7.4
- 3 - it seems that the water is good, transparent, but I'm not sure if it is useful for health 30.6
- 4 - it is hard to say 3.8

4. How do you treat the drinking water?

- 1 - I use drinking water without any treatment 90.4
- 2 - I boil the water 4.0
- 3 - I let water stay still for some time 4.4
- 4 - I use the produced filters 0.2
- 5 - I chlorinate the drinking water 1.2
- 6 - other methods of treatment 0.0

5. If you use any treatment of drinking water, please, tell how often do you use it?

- 1 - I treat water every time I drink it 2.0
- 2 - I treat water every time I give it to children, but not every time when I use it myself 0.6
- 3 - I treat the water sometimes 4.6
- 4 - I rarely use any treatment 2.2
- 5 - another opinion 0.2

6. If there are any disadvantages of your drinking water, please, name them.

- 1 - water has unpleasant smell 0.2

- 2 - water has unpleasant taste 2.4
- 3 - water is not transparent 6.4
- 4 - water is hard/has too much salt in it 14.2
- 5 - sometimes there is rubbish in the water 5.6
- 6 - it is chlorinated too much 0.2
- 7 - other disadvantages 1.6

7. Does anybody clean the well where you usually get drinking water?

- 1 - yes 88.4
- 2 - no 3.4
- 3 - not yet, our well is new 5.4

8. When was your well cleaned the last time?

- 1 - less than a month ago 2.6
- 2 - less than a half year ago 10.6
- 3 - less than a year ago 24.0
- 4 - 1-2 years ago 30.4
- 5 - 3-4 years ago 13.0
- 6 - 5 or more years ago 4.6
- 7 - I can't remember it 6.2

9. What is the way of cleaning the well you use?

- 1 - I don't know 8.4
- 2 - taking out all the water and cleaning the bottom and the walls 73.0
- 3 - cleaning the walls without pooling out all the water 7.2
- 4 - only the rubbish is taken out of the well 2.8

10. Is the water in your well being chlorinated?

- 1 - yes 26.2
- 2 - no 35.2
- 3 - it is being done very rarely 30.4
- 4 - I don't know 5.6

11. Who usually brings water from the well?

- 1 - myself 69.8
- 2 - my wife, my husband 56.6
- 3 - other adults -members of the family 32.6
- 4 - children 24.8
- 5 - another answer (water pump, other relatives) 3.6

12. Do you have a pump to take water from the well?

- 1 - yes, I have 16.0
- 2 - I have, but I don't use it 4.4

3 - no, I have not 71.8

4 - I have no pump, but I often lend it from my neighbors 5.0

13. Does the well you usually use have a roof or a lid ?

1 - it has a roof 57.8

2 - it has a lid 60.2

3 - it has neither roof nor lid 16.2

4 - it has a lid, but usually it is open 4.2

14. Have you ever noticed mud, rubbish, etc. in the well you take drinking water?

1 - never 51.2

2 - only once 5.8

3 - some times I see it 36.2

4- very often 4.4

15. Do you think the children who take water from your well observe the hygienic norms when they take water?

1 - usually they observe the hygienic norms 49.6

2 - sometimes observe, sometimes not 37.0

3 - children usually don't observe the hygienic norms 10.8

16. If you suppose that children often or sometimes violate the hygienic norms when taking water, please, note the manifestations of such behavior?

Children leave the lid open 7.0

Pour water near the well 3.8

Children give water to the animals near the well 0.6

They spit into the water 1.4

Throw the foreign bodies into the well 7.2

Children put dirty buckets on the edge of the well 0.2

There is no common bucket, everybody uses his own 1.6

The common bucket is being put on the ground 3.2

There is no mug, children drink from the bucket 0.6

Children wash hands in the common bucket 1.4

Children play near the well, eat sun-flower seeds 13.2

17. And what about the adults?

1 - usually they observe the hygienic norms 69.8

2 - sometimes observe, sometimes not 23.2

3 - adults usually don't observe the hygienic norms 4.6

The manifestations of such behaviour:

People leave the lid open 3.8
Pour water near the well 2.2
Give water to the animals from the common well 2.4
Throw the foreign bodies into the well 0.2
There is no special place for bucket 0.2
There is no common bucket, everybody uses his own 1.8
People put the common bucket on the ground 0.2
There is no mug, people drink from the common bucket 1.0
Other (people eat sun-flower seeds near the well) 2.8

18. Is it necessary to inform the people about the correct treatment of drinking water?

1 - yes 82.0
2 - no 8.8
3 - it is difficult to say 9.0

19. Is the area around your well usually dry or wet?

1 - it is usually dry 69.6
2 - it is usually wet 7.2
3 - it is wet only when it rains, or when the snow is melting 20.6

20. How can you estimate the maintenance of your well in general?

1 - very good 12.2
2 - good enough 69.6
3 - poor 11.2
4 - very bad 1.0
5 - I didn't think about it 3.8

21. Does your well has a slab or a cement ground?

1 - yes 86.4
2 - no 10.4
3 - I did not pay attention to this 1.0

22. What toilet system do you have in your household?

1 - the hole in the ground 93.2
2 - the hole protected by cement 3.8
3 - the toilet inside the house 1.0
4 - another construction of the toilet 2.0

23. What is the distance between the well where you take the drinking water and the nearest toilet (yours or neighbors')?

1 - less than 10 meters 2.6
2 - 10-15 meters 7.4
3 - 16 -20 9.4

- 4 - 21-30 24.2
- 5 - 31-40 18.4
- 6 - 41-50 12.6
- 7 - more than 50 meters 23.2

24. Does the toilet influence the quality of water in your well?

- 1 - of course not 33.2
- 2 - I suppose not, but I'm not sure 25.6
- 3 - may be it influences 21.6
- 4 - I'm sure there is a negative effect 13.4
- 5 - it is hard to say 3.8

25. If you suppose, there is no influence, why do you think so?

- 1 - the toilet is far enough from the well 37.8
- 2 - the contents of the toilet can't come through the ground to the water 14.8
- 3 - in the course of time the contents of the toilet turn into the soil and it has no negative effect on the water and therefore on the health 3.2
- 4 - all our ancestors had the toilet in the same distances from the well and they were healthy 9.0
- 5 - I've never thought about this possible influence 6.4
- 6 - another reason 0.2

26. If you empty the pit and clean the toilet, where do you put the waste from the toilet?

- 1 - in the place especially designated for it 3.0
- 2 - in the plot in our yard 1.0
- 3 - in the agricultural place outside our yard 2.8
- 4 - in another place 1.0
- 5 - I do nothing, I don't empty the toilet pit 5.8
- 6 - I cover the pit with soil and dig another one 86.2

27. When did you clean your toilet pit, or change it for the new one for the last time?

- 1 - less than a year ago 20.4
- 2 - two - three years ago 34.2
- 3 - 4 - 5 years ago 18.8
- 4 - 6 - 10 years ago 10.4
- 5 - more than 10 years ago 3.6
- 6 - never 10.8

28. If you have animals in your yard, what's the distance between the place where animals (yours or your neighbors') are being kept and the well with the drinking water?

- 1 - less than 10 meters 7.2
- 2 - 10-15 meters 9.6
- 3 - 16-20 meters 8.6
- 4 - 21-30 17.8

5 - 31-40 13.6

6 - 41-50 8.8

7 - more than 50 meters 26.6

8 - I have no animals 5.6

29. Where do you put manure and the other wastes from the animals ?

1 - to the fields far from my yard 12.0

2 - to the agricultural plot in my yard 27.4

3 - to the special place - rubbish heap 50.8

4 - to another place (the hole in the yard, the nearest ravine etc.) 8.4

5 - I do nothing 0.2

6 - I have no animals 5.6

30. Do the cattle and poultry have the possibility to walk free in your yard , not far from the well?

1 - yes 25.6

2 - sometimes 25.4

3 - no 46.6

4 - another opinion 0.0

31. What's your opinion, can the manure worsen the water in your well with drinking water ?

1 - I'm sure it can't 29.6

2 - I suppose no, but I'm not sure 28.2

3 - may be it can worsen 23.6

4 - I'm sure there is a negative effect on drinking water 10.4

5 - it is hard to say 5.4

32. Where do you put the garbage , rubbish from your household ?

1 - we bury it in our yard 4.0

2 - it is exported to the special place - rubbish heap 76.4

3 - we export it in some place not far from our yard, within the village 16.2

4 - another opinion (to the toilet, to the special pit in the yard) 4.0

33. What do you do with the water you wash (laundry, wash yourself) with?

1 - pour out it on the ground in my yard 54.6

2 - pour out it into the gutter in the street 26.4

3 - I have a sewage system 6.4

4 - another opinion (into the special hole in the yard, to the toilet, to the place where manure is kept) 17.4

34. If you have no sewage system, please, tell what is the distance between the place where you pour the waste water and the well with drinking water ?

1 - less than 10 meters 5.8

2 - 10-15 9.4

- 3 - 16-20 10.8
- 4 - 21-30 18.8
- 5 - 31-40 12.6
- 6 - 41-50 11.0
- 7 - more than 50 meters 25.4

35. What are according to you the 3 most important measures to protect the well ?

- to clean the well regularly 41.8
- to have a lid 52.4
- to make a concrete slab near the well 22.2
- to have a common bucket 8.2
- not to give water to cattle from the common bucket 1.0
- to set the latrine farther from the well 4.0
- to set the garbage heap farther from the well 6.4
- to observe the hygienic norms of using the well 8.2
- to have a fence near the well 7.0
- to keep manure and wastes from the animals farther from the well 4.4
- to use less chemicals on the agricultural plots 0.4
- to chlorinize water in the well 20.4
- to have a roof above the well 37.8
- not to pour water near the well 0.8
- to have a common mug 1,2
- to have a drainage channel near the well 0.2
- to keep cleanness around the well 24.8
- to repair the well regularly 5.2
- to take care of the well 4.4
- to explain people the hygienic rules of the using the well 3.2
- not to let children to play near the well 3.2
- the well water should be analysed by the specialists 3.0
- to disinfect the well regularly 2,8
- to dye and white-wash the well 2.0
- to prevent soil and foreign bodies from falling into the well 1.2
- to pay those who take care of the well 0.2
- to have a water pump 0.2
- not to wash cars near the well and not to allow the parking of the cars near the well 0.4
- the common bucket should not be leaky 0.2
- to celebrate the "day of the well" 0.2
- every well should have a host who should be paid for the maintenance of the well 0.2
- the well should be situated at the high place 0.2
- to have a drainage gut near the well 0.2
- to construct a special arrangement for giving water for cattle 0.2
- to stigmatize those who don't observe the hygienic norms of using the well 0.2

to plant trees near the well 0.2
not to arrange the well near the cemetery 0.2

36. Do you use different sources of water for drinking and for washing?

- 1 - yes 28.8
- 2 - no 45.4
- 3 - sometimes I use the same water, sometimes - the different 25.6

37. Have you ever been taught by the specialists how to keep your well correctly?

- 1 - yes 20.4
- 2 - yes, but it was long time ago 16.8
- 3 - no 53.4
- 4 - I don't remember 8.4

38. If you were taught, please, tell where ?

- 1 - I was taught at school 15.4
- 2 - at the polyclinic 7.2
- 3 - there were special lectures of the specialists in the club of our village 0.6
- 4 - at my working collective body 7.2
- 5 - I learned about it from press 7.8
- 6 - from TV 12.6
- 7 - from radio 8.6
- 8 - another opinion 4.2

39. Have you ever been taught by the specialists how to treat the water you drink?

- 1 - yes 24.0
- 2 - yes, but it was long time ago 13.8
- 3 - no 53.6
- 4 - I don't remember 8.4

40. If you were taught, please, tell where.

- 1 - I was taught at school 17.2
- 2 - at the polyclinic 10.6
- 3 - there were special lectures of the specialists in the club of our village 0.4
- 4 - at my working collective body 6.0
- 5 - I learned about it from press 6.2
- 6 - from TV 8.6
- 7 - from radio 3.8
- 8 - another opinion 2.4

41. How do you think, does the water of your well (or another source you use for drinking) have the negative effect on your health?

- 1 - no 52.8

2 - yes 45.4

The diseases named:

hepatitis 2.2

kidney diseases 6.4

liver diseases 1.8

stomach diseases 3.6

diarrhoea 6.4

cholera 3.4

deposit of salts 2.2

osteocondrosis 0.4

dental caries 2.4

gastritis 1.6

aches of teeth 0.6

cancer 0.8

jaundice 1.0

dysentery 4.6

influenza 0.2

acute intestinal diseases 2.2

helminthiasis 0.8

gall bladder 1.0

other 1.6

42. If the analyses show that the well where you take drinking water is polluted what will you do?

1 - I'll do nothing, I'll use water from my well 5.6

2 - I'll take water from another well 34.6

3 - I'll take water from the spring 6.2

4 - from the pump station 2.4

5 - from the river 0.0

6 - from the brook 0.0

7 - I'll collect rain water 0.6

8 - I'll disinfect and clean my well 52.8

9 - another opinion 0.4

43. If your well is polluted and you have to get water from another well, how much time do you agree to walk (in one way) ?

1 - less than ten minutes 48.8

2 - less than 20 minutes 23.4

3 - less than 30 minutes 10.6

4 - less than one hour 5.8

5 - more than one hour 4.8

6 - in that case I should use a car or a bike, I don't need to walk 1.6

44. How do you estimate the state of your health?

- 1 - I'm practically healthy (sometimes I have flu, or some other common diseases) 68.0
- 2 - I had serious diseases, but now I'm practically healthy 13.8
- 3 - I have serious diseases now and I often feel bad myself 16.0
- 4 - I'm an invalid 2.0

45. Do you worry about your health?

- 1 - yes, very often 17.0
- 2 - often 10.8
- 3 - sometimes 35.4
- 4 - rarely 27.6
- 5 - never 9.2

46. Did any of your children have diarrhea in the last month?

- 1 - yes 9.8
- 2 - no 68.8
- 3 - I don't know 1.2
- 4 - I don't have minor children 19.8

47. Age

- 18-24 10.8
- 25-29 11.2
- 30-39 18.0
- 40-49 24.2
- 50-54 7.6
- 55-59 8.8
- 60 and more 19.0

48. Sex

- 1 - male 48.6
- 2 - female 51.4

49. Do you have children under 2 years old?

- 1 - yes 13.6
- 2 - no 85.6

50. Education

- 1 - elementary education 15.2
- 2 - incomplete secondary education 25.4
- 3 - complete secondary education 28.2
- 4 - secondary special education 22.6
- 5 - higher education 8.6

51. Income

- 1 - good 0.4

2 - normal, but not bad 10.6

3 - poor 32.0

4 - very bad 51.8

5 - it is hard to say 5.2

52. Employment

1 - I'm employed, have a job 43.0

2 - I have a private business, or produce agricultural products for sale 7.8

3 - I work in my household for myself 17.0

4 - I'm unemployed (want to work, but can't find it) 7.2

5 - I'm a student 0.0

6 - retired 22.0

7 - other state 3.0

53. Sphere of occupation

1 - agriculture 59.6

2 - industry 0.8

3 - building 1.2

4 - education 4.8

5 - health service 3.8

6 - administration 0.8

7 - other occupation (pensioners etc.) 29.0

Note : in some alternative questions the sum of answers is less than 100%, because a small part of the respondents did not give the certain answers. For the multiple choice questions this sum exceeds 100%, because the respondents could give more than 1 answer.

Frequencies (number of respondents)

The sample of 100 pregnant woman and nursing mothers

1. What sources of water do you usually use for drinking?

1 - well 95

2 - spring 14

3 - water pipe 7

4 - water pump station 3.0

5 - river 0

6 - brook 0

7 - I collect rain water 0

8 - other sources 0

2. Do you have a private well in your yard?

1 - yes, we have a private well in our yard 10

- 2 - we share our well with one or two neighbouring families 25
 - 3 - we use the common well situated in the street 55
 - 4 - we have no well 10
3. What do you think about the quality of the water you usually use for drinking and cooking?
- 1 - the quality is good 67
 - 2 - the quality is bad 7
 - 3 - it seems that the water is good, transparent, but I'm not sure if it is useful for health 22
 - 4 - it is hard to say 4
4. How do you treat the drinking water?
- 1 - I use drinking water without any treatment 82
 - 2 - I boil the water 15
 - 3 - I let water stay still for some time 2
 - 4 - I use the produced filters 0
 - 5 - I chlorinate the drinking water 0
 - 6 - other methods of treatment 0
5. If you use any treatment of drinking water, please, tell how often do you use it?
- 1 - I treat water every time I drink it 5
 - 2 - I treat water every time I give it to children, but not every time when I use it myself 8
 - 3 - I treat the water sometimes 3
 - 4 - I rarely use any treatment 0
 - 5 - another opinion 0
6. If there are any disadvantages of your drinking water, please, name them.
- 1 - water has unpleasant smell 1
 - 2 - water has unpleasant taste 5
 - 3 - water is not transparent 7
 - 4 - water is hard/has too much salt in it 7
 - 5 - sometimes there is rubbish in the water 6
 - 6 - it is chlorinated too much 0
 - 7 - other disadvantages 0
7. Does anybody clean the well where you usually get drinking water?
- 1 - yes 88
 - 2 - no 4
 - 3 - not yet, our well is new 4
8. When was your well cleaned the last time?
- 1 - less than a month ago 2
 - 2 - less than a half year ago 8
 - 3 - less than a year ago 28

4 - 1-2 years ago 28

5 - 3-4 years ago 9

6 - 5 or more years ago 2

7 - I can't remember it 14

9. What is the way of cleaning the well you use?

1 - I don't know 19

2 - taking out all the water and cleaning the bottom and the walls 68

3 - cleaning the walls without pooling out all the water 3

4 - only the rubbish is taken out of the well 2

10. Is the water in your well being chlorinated?

1 - yes 24

2 - no 27

3 - it is being done very rarely 30

4 - I don't know 15

11. Who usually brings water from the well?

1 - myself 66

2 - my wife, my husband 64

3 - other adults -members of the family 32

4 - children 7

5 - another answer 2

12. Do you have a pump to take water from the well?

1 - yes, I have 10

2 - I have, but I don't use it 2

3 - no, I have not 74

4 - I have no pump, but I often lend it from my neighbors 10

13. Does the well you usually use have a roof or a lid ?

1 - it has a roof 64

2 - it has a lid 61

3 - it has neither roof nor lid 17

4 - it has a lid, but usually it is open 6

14. Have you ever noticed mud, rubbish, etc. in the well you take drinking water?

1 - never 57

2 - only once 9

3 - some times I see it 24

4- very often 6

15. Do you think the children who take water from your well observe the hygienic norms when they take water?

- 1 - usually they observe the hygienic norms 42
- 2 - sometimes observe, sometimes not 35
- 3 - children usually don't observe the hygienic norms 16

16. If you suppose that children often or sometimes violate the hygienic norms when taking water, please, note the manifestations of such behavior?

- Children leave the lid open 6
- They spit into the water 3
- Throw the foreign bodies into the well 18
- There is no common bucket, everybody uses his own 3
- The common bucket is being put on the ground 7
- There is no mug, children drink from the bucket 1
- Children wash hands in the common bucket 2
- Children play near the well, eat sun-flowers, run etc. 11

17. And what about the adults?

- 1 - usually they observe the hygienic norms 58
- 2 - sometimes observe, sometimes not 32
- 3 - adults usually don't observe the hygienic norms 5

The manifestations of such behavior

- People leave the lid open 1
- Give water to animals from the common bucket 3
- There is no common bucket, everybody uses his own 1
- People put the common bucket on the ground 1

18. Is it necessary to inform the people about the correct treatment of drinking water?

- 1 - yes 90
- 2 - no 4
- 3- it is difficult to say 6

19. Is the area around your well usually dry or wet?

- 1 - it is usually dry 53
- 2 - it is usually wet 15
- 3 - it is wet only when it rains, or when the snow is melting 28

20. How can you estimate the maintenance of your well in general?

- 1 - very good 15
- 2 - good enough 63
- 3 - poor 13

4 - very bad 1

5 - I didn't think about it 3

21. Does your well has a slab or a cement ground?

1 - yes 85

2 - no 10

3 - I did not pay attention to this 1

22. What toilet system do you have in your household?

1 - the hole in the ground 96

2 - the hole protected by cement 1

3 - the toilet inside the house 2

4 - another construction of the toilet 1

23. What is the distance between the well where you take the drinking water and the nearest toilet (yours or neighbors')?

1 - less than 10 meters 4

2 - 10-15 meters 4

3 - 16 -20 10

4 - 21-30 12

5 - 31-40 22

6 - 41-50 16

7 - more than 50 meters 28

24. Does the toilet influence the quality of water in your well?

1 - of course not 35

2 - I suppose not, but I'm not sure 24

3 - may be it influences 22

4 - I'm sure there is a negative effect 13

5 - it is hard to say 2

25. If you suppose, there is no influence, why do you think so?

1 - the toilet is far enough from the well 39

2 - the contents of the toilet can't come through the ground to the water 14

3 - in the course of time the contents of the toilet turn into the soil and it has no negative effect on the water and therefore on the health 1

4 - all our ancestors had the toilet in the same distances from the well and they were healthy 5

5 - I've never thought about this possible influence 5

6 - another reason 0

26. If you empty the pit and clean the toilet, where do you put the waste from the toilet?

1 - in the place especially designated for it 3

- 2 - in the plot in our yard 0
- 3 - in the agricultural place outside our yard 2
- 4 - in another place 0
- 5 - I do nothing, I don't empty the toilet pit 13
- 6 - I cover the pit with soil and dig another one 81

27. When did you clean you toilet pit, or change it for the new one for the last time?

- 1 - less than a year ago 26
- 2 - two - three years ago 34
- 3 - 4 - 5 years ago 24
- 4 - 6 - 10 years ago 4
- 5 - more than 10 years ago 1
- 6 - never 8

28. If you have animals in your yard, what 's the distance between the place where animals (yours or your neighbors') are being kept and the well with the drinking water ?

- 1 - less than 10 meters 3
- 2 - 10-15 meters 13
- 3 - 16-20 meters 10
- 4 - 21-30 17
- 5 - 31-40 10
- 6 - 41-50 9
- 7 - more than 50 meters 27
- 8 - I have no animals 7

29. Where do you put manure and the other wastes from the animals ?

- 1 - to the fields far from my yard 13
- 2 - to the agricultural plot in my yard 29
- 3 - to the special place - rubbish heap 47
- 4 - to another place 6
- 5 - I do nothing 0
- 6 - I have no animals 7

30. Do the cattle and poultry have the possibility to walk free in your yard , not far from the well?

- 1 - yes 26
- 2 - sometimes 24
- 3 - no 46
- 4 - another opinion 0

31. What's your opinion, can the manure worsen the water in your well with drinking water ?

- 1 - I'm sure it can't 28
- 2 - I suppose no, but I'm not sure 28
- 3 - may be it can worsen 23

4 - I'm sure there is a negative effect on drinking water 12

5 - it is hard to say 5

32. Where do you put the garbage , rubbish from your household ?

1 - we bury it in our yard 3

2 - it is exported to the special place - rubbish heap 70

3 - we export it in some place not far from our yard, within the village 25

4 - another opinion 2

33. What do you do with the water you wash (laundry, wash yourself) with?

1 - pour out it on the ground in my yard 55

2 - pour out it into the gutter in the street 21

3 - I have a sewage system 7

4 - another opinion (pour it to the special hole in the yard, to the toilet) 23

34. If you have no sewage system, please, tell what is the distance between the place where you pour the waste water and the well with drinking water ?

1 - less than 10 meters 4

2 - 10-15 8

3 - 16-20 7

4 - 21-30 12

5 - 31-40 15

6 - 41-50 12

7 - more than 50 meters 34

35. What are according to you the 3 most important measures to protect the well ?

to clean the well regularly 39

to have a lid 53

to make a concert slab near the well 27

to have a common bucket 5

to set the latrine farther from the well 5

to set the garbage heap farther from the well 2

to observe the hygienic norms of using the well 8

to have a fence near the well 3

to keep manure and wastes from the animals farther from the well 13

to use less chemicals on the agricultural plots 0.4

to chlorinize water in the well 23

to have a roof above the well 32

not to pour water near the well 4

to keep cleanness around the well 29

to repair the well regularly 2

to take care of the well 10

to explain people the hygienic rules of the using the well 1
not to let children to play near the well 7
the well water should be analysed by the specialists 1
to disinfect the well regularly 8
to dye and white-wash the well 1
to plant trees near the well 1

36. Do you use different sources of water for drinking and for washing?

- 1 - yes 37
- 2 - no 38
- 3 - sometimes I use the same water, sometimes - the different 25

37. Have your ever been taught by the specialists how to keep your well correctly?

- 1 - yes 25
- 2 - yes, but it was long time ago 12
- 3 - no 51
- 4 - I don't remember 11

38. If you were taught, please, tell where ?

- 1 - I was taught at school 24
- 2 - at the polyclinic 6
- 3 - there were special lectures of the specialists in the club of our village 0
- 4 - at my working collective body 4
- 5 - I learned about it from press 8
- 6 - from TV 14
- 7 - from radio 5
- 8 - another opinion 1

39. Have you ever been taught by the specialists how to treat the water you drink?

- 1 - yes 40
- 2 - yes, but it was long time ago 8
- 3 - no 50
- 4 - I don't remember 2

40. If you were taught, please, tell where.

- 1 - I was taught at school 19
- 2 - at the polyclinic 21
- 3 - there were special lectures of the specialists in the club of our village 0
- 4 - at my working collective body 6
- 5 - I learned about it from press 4
- 6 - from TV 10
- 7 - from radio 2
- 8 - another opinion 0

41. How do you think, does the water of your well (or another source you use for drinking) have the negative effect on your health?

1 - no 65

2 - yes 30

The diseases named:

hepatitis 5

kidney diseases 3

liver diseases 2

stomach diseases 2

diarrhoea 4

cholera 4

deposit of salts 2

osteochondrosis 1

dysentery 4

helminthosis 1

ulcer 1

42. If the analyses show that the well where you take drinking water is polluted what will you do?

1 - I'll do nothing, I'll use water from my well 4

2 - I'll take water from another well 28

3 - I'll take water from the spring 8

4 - from the pump station 0

5 - from the river 0

6 - from the brook 0

7 - I'll collect rain water 2

8 - I'll disinfect and clean my well 60

9 - another opinion 0

43. If your well is polluted and you have to get water from another well, how much time do you agree to walk (in one way) ?

1 - less than ten minutes 41

2 - less than 20 minutes 15

3 - less than 30 minutes 22

4 - less than one hour 8

5 - more than one hour 7

6 - in that case I should use a car or a bike, I don't need to walk 3

44. How do you estimate the state of your health?

1 - I'm practically healthy (sometimes I have flu, or some other common diseases) 89

2 - I had serious diseases, but now I'm practically healthy 7

- 3 - I have serious diseases now and I often feel bad myself 3
- 4 - I'm an invalid 1

45. Do you worry about your health?

- 1 - yes, very often 11
- 2 - often 6
- 3 - sometimes 32
- 4 - rarely 44
- 5 - never 7

46. Did any of your children have diarrhoea in the last month?

- 1 - yes 6
- 2 - no 84
- 3 - I don't know 0
- 4 - I don't have minor children 10

47. Age

- 17 - 24 51
- 25 - 29 30
- 30 - 39 18
- 40 and more 1

48. Sex

- 1 - male 0
- 2 - female 100

49. Do you have children under 2 years old?

- 1 - yes 63
- 2 - no 37

50. Education

- 1 - elementary education 0
- 2 - incomplete secondary education 37
- 3 - complete secondary education 33
- 4 - secondary special education 23
- 5 - higher education 7

51. Income

- 1 - good 0
- 2 - normal, but not bad 14
- 3 - poor 37

- 4 - very bad 38
- 5 - it is hard to say 3

52. Employment

- 1 - I'm employed, have a job 25
- 2 - I have a private business, or produce agricultural products for sale 6
- 3 - I work in my household for myself 31
- 4 - I'm unemployed (want to work, but can't find it) 22
- 5 - I'm a student 0
- 6 - retired 0
- 7 - other state (have allowance for mothers) 16

53. Sphere of occupation

- 1 - agriculture 54
- 2 - industry 0
- 3 - building 1
- 4 - education 6
- 5 - health service 4
- 6 - administration 2
- 7 - other occupation 33