

Martina Hudak
A-SMYLE program, Baxter High School
Baxter, Iowa
Serbia, Factor 10

Arsenic contaminated water in Vojvodina, Serbia

Serbia is not a big country, the total area is 77.474 km². Serbia is divided into two regions: Central Serbia with an area of 55.968km² and Vojvodina with total area of 21.506km². This beautiful country is located at the crossroads of Central Europe and Southeast Europe and it is mostly mountainous, but it's north parts are flat. They lie in the Pannonian Basin. (Serbia Country Info)

Serbia has 7.498.001 citizens and it is a multicultural country. There are 82.86% Serbs, 3.91% Hungarians, 1.82% Bosniaks, 1.44% Roma, 0.94 Croats and 9.03% other. (Demographics of Serbia)

Serbia has a big agricultural sector that is based on a high quality arable land and continental climate. Agricultural land covers around 66% of total land area. (Serbia Country Review)

Typical subsistence family in Serbia contains of 5 members: father, mother and 3 children. Children are obligated to enroll in elementary school at the age of six or seven. The elementary school lasts for eight years and after that students can choose if they will continue their education at high school. There are four types of high schools in Serbia: Grammar schools, Professional schools, Vocational schools and Special schools for gifted children. If the students want to continue their education at the higher school or faculty, they will get accepted based on their grades in high school and entrance exams results. (Education in Serbia) From information from 2007, only 6.5% of Serbian people have their faculty diploma, which is defeating. (Know your enemy)

In Serbia, healthcare is available to everyone. However, even though medical staff is well trained, equipment and facilities let the healthcare down. People that are employed must get the health insurance from their employers and self employed must pay the full contribution. The pensioners, unemployed, people on long-term sickness benefit or maternity leave do not pay for healthcare contribution. (Healthcare in Serbia)

Typical Serbian subsistence family has a house in town and owns a field near that town on which they grow crops. The average size of a field in Serbia is 3.6 hectares and the most popular crops grown are maize (44%), wheat (23%), sunflower (9%), barley (4%), soya (3.6%), sugar beet (3.1%). Part of these crops they grow for themselves, but most of these they sell to local food facilities that freeze them. (Serbia Country Review)

Most of the families own chickens and pork. They raise them mostly for their own usage, but there are local markets, too that they often visit. At that market, everybody is selling their goods like eggs, crops, vegetables, chickens, pork. But these local markets are not as crowded as they used to be. Most of the people don't visit them as they used to anymore. They rather go to a shop.

There are many barriers to improving agricultural productivity and earnings. Many farmers complain that they don't have enough money because the country doesn't pay them enough for their crops. That's why many of those that are in the agriculture, have off land employments.

Farmers have problems with water and wind erosions, too. Water erosion dominates in the hilly and mountainous regions of central Serbia, while wind erosion dominates in the Vojvodina.

Another problem that farmers in central Serbia have is heavy metal contamination in soils. Kolubara and Kostolac basins are in the worst position, because of lignit. (Serbia Country Review)

The problem that people in Vojvodina have is underground water contained with arsenic. The worst thing about that is that they drink that water, even though they are not supposed to.

Because Pannonian Basin, where Vojvodina is placed, used to be covered with Pannonian sea, the land is very fertile there, but when people migrated here, they found out that there is underground water in Vojvodina and that it is called Artesian water. That is why they made artesian aquifers and have used that water as drinking water for themselves and for their animals.

The artesian water can be found at a depth of 40 to 600 meters and it is a groundwater under positive pressure which causes the water level in well to rise to a point where hydrostatic equilibrium has been reached. (Artesian aquifer)

Even though people have been drinking this water for many years, the problem with it has been discovered just around ten years ago. It has been discovered that the Artesian water has higher percent of arsenic than allowed.

Higher percent of arsenic in the water can be really bad for people. Arsenic can enter our body through drinking water and food. The water that contains arsenic is used for watering plants, and water that is given to animals also contains a higher percent of arsenic than allowed. And we eat these plants and we eat meat of these animals.

Arsenic is dangerous for health. Early symptoms are characteristic skin ailments including changes in skin pigmentation and progressively painful skin lesions. Increased exposure can lead to liver and kidney disease, chronic lung disease, cardio-vascular and peripheral vascular disease, neurological effects, diabetes, gangrene and multiple cancers. Lung and heart disease and lung and bladder cancers are major causes of death. (Arsenic Pollution)

Institute of Public Health Novi Sad did a research during 2005. They found out that concentration of total arsenic in drinking water varies from 0.005 to 0.450 mg/l. Recommended amount of arsenic in water is 0.01 mg/l. (Arsenic contamination in environment in the region of Vojvodina)

In the towns where the water is contaminated with arsenic, there is, or will be, a public fountain, where people can get treated, clean water. The problem is that people don't want to give up their old habits. Most of the town's population still drink the water from their sink, and don't get it from town's public fountain. Some people who are wealthier, can afford to buy themselves bottled water, but others who are not willing to go to the local fountain, are in a real danger.

Therefore, the towns are trying to improve the situation, but the people are the ones that don't want to change their habits. So, I can say that the drinking water contamination with arsenic is not worsening, not staying the same, it's slightly improving, but not much. But there is still the food that is contaminated with arsenic.

Improving, or even resolving this situation would help everybody. We would drink healthier water, we would eat healthier food, and we would improve our next generation's lives.

Just imagine if we do nothing anything about this issue, and the water becomes even more contaminated with pesticides, sewage, nutrients, synthetic organics, petrochemicals, etc. This would cause cancer even faster. What a disaster would that be. (Health impacts of water pollution)

When I found out that the water I was drinking was contaminated with higher percent of arsenic than it should, I didn't do anything about it. I just continued to drink it. But after doing this research, I found out that I don't want to drink that water anymore.

I think that's the biggest problem among most people. They are not aware of what arsenic can do to them. They don't know that it can cause changes in skin pigmentation or even liver and kidney disease, chronic lung disease and multiple cancers.

That's why my solution for this problem would be education. We need to educate people about arsenic and not just tell them not to drink it. Everybody knows that when you say to someone not to do something, of course he will do that.

I believe that first thing that should be done is to educate kids and youth about arsenic. There should be some presentations about that in schools. Educated people should talk about that and explain to them why they should stop drinking tap water that contains arsenic.

Of course, older people should be educated, too. There should be some presentations for them, too. Experts in this field should explain to them why the arsenic is bad for them. Or at least they should explain to them why they shouldn't let their children to drink water that has higher percent of arsenic than allowed. Just because they don't want to change their habits, they shouldn't let their children do that too.

If they still wouldn't be willing to get their water from public fountain, they should consider buying some special devices they could use in their house. There are a number of great mechanisms for arsenic removal that have been developed for treating water supplies. For example there is a "specialized, arsenic selective resin-a strongly basic hybrid Anion Exchange Resin" which is available in a water filter countertop system. A system like this has 5 filtering stages, ending with an activated carbon filter. This cartridge lasts for one year and costs around \$120 (Arsenic Water Filters). Another good way to remove arsenic from your drinking water is distillation. "The distillation units boil the water, gather the steam, and cool it to turn it back into water. The heat kills bacteria. The mineral, metal and other contaminants, including arsenic, stay in the boiler. It results in nearly pure water." (Distillation to Remove Arsenic from Drinking Water) There are some other devices that may help: reverse osmosis, aeration, conventional filtration, ion exchange, membrane filtration and separation, separation and clarification or packaged water treatment plants among the others. (Arsenic Removal from Drinking Water)

The new solution that has been discovered is really cheap and easy. Apparently, you can clean your water using the plastic bottle and cysteine. "'Dealing with arsenic contamination of drinking water in the developing world requires simple technology based on locally available materials," said study leader Tsanangurayi Tongesayi, Ph.D., professor of analytical and environmental chemistry at Monmouth University, West Long Branch, N.J. "Our process uses pieces of plastic water, soda pop and other beverage bottles. Coat the pieces with cysteine -- that's an amino acid found in dietary supplements and foods -- and stir the plastic in arsenic-contaminated water. This works like a magnet. The cysteine binds up the arsenic. Remove the plastic and you have drinkable water.'" (Removing Arsenic From Water With...Plastic Bottles and Nutrition Supplements?!)

People should be taught how to reduce the amount of contaminated soil, too, because they unintentionally breathe it and swallow it. I found some suggestions how to do that:

"Wear gloves while gardening.

Wash all vegetables carefully and peel vegetables where possible. Be sure to remove particles of soil on the food item. Wash inside crevices (e.g. broccoli and cauliflower).

Though there is evidence that vegetables and fruits may take up small amounts of arsenic into their roots or leaves, a more serious problem could come from eating fruits and vegetables that have bits of contaminated soils stuck to them.

Add clean soils or soil supplements such as compost or mulch to your existing garden. Clean soils are ones that are known to be contaminant-free.

Consider establishing a raised bed using clean soils.

Do not garden in soils with arsenic in excess of 20 ppm (parts per million). Bring in clean soils and build a raised bed instead.

Dampen soils with water before you garden to limit the amount of dust you inhale.

Consider wearing a mask if you spend time in dusty soils.

Follow guidelines below to reduce your exposure to contaminated soils.” (Arsenic Facts)

“Keep children from playing in contaminated dirt. The most likely way to become exposed to arsenic is from ingesting (eating) dirt; toddlers and young children tend to play in dirt and then put their hands/toys/other items in their mouths. Some children (over two years old) and adults eat dirt on purpose.

Frequently wash toys, pacifiers and other items that go into children's mouths.

Cover bare soils with grass or other material.

Wash hands and face thoroughly after working or playing in the soil, especially before eating. Do not eat, chew or smoke in areas with contaminated soil.

Wash garden vegetables and fruits carefully to remove all soil particles. Take care to get dirt out of the crevices of vegetables such as broccoli.

Remove work and play shoes before entering the house.

Wash soil-laden clothes separately from other clothes.

Damp-mop floors and wipe down counters, tables and window ledges regularly. Do not use a vacuum as a method to keep contaminated dust under control. Vacuum cleaners DO NOT reduce dust and tend to stir it up into your breathing zone. If you prefer to use a vacuum cleaner, use one with a HEPA (high efficiency particulate air) filter.

Prevent pets from tracking contaminated soils into your home. Keep them out of areas with exposed dirt.

Consider wearing a mask if you spend time in dusty environments.” (Arsenic Facts)

Media should have big part in this, too. Many people watch television, read newspapers, so I think they would have a big influence on them.

Of course, Serbian government should provide money for these actions. Health corporations and experts in this field should give the presentations. Local towns should, of course, uphold this and provide space for these happenings.

Hopefully, that would help, educate and make people understand what they're doing to themselves.

Many countries have problems with arsenic contaminated water. Serbia is one of them. There has been done something to protect citizens that drink that water. In almost every town that has arsenic contaminated water there is a public fountain where people can get clean water. But that's not enough. People still drink arsenic contaminated water in their homes. They are not aware of what it can do to them. I was one of them until I started doing this research. Now when I found out how bad it is for me and all the diseases it can cause, I'm sure that I won't drink that water anymore. That's why my suggestion is to educate people what they are doing to themselves while drinking that water and what methods and mechanisms they should use not to do that anymore.

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