Local solutions for water management
The case of waste water treatment plant in Parakar village in Armenia

1 Description of the problem

Parakar is one of the leading communities of the region and is located at 12 km distance from the capital Yerevan; it has 2,500 households and developed infrastructure. 70% of the community has gas supply. It has organized scavenging; water supply is implemented by Yerevan Djur CJSC. 70% of the population has 12-hour water supply, and the remaining 30% receive water once every two days. 60% of the community is connected to sewerage network.

The population is mainly employed in the service sector. All of them have privatized agricultural lands, of which only 5% is cultivated. The remaining agricultural lands are not tilled and exposed to degradation from year to year. The main reason for that is pollution of irrigation water by domestic wastewater.

During the Soviet years the domestic wastewater of the community was pumped by two-stage pumping system to the wastewater collector of Yerevan's South-Western district and then transported to "Aeratsia" treatment plant of the capital Yerevan. Because of the energy crisis after the collapse of the USSR, the pump stations terminated their operation and the community wastewater was removed through the wastewater system up to the non-operating pumping station in the center of the village and afterwards discharged into the open irrigation canal passing nearby the pumping station and through the village (the school yard and the residents' farmlands) up to its south-eastern border and infiltrated into ground.

For many years the irrigation canal had been almost fully filled with sediments from wastewater. The latter often flowed out the canal to adjacent areas, making foul odor and anti-sanitary condition.

The critical situation seriously worried the community head and the administration mainly because of **the agriculture development and health related concerns**:

- after mixing of the domestic wastewater with irrigation water, the latter was not used for irrigation purposes and about 100ha agricultural lands remained uncultivated;
- flowing out the irrigation canal, the wastewater contaminated the cultivated lands, degraded qualitative indicators of the lands, jeopardized food safety of population;
- wastewater in the community environment posed a real risk for break-out of intestinal and epidemic diseases, especially during summer.

2 Decisions and Actions Taken

The project team responded to structured questions that are provided to guide authors of IWRM ToolBox case studies. In order to keep the format, we have developed the responses to these questions as we found that they are useful for considerations ot scholars, practitioners and decision makers.

Who took a leadership in the project? How the project was phased? – from the idea, development, implementation? How long does it take?

In 2010, the community head in partnership with "Parakar" Benevolent Foundation and Country Water Partnership (NGO) initiated and developed a demonstration pilot project for domestic wastewater treatment. The project implied applying lagoon type of wastewater treatment system for the first time in Armenia, which has a broad application in many countries, such as USA, Canada, European countries and is relatively cost-effective to build and operate. This wastewater treatment technology was adapted for Armenian conditions and the treatment structures were designed by JINJ engineering-consulting company. This technology allows treating the domestic wastewater to the quality required for irrigation water (reduction of BOD5 from 280 mg/l up to 42mg/l) and using the treated wastewater for irrigation purposes (fig.1).

Figure 1. Lagoon type of wastewater treatment system in Parakar village

The construction works for wastewater collection and treatment facilities started in October 2010 (see fig.2).

1. 882m-long 250mm polyethylene wastewater collector and 17 observation chambers were constructed.
2. The mechanical structures of the plant were constructed:
3. Screen,
4. Pump station with two pumps installed: one is horizontal, with cutting machine, submerged, grinder pump and the other is vertical, single-stage, made from stainless steel, submerged, three-phase engine with automatic switching, as a spare pump.
5. Air blowing node where two air blowers of Italian ROBUSCI production were installed, an air vent system, which evenly distributes air throughout the lagoon area.
6. First biological lagoon with 5,350m3 operating capacity, which is moisture-proof with aeration pipes passing through it.
7. Sedimentation lagoon with 112m3 operating capacity.
8. Fence.
9. A guide post.

Figure 2. Details of the lagoon type of wastewater treatment system in Parakar village

It is worth mentioning that all organizations taking part in the project (Country Water Partnership, JINJ Ltd., community administration) have attached importance to this initiative and made monetary and in-kind contributions to the project. Besides, this is the first project within the framework of UNDP/GEF Small Grants Programme in Armenia where the community monetary contribution makes about 75% of the total project budget.

Financing of water infrastructure: the project was depended on foreign grant but operation cost will stay with local community, how this is discussed?

During the project implementation special attention was paid also to public awareness raising and formation of appropriate attitude of population towards the new wastewater treatment technology. By means of information leaflets and round tables the community population was informed about the project goals, the implemented works and the anticipated outcomes. The population was informed also about the positive impacts of the project on the environment, health and social-economic condition.

During all of the public hearing meetings the participants appreciated the project results, since this was the first attempt of applying such a technology in Armenia and the possibility of its replication in other settlements depends on the project success. Under the project training sessions were also organized for the plant operating staff.

3 Outcomes

Despite being at the early stages, the project has already visible outcomes. First of all it provides a local solution for the local level problems. Second it improves the level of community involvement in the local water management. Then, it definitely provides benefits of integrated approach, since it incorporates waste water service, improves condition of the irrigation system and reduces degradation of community farmlands as well as health conditions in the village.

Moreover, unlike the option developed under the general plan of the community, according to which the domestic wastewater of the community would be pumped to the collector of Yerevan's South-Western district and then removed to "Aeratsia" wastewater treatment plant, with US$1.5 million preliminary estimated value, this approach is rather inexpensive and more acceptable from the environmental point of view.

How the project can contribute to others? Could it be replicable?

It is assumed that the project will also contribute to development of small business in Parakar, i.e. establishment of the community-based entity for operation of the wastewater treatment system and development of fish industry in the future.

4 Lessons learned

There are several lessons learned from this case. First of all, in case of the small villages issues being outside of the interest of big water service investors because there are not "rate of return" alternative initiatives are appropriate to consider.

Similar to other IWRM relevant cases, local and small scale solutions proved to be one of the best alternatives in this case.

Moreover, the small scale solutions might benefit from the incorporating integrated approaches of IWRM. As was shown in the case of Parakar village, there are possibilities to incorporate waste water service, improves condition of the irrigation system and reduced degradation of community farmlands as well as sanitation conditions in the village.

Community involvement is needed to make reasonable technical and financial plans. At the same time, there is a need to provide relevant information and even education programme about health and environmental concerns in advance; in order to develop responsive and responsible participation climate in the community.

5 Contacts and references

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