

# Initial Environmental Examination

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## ARM: Water Supply and Sanitation Sector Project – Improvement of Water and Sanitation Systems of Villages Odzun, Tsater And Deghdzavan

Prepared by Armenian Water and Sewerage Company for the Republic of Armenia and the Asian Development Bank.

**ASIAN DEVELOPMENT BANK FUNDED  
WATER SUPPLY AND SANITATION SECTOR PROJECT**

**WATER SUPPLY AND SANITATION SYSTEM IMPROVEMENT  
IN THE SETTLEMENTS OF THE REPUBLIC OF ARMENIA**

**INITIAL ENVIRONMENTAL EXAMINATION**

**IMPROVEMENT OF WATER AND SANITATION SYSTEMS OF VILLAGES  
ODZUN, TSATER AND DEGHDZAVAN**



## 1. Scope of work

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The goal of this sub-project is to rehabilitate water supply and wastewater systems of Tsater, Odzun and Deghdzavan and provide the population with sustainable water supply and safe drinking water.

For this purpose, the following is planned to be implemented:

### *v. Odzun*

- Disconnection of all connections from Lori-Berd water main,
- Construction of new water lines,
- Construction of water metering, valve nodes and inlet lines.

### *v. Tsater*

- Reconstruction of a segment of water main and construction of distribution chamber,
- Construction of new water lines in the distribution network,
- Construction of water metering nodes and inlet lines.

## 2. Description of the Present Water Supply Systems of the Residential Areas

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### Water supply system of village Odzun

#### *External system*

Presently water supply to the village is implemented through Lori-Berd and Agarak water mains by gravity.

The water mains Lori Berd and Agarak emerge from Lori Berd and Agarak spring intakes. Both water mains pass through the southern part of the village, at a certain distance from each other. The Lori-Berd water main passes at higher elevations of the village, and continues to town Alaverdi, while the Agarak water main ends up at the ending part of the village Odzun. Near the village Odzun the Lori-Berd water main branches into two Ø500(St) water mains, which are laid parallel to each other. One of these mains is disconnected at the branching point and also blanked off at the end of the village with the purpose of using that part of the main as a distributing pipeline for water supply distribution network of village Odzun. In recent years also Ø500(St) pipeline was constructed, through which water from Agarak water main is given to the above mentioned distributing pipeline. Actually, the village Odzun is fed from both Agarak and Lori-Berd water mains.

#### *Water supply distribution network*

The existing water supply distribution network of the village is mainly implemented from steel and polyethylene pipelines. From the funds of AWSC Ø50(PE) - Ø160(PE)mm polyethylene pipelines were constructed in recent years, with total length of about 6.7 km.

The diameters of the other water lines of the distribution network are not known, since they have been constructed mainly by the residents.

### **Water supply system of village Tsater**

#### *External system*

Water supply to this village too is implemented from the Lori-Bard and Agarak water mains by gravity. Water supply to Tsater is implemented through two main Ø100(St) pipelines. One of the pipelines, constructed earlier than the other one, is fed from the Agarak water main, through which water is supplied to the 80.0m<sup>3</sup> capacity circular storage reservoir of the village located at the 1220.0m absolute elevation. The second pipeline, which was constructed in the 1990s, is fed from the Lori-Bred water main and supplies water to the 200.0m<sup>3</sup> capacity rectangular storage reservoir located in the southern part of the village at 1245.0m absolute elevation. The village has two more supply pipelines; one of them is 1xØ150-Ø200 asbestos-cement pipeline and the second one is 1xØ50(St) steel pipeline.

#### *Water supply distribution network*

The existing water supply network of the village includes about 12.0km long 50-100mm pipelines (water main and distribution network). The network is implemented from steel and asbestos-cement pipes.

## **3. The Geographical Location and Climate of the Residential Areas**

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All of the residential areas covered by the project are located within the territory of the Lori Marz, on Lori plateau.

Stepanavan town is situated at the right and left banks of the Dzoraget River, in the north-western part of the Marz, at 157km distance from Yerevan. The northern peaks of the Bazum mountain range are spread in the south-west of the town and the Ledjan mountain slopes are located to the north-east of the town. The town is located at 1380-1530m altitudes and covers an area of 5311.6ha. The town is a resort zone thanks to favorable climatic conditions. There are many resort and health houses there.

Tashir is located at 174km distance from Yerevan. River Tashir, a tributary to Debed river flows through the town. The town is located at 1487-1530m altitudes. Here mainly agricultural activity is common.

Villages Metsavan and Sarchapet are located at 60-35km distance from Vanadzor – the marz center. The villages are located at 1550-1675m and 1680-1780m altitudes accordingly.

Village Odzun is located within the territory of the Lori Marz of the Republic of Armenia, at 8.0km south-west from town Alaverdi, on the left higher-located banl of Debed, surrounded with ridges covered by dense forests. The village is located at 1070 – 1175m altitudes.

Village Tsater is located within the territory of the Lori Marz of the Republic of Armenia, at 11.0km south from town Alaverdi, on the left higher-located banl of Debed, “buried” in orchards. The village is located at 1180 – 1250m altitudes.

The Lori marz involves the whole basin of river Debed and has mountainous relief. It is notable for its relatively wet climate. In mid and higher altitude zones the climate is temperate, with long and cold winters. There is a stable snow cover each year. Forests are warm, relatively humid.

The regions under study are characterized by dry continental climate.

Absolute maximum air temperature is +35°C in Stepanavan and +34°C in Tashir.

Absolute minimum air temperature is -31°C in Stepanavan and -34°C in Tashir.

Annual precipitation is 687-722mm.

South-eastern (in winter) and western (in summer) winds with are predominant in Stepanavan, once in 20 years winds with 41m/sec velocity are possible. Wind pressure – 55kg/m<sup>2</sup>. Snow cover pressure – 70kg/m<sup>2</sup>.

South-western (in winter) and northern (in summer) winds with are predominant in Tashir. Once in 20 years winds with 29m/sec velocity are possible. Wind pressure – 45kg/m<sup>2</sup>. Snow cover pressure – 70kg/m<sup>2</sup>.

Maximum soil frost depth is 71cm.

According to the data from the LSGBs total number of population as of 01/01/2010 in Stepanavan was 16600, in Tashir – 12300, in Metsavan – 7300 and in Sarchapet – 3150, in Odzun-5800, in Tsater - 443.

#### **4. Biodiversity and sensitive nature areas**

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From relief point of view the area is located in Lori plateau where the relief belongs to volcanic type and is a slit type mountainous relief.

From geomorphologic point of view it is located in Dzoraget and Tashir river basins (Debed basin).

From hydro-geological point of view the areas are included in the region of fracture waters of various eruptive rocks and are water abundant. Underground waters are related to both volcanic and alluvial rocks.

According to the published literature, underground waters are located at 10.0-15.0m depth, and groundwaters – at 3.0-8m depths that can generate significant flow.

Among dangerous physical-geological processes are extensive surface washing by surface waters, erosion volcanic weathering and destruction.

In the geological structure of the area the groups of volcanic rocks of Upper Eocene Oligocene age take part: andesite-basalts covered by layers of Quaternary age alluvial, eluvial, deluvial-proluvial, deluvial formations - clay, sand, fragmental soils.

According to the RA CC II-6.02.2006 the region and the area are included in the II (second) seismic zone, with 0.3g-0.4g background acceleration.

The areas under study are located within Lori floristic region that is notable for a series of peculiarities. First of all the plant community characteristic for the region is notable. At the same time, along with steppe, valley formations, tragacanth plants here also forests are represented with dominating *Quercus* and *Fagus*. There are also wild *Pyrus*, *Malus*, *Prunus*, as well as bushes of *Rosa* on cliffs. In the field of Lori there are crop plants and valley-steppe communities, in north-east – *Juniperus* forests. In the higher-mountainous zone there are sub-Alpine and Alpine valley communities. In general, there occur 6 endemic species in Lori floristic region, there are also around 50 rare and endangered species.

The area is notable for its rich and special biodiversity, high value of geological and landscape complexes and their separate components, unique natural and historical-cultural monuments, health and recreation resources.

“Gyulagarak” reserve is located within the marz area. The protection object of the reserve is relict *Pinus* forests covering 2586 ha areas. The reserve is located at 8km south-east from Stepanavan. Here is also “Sochut” (*Pinus* forest) arboretum located within Stepanavan’s administrative area. It was founded in 1933 and together with its flower beds covers an area of 35ha. With its diversity, beautiful alleys. flower beds it has become a very beautiful museum site and being located in a resort zone, it serves also as a resort place.

Among specially protected natural areas in Lori marz are also “Margahovit” (protection object – forest animals, area – 5000 ha) and “Mrtavardenu” (*Rhododendron*) (protection object – relict Caucasian *Rhododendron* - 10000 ha) reserves, which are at great enough distances from the planned activity site.

In the regions under study the animal species are diverse. Among mammals are wolf, fox, rabbit, jackal, hedgehog, squirrel, etc. Among birds are *Accipiter gentilis*, wild duck, *Perdix perdix*, *Alauda arvensis*, *Coturnix coturnix*, *Dendrocopos*, etc. Among reptiles are Caucasian grass snake. There are many insects here. In small lakes located on Lori plateau various fish species are bred.

These data were obtained as a result of interviews with the administration heads. The information was gathered on the basis of the following survey form.

**B1. Are any of the following areas located inside or around the village or project site?**

		Yes	No	Not identified
<b>B1.1</b>	National park, protected area designated by the government (coast line, wetlands, reserved area for ethnic or indigenous people, cultural heritage), and areas being considered for national parks or protected areas		2	
<b>B1.2</b>	Virgin forests, tropical forests		2	
<b>B1.3</b>	Ecological important habitat areas (coral reef, mangrove wetland, tidal flats)		2	
<b>B 1.4</b>	Habitat of valuable species protected by domestic laws or international treaties		2	
<b>B 1.5</b>	Likely salts cumulus or soil erosion areas on a massive scale		2	
<b>B 1.6</b>	Remarkable desertification trend areas		2	
<b>B 1.7</b>	Archaeological, historical or cultural valuable areas		2	
<b>B 1.8</b>	Living areas of ethnic, indigenous people or nomads who have a traditional lifestyle or special socially valuable areas		2	

**5. Environmental Impact**

The Initial environmental examination (IEE) identified that negative impact on landscapes, flora and fauna of the residential areas where improvement of water supply system will be done is not expected.

The detailed environmental examination is planned to be implemented in the course of the detailed design when all the construction or reconstruction sites will be approved.

Based on the detailed environmental examination, the sub component will be estimated by category and if needed, environmental management plan, as well as monitoring plan will be prepared.