

**Azervodokanal
Production Association**

**Calculation
of Operational and Financial Performance Indicators
for Azervodokanal Water and Sewerage Utilities**

**Indicative Survey
of Azervodokanal Water and Sewerage Utilities**

BAKU, 2003

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INTRODUCTION

This report has been prepared under a contract with the Organization for Economic Cooperation and Development (OECD) to assess the availability of water and sewerage services to the public, the economic and environmental aspects of water use, and the technical and financial condition of water and sewerage utilities in the Republic of Azerbaijan.

The summary analysis of the current state of municipal water and sewerage networks managed by Azervodokanal was performed by Izzet Amirkhan kyzy Soltanova and Rena Mamedali kyzy Agayeva, employees of the Economics Department, under the supervision of Elman Baba ogly Kuliev, First Deputy Director, and Saida Balaga kyzy Ragimova, Head of the Economics Department.

The indicative survey had the following objectives:

- collect and analyze information on the condition and operating results of water and sewerage utilities;
- select utilities that potentially qualify for subsequent financial assistance via reconstruction/development projects.

Information on utility condition and results of operations is presented in the form of standard indicators designed and commonly used by the World Bank.

The indicators were grouped as follows:

- technical and technological indicators;
- economic indicators;
- service quality indicators;
- indicators of service availability to consumers;
- environmental indicators.

The Azervodokanal Association comprises 51 towns in various regions of Azerbaijan, including:

1. Sirvan region: Agdas, Kurdamir, Agsu, Goycay, Mingacevir, Samaxi, Ucar, Saki, Zardab, Gobustan.
2. Mugan region: Astara, Bilasuvar, Ali Bayramli, Sabirabad, Saatli, Salyan, Lankaran, Lerik, Calilabad, Ismayilli, Neftcala.
3. Ganca-Basar region: Qazax, Goranboy, Canca, Tovuz, Xanlar, Samkir, Agstafa, Dali-Mamedli, Samux.
4. Karabakh region: Agcabadi, Barda, Yevlax, Naftalan, Terter, Goradiz, Imisli.
5. Northern region: Balakan, Quba, Qusal, Qabala, Qax, Zaqatala, Xacmaz, Qudat.
6. Eastern Region: Daskasan
7. Southern region: Yardimli, Khilli, Masalli, Oguz.

According to some estimates, the population of Azerbaijan over the last five years grew by more than one million people. This growth has been conditioned by the forced migration from Karabakh and the inflow of refugees from several neighboring CIS countries.

CONDITION OF WATER AND SEWERAGE SECTOR

Water distribution networks in Azerbaijan were laid 60-70 years ago and, unsurprisingly, tend to breakdown in the absence of adequate maintenance and repairs. Given the lack of funds for major renovation, only minor repairs are made at present. It is also worth mentioning that there have been virtually no investments in the sector over the last several years.

The available funds are predominantly used to finance emergency repairs that are becoming increasingly common due to the high incidence rate driven by engineering infrastructure and equipment obsolescence. Frequent breakdowns result in major water losses, which in turn increase the cost of services.

In flatland towns, where water supply requires little or no pumping, natural water flow reduces energy costs, thus minimizing total production costs.

In mountainous areas, energy costs are higher due to the extensive use of pumping equipment. The costs of drinking water production in highland towns are additionally driven up by low temperatures and inadequate or nearly completely decrepit pipeline coating.

In some other towns, such as Sabirabad and Ali Bayramli, water is purchased from neighboring localities, which also increases the costs of production.

Many industrial enterprises in Azerbaijan stand idle since 1996 (the aluminum plant, the glassworks, the textile plant, wineries, bakeries, the tire works etc.). The production slump drove industrial consumption of drinking water down to a mere 1%, with only a handful of active industrial consumers (the Lankaran and Xacmaz canning plants, the Samkir cognac distillery and others) that are operating at less than full capacity.

Power delivery in Azerbaijan decreased by 33% since 1993. Frequent pump breakdowns triggered by low voltage reduce the volumes of water delivered to consumers.

OPERATIONAL AND FINANCIAL PERFORMANCE INDICATORS

A. Service coverage

1. Water coverage

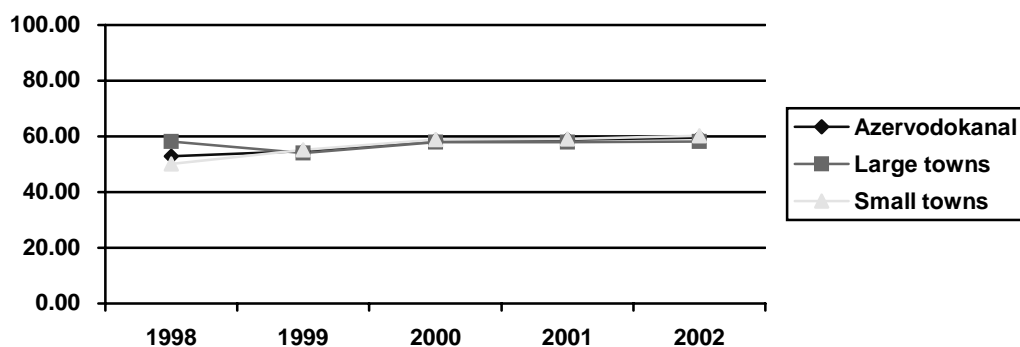
Azerbaijan has a population of slightly above eight million, of which 51% (4,075,700 persons) live in urban communities.

Azervodokanal serves only urban communities. In rural areas (Kedabek, Lerik, Astara, Lankaran, Samkir, Agstafa, Qudat etc.), where residents use water wells, there is no market for the Company's services.

Overall service coverage does not exceed 60%, but has demonstrated steady growth over the last several years.

Table 1. Water coverage

Year	Azervodokanal	Large towns	Small towns
1998	52.91%	58.10%	50.20%
1999	54.74%	54.06%	55.11%
2000	58.53%	57.98%	58.84%
2001	58.77%	58.04%	59.17%
2002	59.48%	58.17%	60.21%

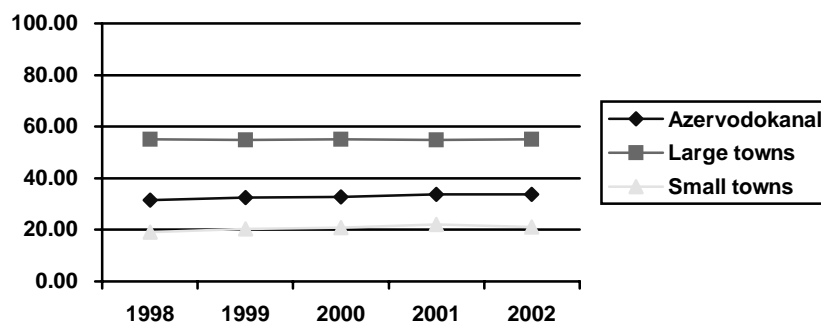


2. Sewerage coverage

Of the 51 towns covered by Azervodokanal, only 23 have sewers. Current sewerage coverage is 31-33%.

Table 2. Sewerage coverage

Year	Azervodokanal	Large towns	Small towns
1998	31.63%	55.11%	19.18%
1999	32.51%	54.74%	20.44%
2000	32.72%	55.15%	20.82%
2001	33.82%	54.93%	22.11%
2002	33.70%	55.19%	20.99%



B. Drinking water production and consumption

3. Water production

Water production reduced considerably over the last several years, primarily due to the drop in industrial activity and the use of own wells by commercial entities.

The drop in water production in 2002 was also a result of heavy rains and storms in 2001. Excess rainfall in Sabirabad, Ali Bayramli, Salyan and Neftcala raised the water level in the Kura River, flooding the pump stations in Ali Bayramli, while in other towns pumps installed on floating pontoons were swept away by torrents. The dirt and litter from the streets washed away by rains clogged the sewers, resulting in partial flooding of communities. Storms tore down power lines feeding pump stations, knocking out water distribution networks and pumps.

Table 3. Water production (daily liters per person)

Year	Azervodokanal	Large towns	Small towns
1998	230.51	307.39	183.34
1999	229.87	421.64	167.42
2000	229.54	433.29	118.99
2001	216.72	427.10	129.93
2002	226.01	291.29	191.26

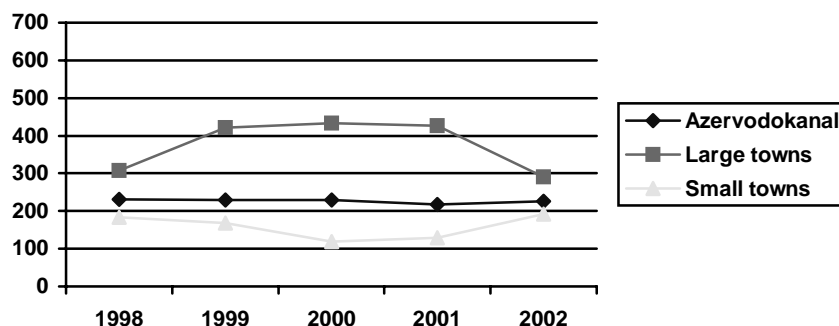


Table 4. Water production (monthly cubic meters per connection)

Year	Azervodokanal	Large towns	Small towns
1998	7.01	9.35	5.58
1999	6.91	10.74	4.63
2000	6.98	13.18	3.62
2001	6.59	10.82	4.31
2002	6.87	8.86	5.82

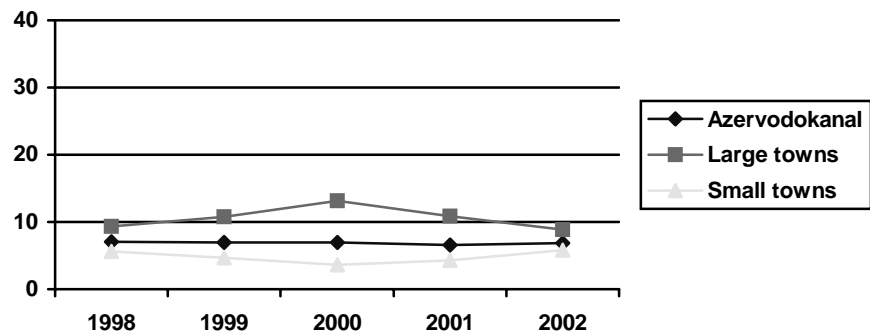


Table 5. Water production (monthly cubic meters per household)

Year	Azervodokanal	Large towns	Small towns
1998	16.5	20.9	13.7
1999	22.1	34.7	15.9
2000	24.2	38.4	16.3
2001	24.4	41.5	14.5
2002	20.6	33.7	15.0

4. Water consumption

The pattern of changes in water consumption over the five years from 1998 to 2002 does not match the dynamics of water production because of the growth in population due to the influx of forced migrants and refugees. In 1998 refugees predominantly settled in large towns, with water production increasing from 9.35 cubic meters to 13.18 cubic meters in 2000. Subsequently, when special settlements for refugees were built in small towns, water production in large cities declined against an increase in small cities.

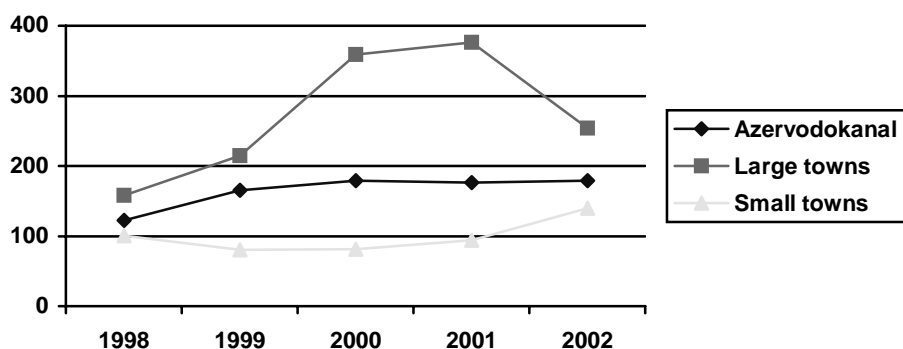
By 2002, daily water consumption per person increased in both large and small towns.

In small communities, daily consumption per person is much lower than in larger towns, consistent with the generally inferior living standards.

In buildings with all modern amenities (hot and cold tap water, central heating, showers, water heaters, baths, sewerage), the statutory daily consumption standard is 250-300 liters per person, while in houses with no sewerage the standard is 150-180 liters. 70% of residential buildings are connected to centralized sewerage networks. 30% have no sewerage service, and wastewater is discharged directly into rivers or fields.

Table 5. Water consumption (daily liters per person)

Year	Azervodokanal	Large towns	Small towns
1998	122.23	157.74	100.44
1999	165.38	214.28	79.92
2000	178.79	358.68	81.18
2001	176.51	375.85	94.28
2002	179.06	253.60	139.39



C. Unaccounted-for water

5. Unaccounted-for water

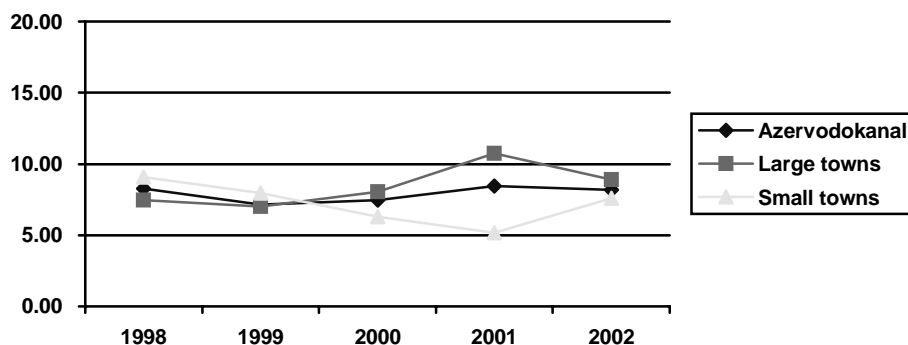
Water losses across the association total 8% against 10% reported by some utilities in Azerbaijan.

Water distribution networks are more than 50 years old, with 60% rendered inoperable by the lack of adequate maintenance. Repairs cover only minor sections of the system. In recent years, approximately 17-20% of facilities were repaired using budget financing.

Water meters are not currently used in Azerbaijan.

Table 6. Unaccounted-for water

Year	Azervodokanal	Large towns	Small towns
1998	8.25%	7.45%	9.08%
1999	7.14%	7.03%	7.94%
2000	7.45%	8.03%	6.29%
2001	8.46%	10.76%	5.15%
2002	8.18%	8.89%	7.59%



D. Water and sewerage network operational indicators

6. Pipe breaks

All utilities, except those in small communities, report increased annual breaks per km, evidence of an extremely poor network condition.

The main drivers are wear and tear, natural calamities and lack of funds. As indicated above, average depreciation of engineering infrastructure stands at 15-20%, reaching up to 60-70% in areas affected by natural disasters.

Table 7. Pipe breaks (annual breaks per km)

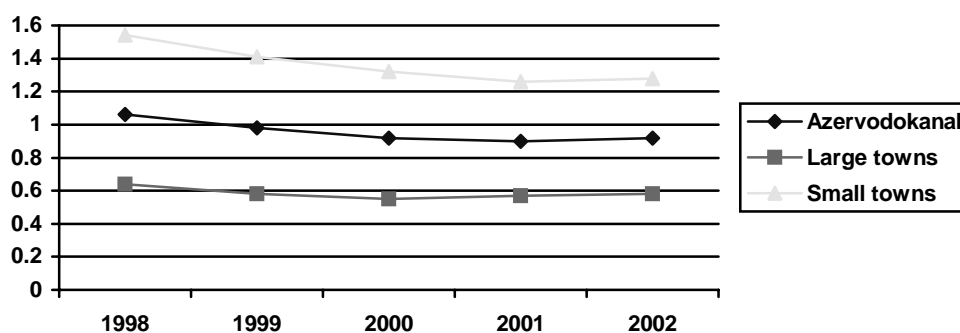
Year	Azervodokanal	Large towns	Small towns
1998	0.72	1.18	0.58
1999	0.79	0.98	0.69
2000	0.83	0.74	0.85
2001	1.13	1.68	0.67
2002	0.85	1.70	0.62

7. Sewerage blockages

As shown in the table and the chart, the number of blockages in recent years has declined. Utilities clean sewers by blockage piercing or flushing using water trucks and high-pressure pumps or compressors. However, these efforts are insufficient given the careless practices of residents that result in recurrent blockages. Utilities carry out public awareness programs, but so far the problem has not been fully addressed.

Table 8. Sewerage blockages (annual blockages per km)

Year	Azervodokanal	Large towns	Small towns
1998	1.06	0.64	1.54
1999	0.98	0.58	1.41
2000	0.92	0.55	1.32
2001	0.90	0.57	1.26
2002	0.92	0.58	1.28



E. Costs and staffing

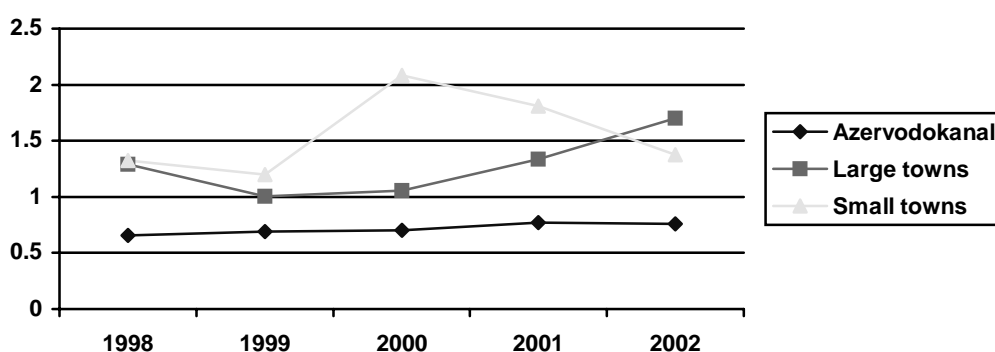
8. Unit operational cost

Production costs grew by 16% due to high electricity and overhaul expenses, complemented by a major increase in prices for spare parts, fuel and lubricants, and construction materials.

In 2002 electricity costs reduced by 15% against 1998-1999, partially neutralizing price growth.

Table 9. Unit operational cost (US\$ per cubic meter of produced water)

Year	Azervodokanal	Large towns	Small towns
1998	0.654	1.289	1.326
1999	0.691	1.002	1.197
2000	0.701	1.055	2.085
2001	0.769	1.336	1.812
2002	0.761	1.699	1.377

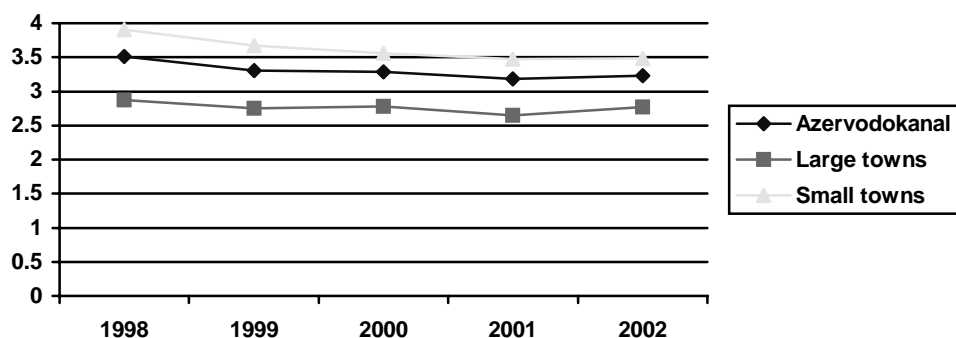


9. Staffing

The number of utility staff is consistent with staff listing. However, utilities' performance is adversely affected by the fact that no re-training courses have been offered in Azerbaijan since 1996, and by the low automation of utility operations. Higher staffing levels in small communities compared to larger towns can probably be attributed to the geographical peculiarities of the country, among other factors.

Table 11. Staff per thousand water and sewerage service populations

Year	Azervodokanal	Large towns	Small towns
1998	3.5	2.9	3.9
1999	3.3	2.8	3.8
2000	3.3	2.8	3.6
2001	3.2	2.6	3.5
2002	3.2	2.8	3.5



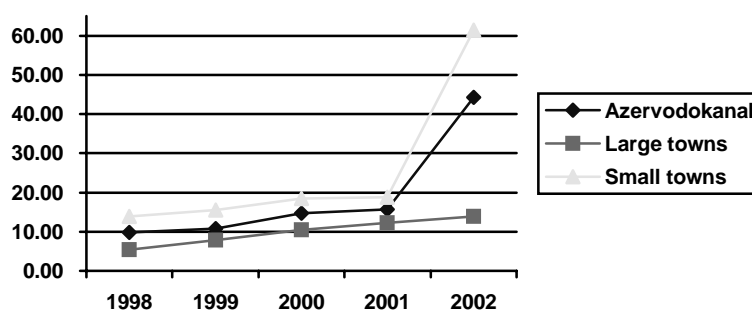
10. Labor costs as a proportion of operational costs

In 1998, labor costs totaled 9.84% due to inflation. The ratio of inflation to labor costs is 2.5%.

The minimum statutory wage in Azerbaijan changed several times over the surveyed period. This factor has also affected labor costs.

Table 12. Labor costs as a proportion of operational costs

Year	Azervodokanal %	Large towns %	Small towns %
1998	9.8	5.4	13.8
1999	10.6	7.9	15.5
2000	14.5	10.5	18.5
2001	15.6	12.2	18.8
2002	44.3	13.9	61.4



E. Service quality

11. Uninterrupted daily service

Average daily service among the surveyed utilities totals 8 hours, primarily due to the irregular power supply schedule. Lack of funds precludes utilities from using additional power generators.

Table 13. Uninterrupted daily service (hours per day)

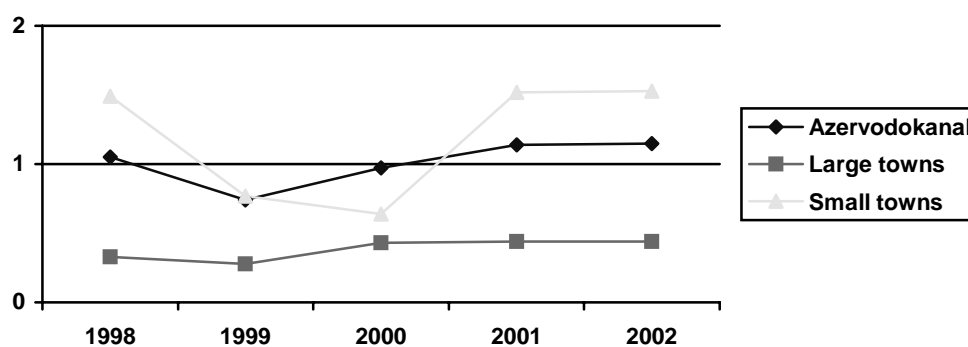
Year	Azervodokanal	Large towns	Small towns
1998	8	8	8
1999	8	8	8
2000	8	8	8
2001	8	8	8
2002	8	8	8

12. Number of water and sewerage service complaints

The number of complaints continues to increase. Many complaints refer to insufficient service hours. Another common complaint is the low quality of drinking water, resulting from the absence of water treatment facilities in many towns.

Table 14. Number of water and sewerage service complaints (%)

Year	Azervodokanal	Large towns	Small towns
1998	1.05%	0.33%	1.49%
1999	0.74%	0.28%	0.77%
2000	0.97%	0.43%	0.64%
2001	1.14%	0.44%	1.52%
2002	1.15%	0.44%	1.53%



13. Wastewater treatment

85% of Azervodokanal utilities have no sewerage networks, while most of the existing ones are virtually inoperative. As a result, wastewater is discharged into rivers and sewage ponds without any pre-treatment.

The existing standards provide for mechanical and biological purification to reduce contamination levels. However, the condition of facilities does not enable full wastewater treatment, which currently stands at 40%, or less than half of statutory requirements.

Routine repairs and maintenance are performed by local utilities using own resources. Repair funds cover a mere 9-11 % of total requirements.

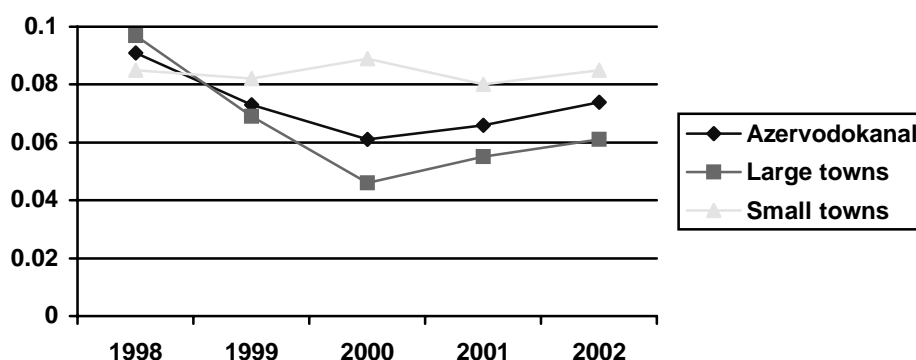
G. Billing and collection

14. Average tariff

On average, there have been no major tariff increases among Azervodokanal utilities because of the low paying capacity of consumers. Tariffs do not provide full cost recovery or funds for business development. Tariffs for water and sewerage services differ depending on utility location and production costs.

Table 15. Average tariff (US\$ per cubic meter p.a.)

Year	Azervodokanal \$	Large towns \$	Small towns \$
1998	0.091	0.097	0.085
1999	0.073	0.069	0.082
2000	0.061	0.046	0.089
2001	0.066	0.055	0.080
2002	0.074	0.061	0.085



15. Water charges as a proportion of per capita income

Utility charges total 2.8% of per capita income.

Given the social situation in the country, average residential water charges are below cost. The difference between production costs and average charges is covered by other consumer groups (commercial entities and industrial enterprises). In the context of average per capita income (minimum wage is US\$ 24.3), residential charges are affordable. In the future, it is planned to raise average tariffs above water costs.

16. Fixed monthly charge

Azervodokanal charges a fixed monthly fee, payable per water bills.

Fixed charges for all consumer groups total a mere 45-55% and do not cover production costs. Collected funds are first and foremost used to pay utility staff, all social expenses and travel expenses.

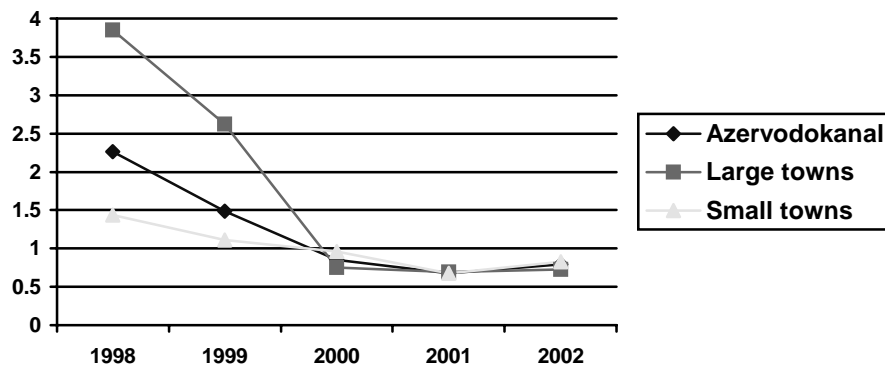
17. Ratio of industrial to residential revenues

The ratio of industrial to residential revenues is 71%.

According to the development program for 2004-2007 adopted by the Government of Azerbaijan, a number of plants are to be put in operation in the next several years, including the Ganca Machine-Building Plant, the Shekin Silk Farming Factory, the Mingacevir Textile Plant, the Rubber Plant, the Mingacevir Electrical Equipment Plant etc. This will increase industrial revenues considerably.

Table 16. Ratio of industrial to residential revenues

Year	Azervodokanal	Large towns	Small towns
1998	2.26	3.85	1.44
1999	1.49	2.62	1.11
2000	0.85	0.75	0.96
2001	0.68	0.69	0.68
2002	0.79	0.73	0.83



18. Connection charge

Given regional specifics, Azervodokanal utilities do not use single-rate tariffs, and connection charges are shown separately.

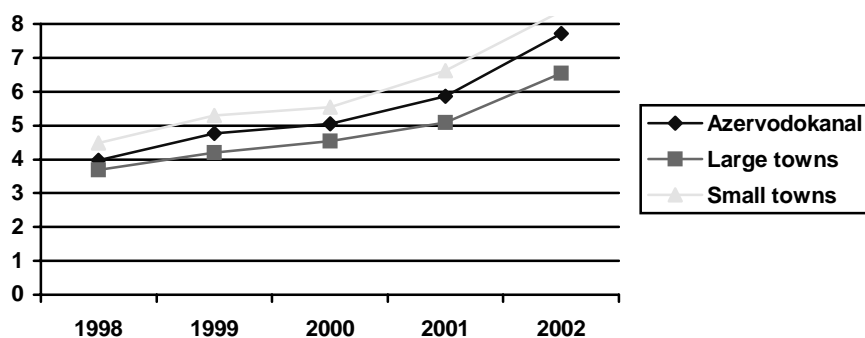
19. Collection

On average, collection across the surveyed utilities has somewhat improved, owing to utility subsidies paid to refugees and the large number of individuals engaged in the commercial sector.

The population's focus on commerce helped increase collection by 5.8%. Such a modest figure can be attributed to the fact that many commercial entities use well and spring water that bypasses Azervodokanal's treatment facilities. Collection is the responsibility of customer departments of utilities. The ratio of collection to outstanding invoices is 55%.

Table 17. Collection (months)

Year	Azervodokanal	Large towns	Small towns
1998	3.97	3.68	4.49
1999	4.76	4.19	5.29
2000	5.05	4.53	5.55
2001	5.87	5.08	6.61
2002	7.72	6.55	8.37



H. Financial indicators

20. Working ratio

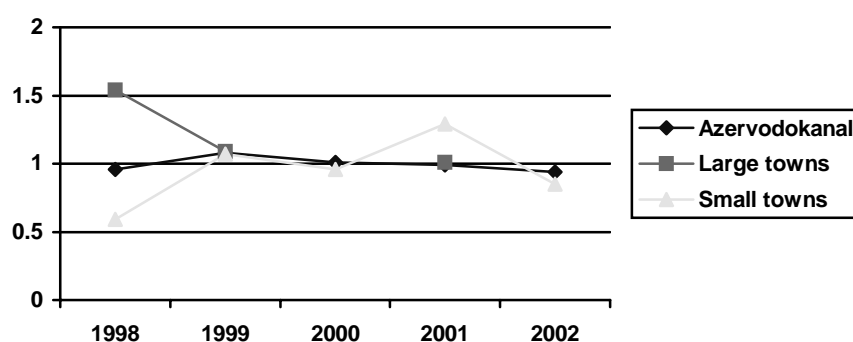
On average, the working ratio across the utilities is uneven. In large towns costs exceed revenues, which is an alarming trend implying potential bankruptcies.

The assets to liabilities ratio is 90.6 %.

Azervodokanal's accounts receivable exceed accounts payable. Accounts receivable primarily include amounts due from residents and out-of-operation industrial consumers. These irrecoverable debts are to be extinguished by the Government before 2008.

Table18. Working ratio

Year	Azervodokanal	Large towns	Small towns
1998	0.96	1.54	0.59
1999	1.08	1.09	1.07
2000	1.01	1.04	0.96
2001	0.99	1.03	1.29
2002	0.94	1.01	0.85



I. Capital investments

21. Fixed assets per capita

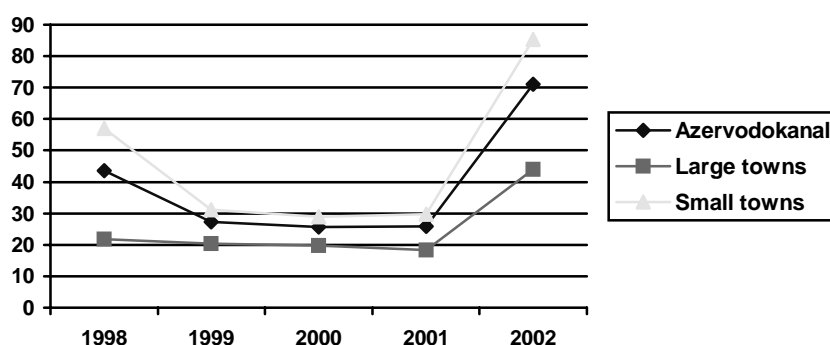
In the period from 1998 to 2001, the value of fixed assets per capita reduced owing to depreciation of fixed assets. However, in 2002 this indicator dramatically increased. The increase is due to several natural disasters that took place in Azerbaijan in that year, following which the Government provided funds to finance the replacement of fixed assets.

Prior to 2002, Sabirabad and Ali Bayramli purchased water from the *Group Water Supply System (GWSS)*. In 2002, GWSS merged with the water utilities of Sabirabad and Ali Bayramli. As part of the merger, the two utilities took over all fixed assets of GWSS. The resulting increase can be clearly seen in the table and the chart below.

Many towns (Khanlar, Beylagan, Agcabedi, Samkir etc.) expect to launch construction and renovation of sewers in the period before 2008, as provided for in the budget, and plan to expand their water infrastructure. Given this, the value of fixed assets may potentially increase by 40%.

Table 19. Fixed assets per capita (US\$)

Year	Azervodokanal	Large towns	Small towns
1998	43.57	21.74	56.96
1999	27.29	20.31	31.08
2000	25.71	19.68	28.99
2001	25.78	18.29	29.83
2002	70.97	43.89	85.38



Energy costs

Average energy costs per cubic meter of produced water across the surveyed utilities totaled 0.20-0.24 kWh, while in small towns the figure increased from 0.12 to 0.20 kWh per cubic meter. Irregular power supply damages equipment, which cash-strapped utilities replace with cheaper and less efficient machinery.

Utility energy costs also depend on location.

Table 20. Energy costs per cubic meter of produced water (kWh)

Year	Azervodokanal	Large towns	Small towns
1998	0.196	0.069	0.122
1999	0.402	0.252	0.619
2000	0.422	0.239	0.607
2001	0.337	0.252	0.459
2002	0.241	0.293	0.199

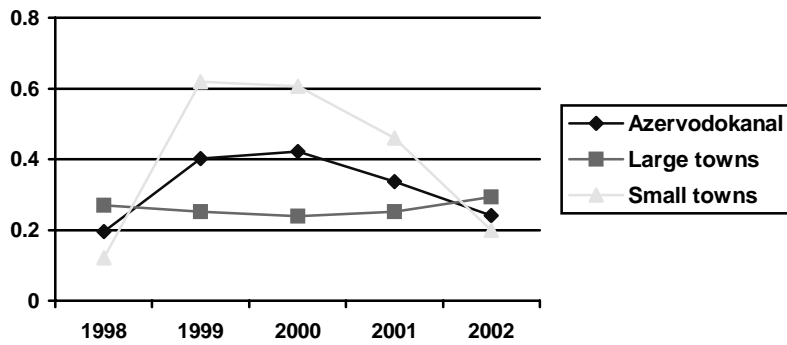
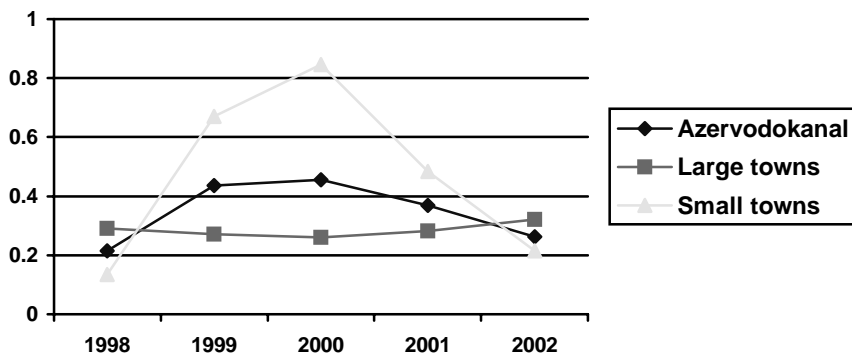


Table 21. Energy costs per cubic meter of wastewater (kWh)

Year	Azervodokanal	Large towns	Small towns
1998	0.214	0.291	0.135
1999	0.435	0.271	0.671
2000	0.456	0.260	0.845
2001	0.368	0.283	0.484
2002	0.263	0.322	0.215



Environmental activities

To improve the situation, major renovation, reconstruction and expansion of wastewater treatment facilities are required. Several communities need new treatment plants capable of processing water to modern (i.e. European) standards.

Lower water intake may be achieved through the introduction of circulation water systems at industrial enterprises that will reduce wastewater discharge and enhance quality. At present, industrial producers reuse a mere 1% of water. In the event of operation at full capacity in the future, reuse may reach 60-70%.

CONCLUSIONS

1. Azervodokanal's nation-wide water and sewerage coverage is low as the association's services are available to a mere 19.5% of total population of Azerbaijan.
2. Service quality has been declining, driven down by high network breakdown incidence and deteriorating facilities.
3. The primary cause of the deteriorating technical condition of the water and sewerage networks and facilities operated by utilities is their poor financial condition.
4. Utilities lack extensive water meter installation programs, one of the reasons behind increased water consumption and wastewater volumes.
5. The non-payments problem erodes the operating and financial results of water and sewerage utilities. The management of water utilities ought to step up efforts to enhance collection.
6. Given the current economic growth in Azerbaijan and a greater focus on water supply and environmental protection issues, the situation in the water and sewerage sector in the country may be expected to improve.