

Performance Indicators Information System

PIIS

Annual Report 2006

**Ministry of Water and Environment (MWE)
PIIS Unit**

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1. Foreword

The Ministry of Water and Environment (MWE) was established in 2003 and within the framework of the water sector reform it was determined that one of Sanitation Sector the MWE main tasks is monitoring and evaluation of the Urban Water Supply and Sanitation sector. The MWE in cooperation with the Technical Secretariat For Reform of the Institutional Framework in the Urban Water and supported by GTZ Water Program developed with the Local Corporations, Autonomous Urban Water Supply and Sanitation Utilities and National Water and Sanitation Authority the computerized 'Performance Indicator Information System' (PIIS). This system is the based on the guidelines of 'Performance Indicators for Water Supply Services' of the International Water Association (IWA). The PIIS is designed to support the management of utilities and serve the monitoring needs on the national level in the decentralised environment of the sector. After implementation, MWE emphasised on capacity building to operate and use the system for monitoring purposes on the local and national level. The MWE established a PIIS Unit to collect and to analyse the data of the Urban Water Supply and Sanitation utilities and report it back to the sector stakeholder, utilities and development agencies. At present, 20 urban water utilities have the system locally installed and for 23 utilities operational, financial and technical data are sent to the PIIS unit of the MWE on a monthly base. The PIIS data covers a huge proportion of the urban utilities and allows a meaningful analysis of the performance of the urban sub-sector.

The MWE selected 17 key indicators to assess the performance of the urban utilities. The indicators cover 7 categories namely personnel, technical/operation, finance, billing and customer relations, consumption and coverage. The year 2006 annual PIIS report document the performance, analyses and compares it with regard to the other utilities. Good and bad performers are highlighted to enhance competition among the utilities. The results will be partially used for strategic investment planning and sector development. To increase the competition and comparability of the utilities, the annual report (2007) will be used as baseline for the benchmarking exercise for the urban sub-sector. The benchmarking process was initiated to achieve the goals of the National Water Sector Strategy and Investment Program (NWSSIP). Eleven benchmarks were selected which cover various performance areas. Individual benchmarks were identified for the period 2008 until 2014 and will come into effect with a Ministerial Decree on Urban Water Supply and Sanitation benchmarks. After the baseline year of 2007, good performers will be rewarded and bad performers penalised.

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Minister of Water and Environment

2. Introduction

In 2003, the Performance Indicator Information System (PIIS) was established to monitor and to evaluate the performance of the urban water sub-sector at the local and national level in collaboration with the Ministry of Water and Environment (MWE), the Technical Secretariat (TS/GTZ), the Local Corporations, Autonomous Urban Water Supply and Sanitation Utilities (AUWSSU) and National Water and Sanitation Authority (NWSA). Its development is part of water sector reform process. The PIIS was installed at the MWE, Local Corporations and some AUWSSUs as well as at NWSA. The PIIS is a computer software system that is based on 92 basic data that are either automatically extracted from the accounting and billing software or manually entered. The basic data can be converted to 69 performance indicators via simple calculations, which are based on the performance indicator system of the International Water Association (IWA).

The initial test version of the system software was issued and installed at Rada'a Branch in mid 2004. During the test period, the system was improved according to the needs of the urban water sector utilities by integrating additional basic data and indicators. The system was then installed during the second quarter of 2005 in 9 Local Corporations and 14 autonomous branches. A number of short-term trainings, including refreshing courses and workshops have been organized and more than 60 persons have benefited from the training program such as employees of the MWE, different LCs, AUWSSUs and NWSA. Further improvements of the PIIS took place in the beginning of 2006. The feed back of several meetings and workshops was used to achieve a better understanding of the system by the operators and the managerial positions in the related sector agencies and utilities. Nevertheless, the understanding and analysis of the performance indicators will need further investigations in the coming years on the national and local level.

The national level produces quarterly and annual reports to mirror the urban sub-sector performance for the stakeholders and interested audience. The MWE is in the process of establishing a benchmarking system for the urban sub-sector to increase the competition and comparability of the sub-sector utilities. This will aim at increased transparency and performance of utilities. So far, the last year's figures and the comparison of utilities with PIIS are used as a yardstick vehicle to measure and to state the performance of the urban sub-sector.

3. Utilities Using the PIIS

The graph below shows an overview of the urban water utilities. The utilities marked in orange have a PIIS installed. A total of 10 Local Corporations and 13 autonomous branches (either supervised by LCs or NWSA) are using the PIIS at the local level to monitor and to evaluate their utility performance.

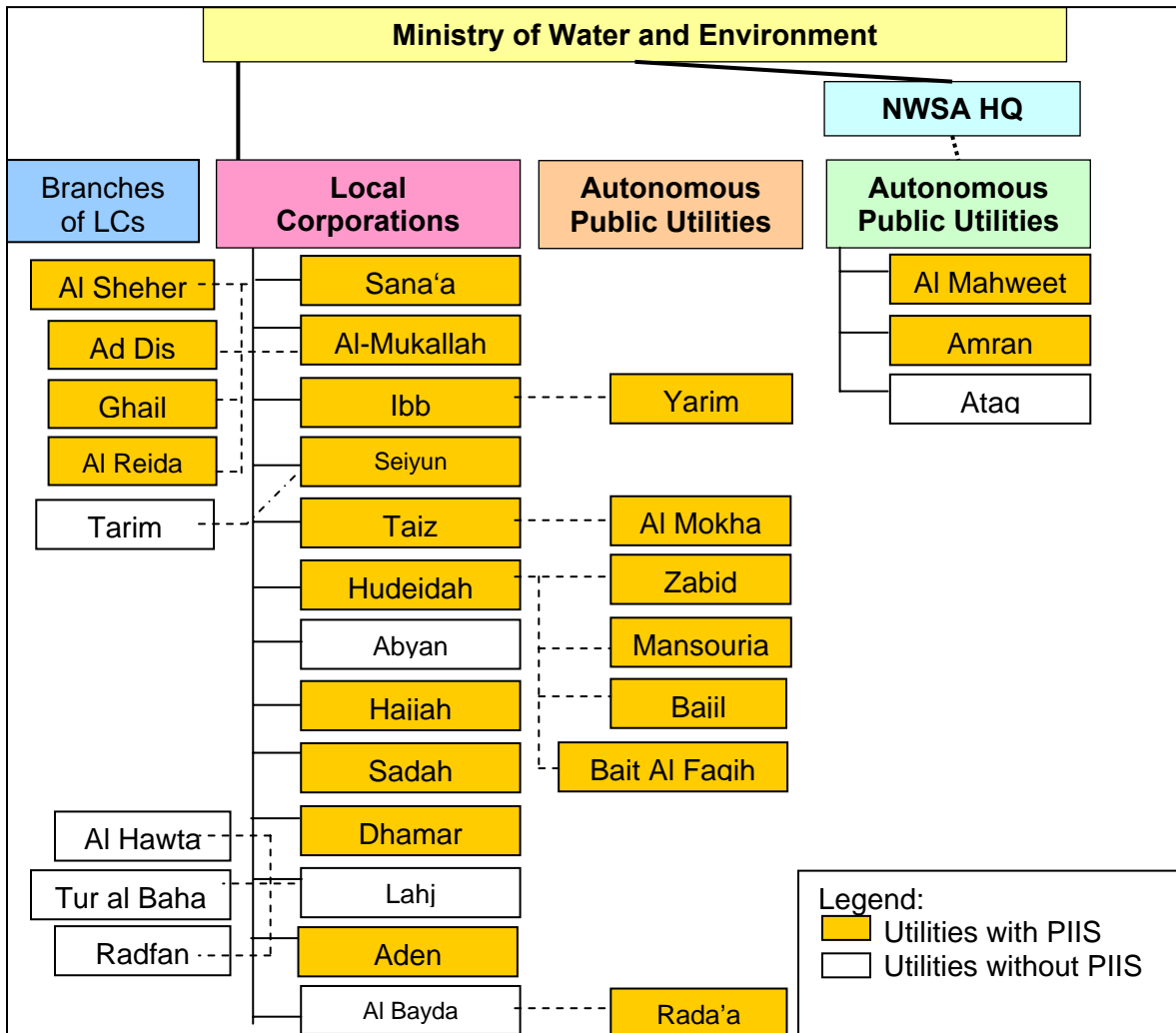


Figure 1: Overview Urban Water Utilities (with PIIS)

4. Submission and Quality of Data

Each utility with a PIIS sends all basic data to the PIIS unit in the Planning Department of the MWE on the 10th of each month. However, most utilities do not fully satisfy the reporting requirements in terms of lack in timely data submission and good data quality. To improve submission and quality of the data, the MWE/PIIS unit does a monthly data completeness and quality check and compiles the results in a monthly report. Those are reported to the utilities. The enhanced communication and follow up from the MWE is needed to improve the data availability and understanding of data on the local level.

Reasons for late and incomplete data submissions are malfunctioning systems due to inappropriate maintenance, shifting of trained personnel to other functions, manual data entry and late closing of accounts. Weak data quality can also mirror insufficient understanding of performance indicators on the local level.

5. Appraisal of the Performance Indicators

The MWE selected following performance indicators to assess the performance of the urban utilities for the year 2006. The results are used as part for strategic investment planning and sector development for the next year. Since so far no benchmarks were fixed for selected performance indicators, the evaluation will concentrate on the comparison of utilities. In the following table, all chosen key indicators are shown.

| Category | No. | Performance Indicator | Unit |
|-------------------------|-------------|---|------|
| Personnel | A.1.2 | Total number of staff per 1000 water and sanitation connections | No |
| | A.2.2 | Training expenses per total personnel costs | % |
| Technical/ Operation | B.1 | Non-revenue water | % |
| | C.1 | Bacteriological quality of water distributed: Number of residual chlorine samples according to standards per total number of samples taken | % |
| | C.2 | Effluent quality of wastewater treatment plants: Number of BOD-samples according to standards per total number of samples taken | % |
| | D.2 | Continuity of water supply services: A: 12-24 hr/d; B:6-12 hr/d; C: 1-6 hr/d; D: at least once a week; E: less than once a week | - |
| Finance | E.1.1 | Total actual cost coverage | |
| | E.2.1 | Operational actual cost coverage | % |
| Billing & Customer | F.1 | Collection efficiency | % |
| | F.2 | Amounts receivable expressed as debt period | days |
| | F.3 + F4 | Water expenses for first 5 m3 per household income for the poor/ Expenses for sewerage per poor household income using up to 5m3 | % |
| Consumption | G.1 | Average total water consumption | lpcd |
| | G.2 | Average domestic water consumption | lpcd |
| Coverage | H.2 | Water supply services coverage | % |
| | H.3 | Sewerage services coverage | % |
| | H.4 | Population served with water supply services | No |
| | H.5 | Population served with Sewerage services | No |

Within the following chapters, all key indicators will be analyzed in detail. PIIS values for all four quarters will be shown as well as the average values for the year 2006. 'v.m.' indicates that this value is missing. Definitions of performance indicator calculations are found in Annex 1 and basic data in Annex 2. The 'national average' shown at the end of each table is calculated as a simple average of all values. Comments will be given on the completeness and quality of each indicator, which will be followed by a short analysis.

5.1 A.1.2 – Total number of staff per 1,000 water & sewerage connections

Definition: Number of total staff per 1,000 water and sewerage connections at the end of the selected period, [No.]

Calculation: $((\text{PAY1}) + [\text{PAY51}]) / (([\text{BIL2}] + [\text{BIL3}]) / 1,000)$

The number of staff per 1,000 water and sewerage connections reflects the efficiency of the utility. The figures are indicating the 'Total number of permanent and contracted staff' (PAY1) plus the 'Total number of daily staff' (PAY51) for all utilities.

Table No. (1): Number of staff per 1,000 water and sewerage connections. – A.1.2, 2006, [No.]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006-Q4 | 2006 |
|-------------------------|---------------|-----------|-------------|-------------|-------------|-------------|-------------|
| LCADN | Aden | PI | 10.5 | 10.4 | 10.3 | 10.2 | 10.4 |
| UTDES | Ad Dis | PI | 14.0 | 14.1 | 14.0 | 14.1 | 14.1 |
| UTSHR | Al Hami | PI | 11.4 | 11.6 | 11.2 | 11.4 | 11.4 |
| UTMAH | Al Mahweet | PI | 14.1 | 14.7 | 14.6 | 14.4 | 14.4 |
| UTMOK | Al Mokha | PI | 13.1 | 13.6 | 13.4 | 13.2 | 13.2 |
| UTRED | Al Reida | PI | 14.5 | 14.1 | 14.4 | 14.2 | 14.5 |
| UTAMR | Amran | PI | 10.1 | 10.2 | 7.5 | 7.4 | 8.8 |
| UTBAJ | Bajil | PI | 6.9 | 6.6 | 6.4 | 6.4 | 6.6 |
| UTBAF | Bayt Al Faqih | PI | 6.2 | 6.2 | 7 | 6.9 | 6.6 |
| UTDMR | Dhamar | PI | 9.3 | 9.8 | 9.8 | v.m. | v.m. |
| UTGHL | Ghail | PI | 15.8 | 15.8 | 15.9 | 15.9 | 15.9 |
| LCHAJ | Hajjah | PI | 14.7 | 14.6 | 13.7 | 13.8 | 14.2 |
| LCHOD | Hudeidah | PI | 5.9 | 5.8 | 6.1 | 6.1 | 6.1 |
| LCIBB | Ibb | PI | 6.1 | 5.9 | 6.3 | 6.3 | 6.15 |
| UTMAN | Mansouria | PI | 9.9 | 9.7 | 9.6 | 9.5 | 9.7 |
| LCMUK | Mukallah | PI | 10.4 | 9.9 | 10.1 | 10.3 | 10.2 |
| LCBYD | Radaa | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTSAD | Sadah | PI | 14.5 | 18.5 | 19.6 | 18.9 | 17.9 |
| LCSAN | Sanaa | PI | 7.6 | 7.5 | 7.6 | 7.6 | 7.6 |
| LCSYN | Seiyun | PI | 13.9 | 13.8 | 13.7 | 13.5 | 13.7 |
| LCTAZ | Taiz | PI | 7.6 | 6.9 | 7.4 | v.m. | v.m. |
| UTYAR | Yarim | PI | 6.4 | 7.6 | 7.4 | 6.2 | 6.9 |
| UTZAB | Zabid | PI | 5.9 | 5.8 | 5.6 | v.m. | v.m. |
| National average | | PI | 10.4 | 10.6 | 10.5 | 10.9 | 10.6 |

The data completeness of indicator A.1.2 is good. Only the values for Rada'a are missing. For Dhamar, Taiz and Zabid the values of the 4th quarter are missing. Most values also seem to be reasonable. Irregularities of the values can be observed in Amran, Sadah and Yarim (shaded in yellow).

The values of Table No. (1) show that most utilities are suffering from overstaffing. Amran and Sadah are the only two utilities, which reduced staff per connections since last year. Mahweet increased their staff per connection on more than 1. Best performers are the Hudeidah and Yarim. Bad performances are Ghail (Ba Wazir) and Sadah.

5.2 A.2.2 – Training expenses per personnel costs

Definition: Training expenses as a percentage of the total personnel costs over the selected time period, [%]

Calculation: (ACC5 / ACC25) * 100

Table No. (2): Training expenses/ personnel costs – A.2.2, 2006, [%]

| Abbr. | Location | PI | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|----------|-----------|-------------|-------------|------------|------------|------------|
| LCMUK | Mukallah | PI | v.m. | 0.2 | v.m. | v.m. | v.m. |
| LCSAN | Sanaa | PI | 0.3 | 1.3 | 1.2 | 0.3 | 0.8 |
| UTYAR | Yarim | PI | 4.2 | v.m. | v.m. | v.m. | v.m. |
| National Average | | PI | 2.25 | 0.75 | 1.2 | 0.3 | 0.8 |

A.2.2 is missing for most LCs and branches. MWE considers the missing data as result of the poor attention that is given to capacity and human resource development (HRD). Only few utilities consider strengthening of knowledge and performance as an important issue. According to recommendations that were given during a sector workshop, values of A.2.2 should be in the range from 0-5%. Further analysis is missing due to lack of data.

5.3 B.1 – Non-Revenue Water (NRW)

Definition: Total water produced minus total water billed as a percentage of total water produced over the selected time period, [%]

Calculation: $((BIL6-BIL7) / BIL6) * 100$

This indicator reflects un-accounted for water according to the definition of the International Water Association (IWA), expressed as a ratio of water lost (difference of total water produced (BIL6) and water billed (BIL7), including the administration losses) per total water produced (BIL6). The table below shows the data reported by the different LCs and branches for this indicator.

Table No. (3): Non-revenue water (NRW) – B.1, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006-Q4 | 2006 |
|--------------|-----------------|-----------|-------------|-------------|-------------|-------------|-------------|
| LCADN | Aden | PI | 34.1 | 34.5 | 32.4 | 29.4 | 32.6 |
| UTDES | Ad Dis | PI | 21.9 | 11.2 | 12.9 | 16.9 | 15.7 |
| UTSHR | Al Hami | PI | 21.0 | 18.4 | 22.1 | 23.1 | 21.2 |
| UTMAH | Al Mahweet | PI | 26.5 | 26.1 | 23.5 | 22.4 | 24.6 |
| UTMOK | Al Mokha | PI | 28.9 | 23.9 | 19.3 | 23.9 | 23.9 |
| UTRED | Al Reida | PI | 53.5 | 51.4 | 52.3 | 51.0 | 52 |
| UTAMR | Amran | PI | 21.2 | 8.3 | 20.2 | 20.1 | 17.5 |
| UTBAJ | Bajil | PI | 22.1 | 21.4 | 20.9 | 22.0 | 21.6 |
| UTBAF | Bayt Al Faqih | PI | 13.4 | 16.7 | v.m. | 17.4 | 16 |
| UTDMR | Dhamar | PI | 40.4 | 48.8 | 26.6 | v.m. | v.m. |
| UTGHL | Ghail | PI | 17.0 | 11.6 | 10.2 | 7.8 | 11.7 |
| LCHAJ | Hajjah | PI | 9.2 | 12.6 | 19.0 | 22.6 | 15.9 |
| LCHOD | Hudeidah | PI | 43.9 | 41.6 | 42.2 | 14.7 | 35.6 |
| LCIBB | Ibb | PI | 22.8 | 19.9 | v.m. | 100 | v.m. |
| UTMAN | Mansouria | PI | 9.7 | 9.9 | 10.9 | 13.4 | 11 |
| LCMUK | Mukallah | PI | 39.2 | 29.9 | 29.8 | 30.6 | 32.4 |
| LCBYD | Radaa | PI | 10.5 | 11.0 | v.m. | v.m. | v.m. |
| UTSAD | Sadah | PI | 21.8 | 18.0 | 28.2 | v.m. | v.m. |
| LCSAN | Sanaa | PI | 40.3 | 36.8 | 38.4 | 39.6 | 38.8 |
| LCSYN | Seiyun | PI | 32.4 | 34.0 | 32.4 | 27.8 | 31.7 |
| LCTAZ | Taiz | PI | 37.0 | 35.8 | 38.5 | v.m. | v.m. |
| UTYAR | Yarim | PI | 24.5 | 14.1 | v.m. | 14.4 | v.m. |
| UTZAB | Zabid | PI | 11.5 | 10.8 | 8.9 | v.m. | v.m. |
| UTZZN | National | PI | 26.2 | 23.8 | 25.7 | 28.2 | 26.4 |

B.1 is rather complete. Only in the 3rd and 4th quarter values are missing for Bayt al Faqih, Dhamar, Ibb, Rada'a, Sada'a, Taiz, Yarim and Zabid. Further, the figures of the utilities Dhamar, Amran, Yarim and Hajjah show high fluctuations. This might be due to the fact that the basic data BIL6 and BIL7 have to be entered manually to the system. It can be assumed that the values are not registered on a regular basis.

Non-Revenue Water (NRW) depends on several factors, such as the conditions and quality of pipes, illegal connections and adherence of the customer accountant department in collecting the actual monthly water meter readings. However, values should be lower than 20% and systems that have a low average network age should have even lower values. For old systems values up to 25% can be acceptable.

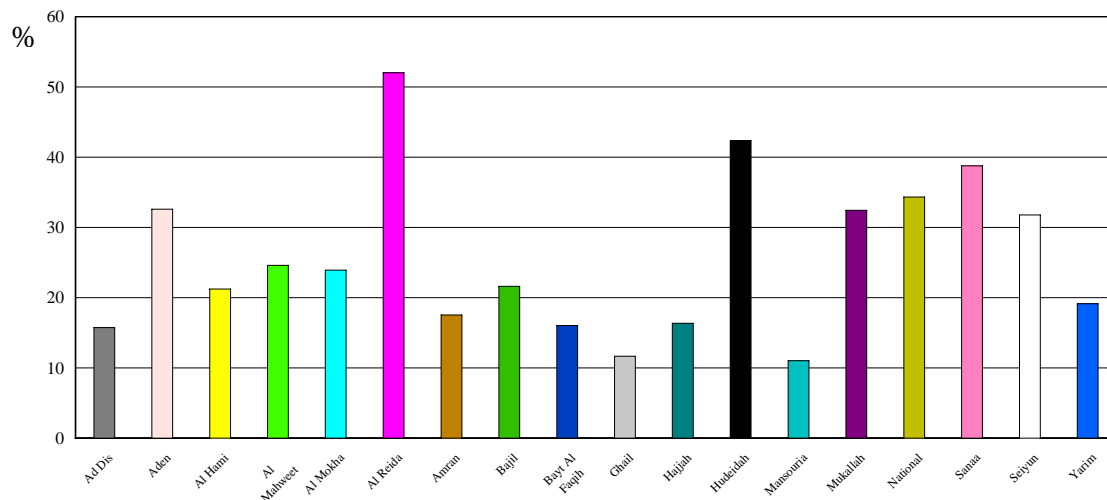


Figure 2: Non-revenue water (NRW) – B.1, 2006, [%]

Compared with the values of the 2005 report, Al Reida and Seiyun are worse off by 5%. Ghail (Ba Wazir) improved according to figures of last year about 14.1%.

Table No. (3) indicates that Mansouria and Ghail (Ba Wazir) are the best performers. Highest values have Al Reida (52%) and Hudeidah (42.2%).

5.4 C.1 – Bacteriological quality of water distributed

Definition: Bacteriological quality of water distributed: Number of samples taken in the water supply network complying with residual chlorine standards as a percentage of the total number of samples taken over the selected time period, [%]

Calculation: $(M13 / M12) * 100$

Table No. (4) shows the results obtained by the LCs and branches that are part of the PIIS.

Table No. (4): Bacteriological quality of water distributed – C.1, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 – Q3 | 2006 - Q4 | 2006 |
|-------------------------|---------------|-----------|-------------|-------------|-------------|--------------|-------------|
| UTDES | Ad Dis | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCADN | Aden | PI | 91.0 | 93.3 | 91.8 | 91.7 | 92 |
| UTSHR | Al Hami | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTMAH | Al Mahweet | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTMOK | Al Mokha | PI | 100.0 | 100.0 | 100 | 100 | 100 |
| UTRED | Al Reida | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTAMR | Amran | PI | v.m. | 43.8 | 18.2 | 25.6 | v.m. |
| UTBAJ | Bajil | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTBAF | Bayt Al Faqih | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTDMR | Dhamar | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTGHL | Ghail | PI | 66.7 | 64.2 | 53.2 | v.m. | v.m. |
| LCHAJ | Hajjah | PI | 84.8 | 91.5 | 91.1 | 91 | 89.8 |
| LCHOD | Hudeidah | PI | 100.0 | v.m. | v.m. | 458.2 | v.m. |
| LCIBB | Ibb | PI | 100.0 | 100.0 | 85.7 | 94.4 | 95 |
| UTMAN | Mansouria | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCMUK | Mukallah | PI | 98.4 | 99.0 | 99.0 | 99.7 | 99 |
| UTRAD | Radaa | PI | v.m. | 100.0 | v.m. | v.m. | v.m. |
| UTSAD | Sadah | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCSAN | Sanaa | PI | 100.0 | 100.0 | 100.0 | 100 | 100 |
| LCSYN | Seiyun | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCTAZ | Taiz | PI | 82.5 | v.m. | 74.4 | 89.9 | v.m. |
| UTYAR | Yarim | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTZAB | Zabid | PI | 100.0 | 100.0 | v.m. | v.m. | v.m. |
| National Average | | PI | 92.3 | 81.1 | 79.3 | 127.8 | 95.9 |

The values for C.1 are still rather incomplete. Only 12 of 23 utilities have entered values into the PIIS. Reason for this is the fact that no residual chlorine tests are performed in some utilities like Al Reidah or Al Mahweet. Other utilities have values available, but do not enter them into the system like Mansouria, Ad Dis or Dhamar. The figure of Hudeidah for the 4th quarter has to be incorrect. It can be assumed that the basic data M12 and M13 were mixed up.

Good performers are Al Mokha and Sana'a. Water irregularities occurred in all utilities that sent data. Bad performers are Amran and Ghail (Ba Wazir) with immense water quality problems. In general it can be said that too little samples were entered to the system by most utility. This has to be improved in future.

5.5 C.2 – Effluent quality of wastewater treatment plants

Definition: Effluent quality of wastewater treatment plants: Number of samples of effluent at the outflow complying with BOD (Biological Oxygen Demand) standards as a percentage of the total number of samples taken over a selected time period, [%]

Calculation: (M15/ M14) * 100

Table No. (5): Effluent quality of treatment plants – C.2, (Q.1-2-3-4-2006), [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|--------------|-------------------|-----------|-------------|-------------|-------------|-------------|-------------|
| LCADN | Aden | PI | 81.8 | 81.6 | 82.3 | 80.9 | 81.7 |
| UTMAH | Al Mahweet | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTDMR | Amran | PI | 100.0 | v.m. | v.m. | v.m. | v.m. |
| UTDMR | Dhamar | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCHAJ | Hajjah | PI | 84.0 | 83.9 | 86.8 | 94.5 | 87.3 |
| LCHOD | Hudeidah | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCIBB | Ibb | PI | 94.1 | 93.5 | 93.3 | 94.2 | 93.8 |
| UTRAD | Radaa | PI | v.m. | 100.0 | v.m. | v.m. | v.m. |
| LCSAN | Sanaa | PI | 66.7 | 55.0 | 70.4 | 53.3 | 61.4 |
| LCTAZ | Taiz | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTYAR | Yarim | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTZAB | Zabid | PI | v.m. | 100.0 | v.m. | v.m. | v.m. |
| UTZZN | National | PI | 85.3 | 85.7 | 83.2 | 80.7 | 81.3 |

14 utilities supply sanitation services, but only 12 utilities have a wastewater treatment plant (WWTP). Thus, 12 utilities should report their values for indicator C.2. Table No. (5) shows that the values are still rather incomplete. Only

approximately 60% of the utilities reported values for the basic data M14 and M15. Only Aden, Hajjah, Ibb and Sana'a have reported values for each quarter.

According to the poor data availability, the good performers are Hajjah and Ibb. Bad performers are Aden and Sana'a, where weak effluent quality occurs.

5.6 D.2 – Continuity of water supply services

Definition: Continuity of water supply as per category: A: 12-24 hr/day; B: 6-12 hr/day; C: 1-6 hrs/day; D: once a week; E: less than once a week

Calculation: OM18

D.2 reflects the continuity of water supply services (hours/day). This give information on performance, but might also mirror the resource situation of the utility or seasonal fluctuations.

Table No. (6): Continuity of water supply services – D.2, (Q.1-2-3-4-2006)*

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------|---------------|----|-----------|-----------|-----------|-----------|------|
| LCADN | Aden | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTDES | Ad Dis | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTSHR | Al Hami | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTMAH | Al Mahweet | PI | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| UTMOK | Al Mokha | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTRED | Al Reida | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTAMR | Amran | PI | v.m. | 3.0 | 3.0 | 3.0 | v.m. |
| UTBAJ | Bajil | PI | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| UTBAF | Bayt Al Faqih | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTDMR | Dhamar | PI | 1.0 | 24.0 | 24.0 | v.m. | v.m. |
| UTGHL | Ghail | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| LCHAJ | Hajjah | PI | 4.0 | 3.0 | 1.0 | 1.0 | 2.3 |
| LCHOD | Hudeidah | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCIBB | Ibb | PI | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| UTMAN | Mansouria | PI | 1.0 | 1.0 | v.m. | 1.0 | v.m. |
| LCMUK | Mukallah | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTRAD | Radaa | PI | v.m. | 2.0 | v.m. | v.m. | v.m. |
| UTSAD | Sadah | PI | 2.0 | 1.0 | 2.0 | 2.0 | 2.0 |
| LCSAN | Sanaa | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|----------|-----------|------------|------------|------------|------------|-------------|
| LCSYN | Seiyun | PI | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| LCTAZ | Taiz | PI | v.m. | v.m. | 5.0 | 5.0 | v.m. |
| UTYAR | Yarim | PI | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| UTZAB | Zabid | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| National Average | | PI | 1.0 | 1.8 | 2.2 | 1.3 | 1.57 |

∞. Categories from 1-5: 1: 12-24 hrs/day; 2: 6-12 hrs/day; 3: less than 6 hrs/day; 4: once a week; 5: less than once a week.

The data record for this indicator is rather complete. Data for Hudeidah and Zabid are missing. The utilities Amran, Dhamar, Mansouria, Radaa and Taiz have missing data for one or two months. The values of the 2nd and 3rd quarter for Dhamar were entered incorrect to the system.

According to the PIIS, 11 utilities were able to supply water 12-24 h/day in 2006, which is 52% of all utilities with PIIS. Although Sana'a and Aden are pumping 24 hours per day into the network, they are not able to supply all their customers at the same time, because these utilities are zoning their supply areas. Poor continuity can be reported from Al Mahweet, Taiz and Yarim. Hajjah suffers from seasonal fluctuations.

5.7 E.1.1 – Total Actual Cost Coverage

Definition: Total COLLECTED revenues (water sales, sanitation fees, service charges, other revenues AND new connection fees) as a percentage of the TOTAL cost (operation, maintenance and depreciation of capital cost), [%]

Calculation: $(ACC19 / (ACC20 + ACC23)) * 100$

Results of indicator E.1.1 are illustrated in Table No. (7).

Table No. (7): Total actual cost coverage – E.1.1, 2006, [%]

| Abbr. | Location | | 2006 – Q1 | 2006 – Q2 | 2006 – Q3 | 2006-Q4 | 2006 |
|-------|------------|----|-----------|-----------|-----------|---------|------|
| LCADN | Aden | PI | 76.4 | 74.9 | 101.0 | 114.4 | 91.7 |
| UTDES | Ad Dis | PI | 120.9 | v.m. | v.m. | v.m. | v.m. |
| UTSHR | Al Hami | PI | 129.8 | v.m. | v.m. | v.m. | v.m. |
| UTMAH | Al Mahweet | PI | 52.5 | 50.4 | 50.2 | v.m. | v.m. |
| UTRED | Al Reida | PI | 81.5 | v.m. | v.m. | v.m. | v.m. |

| Abbr. | Location | | 2006 – Q1 | 2006 – Q2 | 2006 – Q3 | 2006-Q4 | 2006 |
|-------------------------|---------------|-----------|-------------|-------------|-------------|--------------|-------------|
| UTMOK | Al Mokha | PI | 85.4 | 59.2 | 157.6 | 80.6 | 95.1 |
| UTAMR | Amran | PI | 35.3 | 43.6 | 34.1 | 34.5 | 36.7 |
| UTBAJ | Bajil | PI | 40.0 | v.m. | v.m. | v.m. | v.m. |
| UTBAF | Bayt Al Faqih | PI | 119.8 | 100.8 | 395 | 97.5 | 169.5 |
| UTDMR | Dhamar | PI | v.m. | 85.8 | 97.5 | v.m. | v.m. |
| UTGHL | Ghail | PI | 138.1 | v.m. | v.m. | v.m. | v.m. |
| LCHAJ | Hajjah | PI | 39.3 | 40.4 | 32.2 | 305.9 | 107.7 |
| LCIBB | Ibb | PI | 74.6 | 60.8 | 57.8 | 80.9 | 68.7 |
| UTMAN | Mansouria | PI | 58.2 | 68.0 | v.m. | 70.5 | v.m. |
| LCMUK | Mukallah | PI | 76.8 | v.m. | v.m. | v.m. | v.m. |
| LCSAD | Sadah | PI | 80.5 | 72.8 | 73.6 | 87.6 | 79.1 |
| LCSAN | Sanaa | PI | 70.0 | 52.5 | 43.2 | 106.7 | 67 |
| LCSYN | Seiyun | PI | 91.3 | 89.6 | 86.1 | 106.4 | 94 |
| UTZAB | Yarim | PI | 61.5 | 58.0 | 57.4 | 45.9 | v.m. |
| LCHOD | Hodeidah | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCBYD | Radaa | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTZAB | Zabid | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCTAZ | Taiz | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| National Average | | PI | 75.4 | 65.9 | 98.8 | 102.8 | 90.3 |

The data for E.1.1 are rather incomplete. For most of the utilities at least one month is missing. This indicator is not available for Hudeidah, Radaa, Zabid and Taiz, which is mainly due to the fact that the 'Total capital cost' (ACC20) was not entered in the system. Further, it can be assumed that the figures of Hajjah for the 4th quarter and Bayt al Faqih for the 3rd quarter are not correct.

The figures of each LC and branch are fluctuating during the stated quarters. High fluctuation might be due to irregular collection of tariff payments, for example most governmental institutions are paying irregularly. It can also be assumed that indicator E.1.1 has not been understood fully by all utilities.

The aim of this indicator is to ensure revenue efficiency. Cost recovery is an important principle of the national sector reform strategy. It shows how far this principle is applied by the targeted utilities. So far, the utilities are not required to cover their overall O&M and capital cost. Figures of 100% and above show that full cost coverage has already been achieved. Due to the fluctuation of the data, it is difficult to state good and bad performances. The assessment is done by looking at the annual average of the utility. According to the poor data availability

in 2006, good performers are Bayt Al Faqih and Hajjah. Bad performers are Amran and Sana'a.

5.8 E.2.1 – Operational Actual Cost Coverage

Definition: Total COLLECTED revenues (water sales, sanitation fees, service charges and other revenues EXCLUDING new connection fees) as a percentage of the OPERATION and MAINTENANCE cost, [%]

Calculation: (ACC22 / ACC23) * 100

Table No. (8) and Figure (3) reflect indicator E.2.1 for the year 2006.

Table No. (8): Operational actual cost coverage – E.2.1, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|---------------|-----------|--------------|-------------|-------------|--------------|------------|
| UTDES | Ad Dis | PI | 147.5 | 88.0 | 104.1 | 135.1 | 118.7 |
| LCADN | Aden | PI | 109.4 | 96.1 | 136.9 | 139 | 120.4 |
| UTSHR | Al Hami | PI | 139.2 | 117.4 | 117.7 | 174.9 | 137.3 |
| UTMAH | Al Mahweet | PI | 76.3 | 70.4 | 76.0 | 62.2 | 71.2 |
| UTMOK | Al Mokha | PI | 147.8 | 82.8 | 104.8 | 122.5 | 114.5 |
| UTRED | Al Reida | PI | 91.3 | 70.3 | 90.1 | 68.6 | 80.8 |
| UTAMR | Amran | PI | 101.6 | 123.9 | 84.1 | 77.3 | 96.7 |
| UTBAJ | Bajil | PI | 122.3 | 96.7 | 115.2 | 115.7 | 112.5 |
| UTBAF | Bayt Al Faqih | PI | 218.2 | 155.8 | 181.6 | 129.2 | 171.2 |
| UTDMR | Dhamar | PI | 108.4 | 94.5 | 104.2 | v.m. | v.m. |
| UTGHL | Ghail | PI | 157.5 | 135.0 | 150.9 | 897.6 | 335.3 |
| LCHAJ | Hajjah | PI | 48.5 | 48.9 | 37.5 | 301.4 | 109.1 |
| LCHOD | Hudeidah | PI | 90.6 | 95.2 | 77.3 | 157.7 | 105.1 |
| LCIBB | Ibb | PI | 110.7 | 84.2 | 75.9 | 108.4 | 94.6 |
| UTMAN | Mansouria | PI | 99.3 | 97.6 | 92.6 | 111 | 100 |
| LCMUK | Mukallah | PI | 133.1 | 86.2 | 69.6 | 230.7 | 129.9 |
| UTRAD | Radaa | PI | 122.8 | v.m. | v.m. | 109.6 | v.m. |
| UTSAD | Sadah | PI | 121.4 | 100.7 | 100.0 | 112.2 | 108.6 |
| LCSAN | Sanaa | PI | 141.6 | 105.2 | 71.8 | 146.3 | 116.2 |
| LCSYN | Seiyun | PI | 111.1 | 129.9 | 121.7 | 144.6 | 127 |
| LCTAZ | Taiz | PI | 73.6 | 56.8 | 60.3 | v.m. | v.m. |
| UTYAR | Yarim | PI | 90.2 | 82.1 | 81.5 | 70 | 80.7 |
| UTZAB | Zabid | PI | 90.1 | 137.8 | 121.6 | 111.9 | 115.3 |
| National Average | | PI | 115.3 | 98.0 | 98.9 | 167.9 | 120 |

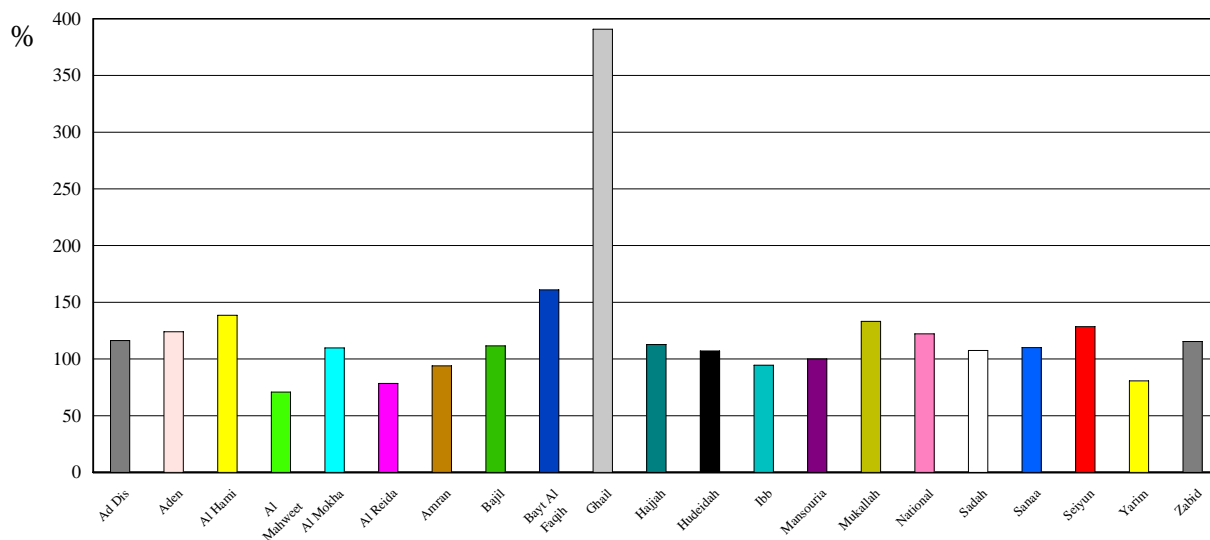


Figure 3: Operational actual cost coverage - E.2.1, 2006, [%]

The values for this indicator are rather complete. Values are mainly missing in the third and fourth quarter. It can be assumed that the figures of Hajjah and Ghail (Ba Wazir) for the 4th quarter are incorrect.

One of the national goals is to achieve at least cost coverage of operational cost plus the capital cost of electro-mechanical equipment. Therefore, covering operational cost (E.2.1) is a first step to achieve the national goal. All utilities should aim at values of higher than 100%, bearing in mind that the long term goal is total cost coverage.

While in the first quarter 15 utilities achieved values higher than 100%, the number of utilities decreases to 11 in the third quarter. In the fourth quarter the number increases again to 17. It becomes clear from the values of the 2nd and 3rd quarters that all LCs and branches do not have constant operational cost coverage, since values fluctuate from one quarter to another. This is due to irregular tariff payments.

Only six utilities improved their operational actual cost coverage since 2005. Sadah increased it by 23.2 % and Bayt Al Faqih by 14.7 %. Good performers for the year 2006 are Bayt al Faqih and Mukallah. Bad performers are Al Mahweet and Al Reida.

5.9 F.1 – Collection Efficiency

Definition: Total COLLECTED operational revenues (water sales, sanitation fees, service charges and other revenues EXCLUDING new connection fees) as a percentage of total BILLED operational revenues

Calculation: (ACC22 / ACC24) * 100

Performance on billing can be measured through the Collection Efficiency (F.1).

Table No. (9): Collection efficiency – F.1, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 – Q4 | 2006 |
|-------------------------|---------------|-----------|-------------|-------------|-------------|--------------|-------------|
| UTDES | Ad Dis | PI | 114.8 | 90.1 | 94.5 | 132.4 | 108 |
| LCADN | Aden | PI | 204.3 | 50.5 | v.m. | 103.1 | v.m. |
| UTSHR | Al Hami | PI | 112.7 | 86.2 | 91.2 | 137.8 | 107 |
| UTMAH | Al Mahweet | PI | 84.0 | 95.2 | 94.9 | 84.6 | 89.7 |
| UTMOK | Al Mokha | PI | 106.9 | 86.7 | 85.3 | 101.6 | 95.1 |
| UTRED | Al Reida | PI | 100.0 | 92.8 | 98.7 | 111.7 | 100.8 |
| UTAMR | Amran | PI | 76.7 | 85.3 | 68.0 | 82.4 | 78 |
| UTBAJ | Bajil | PI | 92.4 | 86.1 | 80.2 | 106.3 | 91.3 |
| UTBAF | Bayt Al Faqih | PI | 85.6 | 82.2 | 74.5 | 115.9 | 89.6 |
| UTDMR | Dhamar | PI | 72.5 | 86.2 | 73.9 | v.m. | v.m. |
| UTGHL | Ghail | PI | 46.6 | 41.1 | 44.0 | 350.8 | 120.6 |
| LCHAJ | Hajjah | PI | 41.9 | 42.6 | 36.3 | 292.6 | 103.4 |
| LCHOD | Hudeidah | PI | 70.2 | 103.3 | 68.2 | 133.9 | 93.9 |
| LCIBB | Ibb | PI | 104.8 | 95.2 | 92.1 | 138.7 | 107.7 |
| UTMAN | Mansouria | PI | 91.7 | 85.0 | 80.5 | 88.5 | 86.4 |
| LCMUK | Mukallah | PI | 79.1 | 69.6 | 67.6 | 260.9 | 119.3 |
| UTRAD | Radaa | PI | 82.9 | 136.3 | 87.0 | 107.1 | 103.3 |
| UTSAD | Sadah | PI | 91.4 | 70.0 | 72.9 | 86.4 | 80.2 |
| LCSAN | Sanaa | PI | 92.4 | 81.3 | 84.6 | 126.7 | 96.3 |
| LCSYN | Seiyun | PI | 106.6 | 85.2 | 91.9 | 137.8 | 105.4 |
| LCTAZ | Taiz | PI | 75.3 | 68.5 | 67.6 | v.m. | v.m. |
| UTYAR | Yarim | PI | 85.7 | 87.7 | 91.0 | 99.0 | 90.9 |
| UTZAB | Zabid | PI | 69.7 | 76.8 | 76.0 | 95.1 | 79.4 |
| National Average | | PI | 90.8 | 81.9 | 78.2 | 137.8 | 97.2 |

Values for F.1 are nearly complete. Only in the third and fourth quarter few data are missing.

Values of F.1 are fluctuating nearly in each utility. This is due to irregular payments, especially from government organizations. To take the effect of debts into account, this indicator will be analysed in combination with indicator F.2 ('Amounts receivable expressed as debt period') in the next chapter.

According to Table No. (9), the collection efficiency increased to 97.2% on average in 2006 in comparison with almost 90% in 2005. Hajjah increased the collection efficiency by 13.7 % and Mukallah by 16.8 %. The utility Zabid decreased the collection efficiency by 17.8 % and Mansouria by 12.8 % in comparison with 2005. In 2006, good performing utilities are Hudeidah and Mukallah. And those of low performance are Zabid and Sadah.

5.10 F.2 – Amounts Receivable as Debt Period

Definition: Total amount receivables at the end of the selected time period, expressed as the average daily BILLED OPERATIONAL revenues in the selected time period, Unit: days

Calculation: $BIL29 / (ACC24 / NOPD)$

Table No. (10): Debt period – F.2, 2006, [days]

| Abbr. | Location | | 2006 - Q1 | 2006 – Q2 | 2006 - Q3 | 2006 – Q4 | 2006 |
|-------|---------------|----|-----------|-----------|-----------|-----------|-------|
| UTDES | Ad Dis | PI | 67.3 | 70.1 | 69.5 | 60.4 | 66.8 |
| LCADN | Aden | PI | 1,125.9 | 284.5 | v.m. | 236.2 | v.m. |
| UTSHR | Al Hami | PI | 98.3 | 97.7 | 112.5 | 80.2 | 97.2 |
| UTMAH | Al Mahweet | PI | 268.9 | 269.1 | 266.2 | 276.4 | 270.2 |
| UTMOK | Al Mokha | PI | 172.0 | 155.5 | 163.8 | 178.7 | 167.5 |
| UTRED | Al Reida | PI | 114.1 | 126.4 | 121.9 | 127.1 | 122.4 |
| UTAMR | Amran | PI | 144.5 | 147.1 | 184.1 | 195.5 | 167.5 |
| UTBAJ | Bajil | PI | 179.5 | 175.5 | 192.0 | 206.8 | 188.5 |
| UTBAF | Bayt Al Faqih | PI | 240.7 | 227.4 | 227.6 | 274.5 | 242.6 |
| UTDMR | Dhamar | PI | 309.1 | 390.0 | 392.8 | v.m. | v.m. |
| UTGHL | Ghail | PI | 171.8 | 219.7 | 279.0 | 40.4 | 177.7 |
| LCHAJ | Hajjah | PI | 359.1 | 402.0 | 417.7 | 277.9 | 364.2 |
| LCHOD | Hudeidah | PI | 287.4 | 436.9 | 332.0 | 271.8 | 332.0 |
| LCIBB | Ibb | PI | 105.4 | 121.2 | 114.4 | 108.5 | 112.4 |
| UTMAN | Mansouria | PI | 205.8 | 167.0 | 188.8 | 185.1 | 186.7 |
| LCMUK | Mukallah | PI | 138.7 | 145.4 | 193.6 | 60.4 | 134.5 |
| UTRAD | Radaa | PI | 144.0 | 200.1 | 154.4 | 164.0 | 165.6 |
| UTSAD | Sadah | PI | 392.4 | 292.7 | 290.2 | 241.3 | 304.2 |

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|----------|-----------|--------------|--------------|--------------|--------------|--------------|
| LCSAN | Sanaa | PI | 189.8 | 176.2 | 196.0 | 173.6 | 183.9 |
| LCSYN | Seiyun | PI | 81.2 | 64.5 | 90.6 | 45.6 | 70.5 |
| LCTAZ | Taiz | PI | 200.3 | 204.9 | 209.3 | v.m. | v.m. |
| UTYAR | Yarim | PI | 135.6 | 153.8 | 186.5 | 214.6 | 172.6 |
| UTZAB | Zabid | PI | 153.1 | 135.7 | 146.4 | 185.3 | 155.1 |
| National Average | | PI | 224.9 | 200.5 | 214.6 | 171.6 | 202.9 |

Values for F.2 are nearly complete. Only in the third and fourth quarter few data are missing.

From Table No. (10) it can be seen that the debt period amounted 172.3 days on average of all PIIS using utilities in 2006. Therefore, the debt period decreased compared with the simple average of 191 in the year 2005. Nevertheless, the average of 172.3 is considered to be too high and needs to be further decreased. The LCs and branches with considerably high values are Al Mahweet and Sadah. The good performers are Ghail (Ba Wazir) and Seiyun.

In the following table, the annual average of indicator F.1 (Collection Efficiency) and indicator F.2 (Amounts receivable expressed as debt period) are compared. Values higher than 100% of collection efficiency can be explained by the collection of old debts. Therefore, the debt period gives a better picture of the historical performance of the utility in terms of bills collection. A slow increase of the debt period over the years is considered to be a burden on the balance sheets and at some point bad debts have to be written off.

Table No. (11): Comparison of Collection Efficiency [%] – F.1 and Debt period [days] – F.2, 2006

| Abbr. | Location | | 2006-F1 | 2006-F2 |
|-------|---------------|----|---------|---------|
| UTDES | Ad Dis | PI | 107.7 | 66.8 |
| LCADN | Aden | PI | v.m. | v.m. |
| UTSHR | Al Hami | PI | 107.4 | 97.2 |
| UTMAH | Al Mahweet | PI | 89.7 | 270.2 |
| UTMOK | Al Mokha | PI | 94.3 | 167.5 |
| UTRED | Al Reida | PI | 100.9 | 122.4 |
| UTAMR | Amran | PI | 78 | 167.5 |
| UTBAJ | Bajil | PI | 90.9 | 188.5 |
| UTBAF | Bayt Al Faqih | PI | 88.7 | 242.6 |
| UTDMR | Dhamar | PI | v.m. | v.m. |

| Abbr. | Location | | 2006-F1 | 2006-F2 |
|-------------------------|-----------|-----------|-------------|--------------|
| UTGHL | Ghail | PI | 126 | 177.7 |
| LHAJ | Hajjah | PI | 103.8 | 364.2 |
| LCHOD | Hudeidah | PI | 94.5 | 332.0 |
| LCIBB | Ibb | PI | 108.2 | 112.4 |
| UTMAN | Mansouria | PI | 86.1 | 186.7 |
| LCMUK | Mukallah | PI | 116.8 | 134.5 |
| UTRAD | Radaa | PI | 100.9 | 165.6 |
| UTSAD | Sadah | PI | 79.7 | 304.2 |
| LCSAN | Sanaa | PI | 96.3 | 183.9 |
| LCSYN | Seiyun | PI | 104.8 | 70.5 |
| LCTAZ | Taiz | PI | v.m. | v.m. |
| UTYAR | Yarim | PI | 90.3 | 172.6 |
| UTZAB | Zabid | PI | 79.7 | 155.1 |
| National Average | | PI | 97.2 | 202.9 |

The table shows that utilities with high collection efficiency have a low dept period like Ghail (Ba Wazir) and Zabid. Utilities with low collection efficiency have a high dept period like Mansouria and Mukallah. This can be seen as a tendency, but some utilities with reasonable collection efficiency have still huge old dept periods.

5.11 F.3 – Water expenses per poor household income using up to 5 m³ and F.4 – Expenses for sewerage per poor household income using up to 5 m³

Definition F.3: Average monthly expenditure on water services for the households using up to 5 m³ as a percentage of the monthly income for poor household income

Calculation: $(BIL32 / M31) * 100$

Definition F.4: Average monthly expenditure on sewerage services for the households using up to 5 m³ as a percentage of the monthly income for poor house

Calculation: $(BIL40 / M31) * 100$

F.3 'Water expenses per poor household income using up to 5 m³' and F.4 – Expenses for sewerage per poor household income using up to 5m³ indicate if poor households are able to afford water and sanitation services. The first 5 m³ of water are cross-subsidized by the higher consumer blocks. According to recommendations of the World Health Organization, it is acceptable to spend up to 5% of a poor household income on water and sanitation services. In order to calculate this value, the basic data M31 'Monthly income for poor household' is needed. The average poor household income is set for all utilities at 20,000 Rial/month, to ensure better comparability. The following table (No. (12)) shows only the water expenses.

Table No. (12): Water expenses for first 5 m³ per household income for the poor – F.3, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|--------------|-----------------|-----------|-------------|-------------|-------------|-------------|-------------|
| UTDES | Ad Dis | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| LCADN | Aden | PI | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| UTSHR | Al Hami | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| UTMAH | Al Mahweet | PI | 2.1 | 2.2 | 2.1 | 2.2 | 2.2 |
| UTMOK | Al Mokha | PI | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| UTRED | Al Reidah | PI | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 |
| UTAMR | Amran | PI | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 |
| UTDES | Bajil | PI | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| UTBAF | Bayt Al Faqih | PI | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| UTDMR | Dhamar | PI | 0.8 | 0.8 | 0.8 | v.m. | v.m. |
| UTMAH | Ghail | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| LCHAJ | Hajjah | PI | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| LCHOD | Hudeidah | PI | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 |
| LCIBB | Ibb | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| UTMAN | Mansouria | PI | 1.3 | 1.4 | 1.3 | 1.5 | 1.4 |
| LCMUK | Mukallah | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| UTRAD | Radaa | PI | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 |
| UTSAD | Sadah | PI | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| LCSAN | Sanaa | PI | 0.9 | 0.9 | 1.0 | 0.9 | 0.9 |
| UTAMR | Seiyun | PI | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| LCTAZ | Taiz | PI | 0.8 | 0.8 | 0.8 | v.m. | v.m. |
| UTYAR | Yarim | PI | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| UTZAB | Zabid | PI | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| UTZZN | National | PI | 0.91 | 0.92 | 0.91 | 0.96 | 0.93 |

Indicator F.3 is nearly complete. Table No. (12) shows that the average expenses of poor households for the first 5 m³ drinking water in 2006 were around 0.95%. Throughout the year, values have slightly increased, which indicates small tariff adjustments. The following table shows F.3, F.4 and the sum of all expenses.

Table No. (13) shows that all tariffs are in the recommended range of the WHO. Good and bad performers will not be appointed for this indicator as long as none utility hits the recommended 5 % border of the WHO.

Table No. (13): Combination F.3 and F.4, 2006, [%]

| Abbr. | Location | F.3 | F.4 | SUM | Acceptable Range? |
|-------------------------|---------------|-------------|-------------|-------------|-------------------|
| UTDES | Ad Dis | 0.5 | No sew. | 0.5 | √ |
| LCADN | Aden | 0.6 | 0.4 | 1.0 | √ |
| UTSHR | Al Hami | 0.5 | No sew. | 0.5 | √ |
| UTMAH | Al Mahweet | 2.2 | 1.1 | 3.3 | √ |
| UTMOK | Al Mokha | 1.3 | No sew. | 1.3 | √ |
| UTRED | Al Reidah | 0.5 | No sew. | 0.5 | √ |
| UTAMR | Amran | 0.8 | 0.5 | 1.3 | √ |
| UTDES | Bajil | 0.9 | No sew. | 0.9 | √ |
| UTBAF | Bayt Al Faqih | 0.9 | No sew. | 0.9 | √ |
| UTDMR | Dhamar | v.m. | v.m. | v.m. | v.m. |
| UTMAH | Ghail | 0.5 | No sew. | 0.5 | √ |
| LCHAJ | Hajjah | 1.8 | 1.0 | 2.8 | √ |
| LCHOD | Hudeidah | 0.5 | 0.4 | 0.9 | √ |
| LCIBB | Ibb | 0.5 | 0.4 | 0.9 | √ |
| UTMAN | Mansouria | 1.4 | No sew. | 1.4 | √ |
| LCMUK | Mukallah | 0.5 | 0.2 | 0.7 | √ |
| UTRAD | Radaa | 1.1 | | 1.1 | √ |
| UTSAD | Sadah | 1.9 | No sew. | 1.9 | √ |
| LCSAN | Sanaa | 0.9 | 0.8 | 1.7 | √ |
| UTAMR | Seiyun | 0.5 | 0.1 | 0.6 | √ |
| LCTAZ | Taiz | v.m. | v.m. | v.m. | √ |
| UTYAR | Yarim | 0.8 | 0.6 | 1.4 | √ |
| UTZAB | Zabid | 0.9 | 0.4 | 1.3 | √ |
| National Average | | 0.95 | 0.55 | 1.50 | √ |

5.12 G.1 – Average Total Water Consumption

Definition: Average total water consumption in litres per capita per day, based on the total amount of water billed and the total number of connections

Calculation: $(BIL7 / (BIL2 * M34 * NOPD)) * 1000$

Indicator G.1 gives an impression on the average water consumption per capita. This gives an idea on the living standards of the country, but also reflects the water resources situation.

Table No. (14): Average total water consumption – G.1, 2006, [lpcd]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|---------------|-----------|-------------|-------------|-------------|-------------|-------------|
| UTDES | Ad Dis | PI | 72.5 | 78.2 | 87.4 | 84.3 | 80.6 |
| LCADN | Aden | PI | 107.8 | 111.9 | 113.4 | 110.3 | 110.9 |
| UTSHR | Al Hami | PI | 62.2 | 69.9 | 73.7 | 74.3 | 70 |
| UTMAH | Al Mahweet | PI | 24.3 | 24.9 | 25.5 | 26.2 | 25.2 |
| UTMOK | Al Mokha | PI | 44.0 | 53.5 | 54.4 | 50.2 | 50.5 |
| UTRED | Al Reidah | PI | 55.2 | 57.2 | 56.6 | 55.9 | 55.2 |
| UTAMR | Amran | PI | 52.5 | 61.7 | 57.2 | 57.1 | 57.1 |
| UTDES | Bajil | PI | 37.8 | 40.2 | 39.9 | 36.8 | 38.6 |
| UTBAF | Bayt Al Faqih | PI | 38.9 | 44.9 | 47 | 40.4 | 42.8 |
| UTDMR | Dhamar | PI | 57.9 | 56.4 | 55.3 | v.m. | v.m. |
| UTMAH | Ghail | PI | 106.3 | 110.1 | 110.7 | 113.9 | 110.3 |
| LCHAJ | Hajjah | PI | 52.6 | 53.6 | 59.1 | 53.8 | 54.8 |
| LCHOD | Hudeidah | PI | 61.1 | 63.9 | 62.3 | 61.7 | 62.6 |
| LCIBB | Ibb | PI | 63.7 | 60.9 | v.m. | v.m. | v.m. |
| UTMAN | Mansouria | PI | 35.1 | 39.8 | 40.6 | 36.0 | 37.9 |
| LCMUK | Mukallah | PI | 81.9 | 92.0 | 85.3 | 82.2 | 85.4 |
| UTRAD | Radaa | PI | 45.7 | 53.5 | 54.4 | 45.6 | 49.8 |
| UTSAD | Sadah | PI | 54.2 | 55.3 | 57.6 | 49.9 | 54.3 |
| LCSAN | Sanaa | PI | 48.3 | 54.1 | 54.5 | 55.7 | 53.6 |
| UTAMR | Seiyun | PI | 54.6 | 64.7 | 69.8 | 61.4 | 62.6 |
| LCTAZ | Taiz | PI | 38.2 | 38.0 | 40.6 | v.m. | v.m. |
| UTYAR | Yarim | PI | 34.7 | 33.3 | 28 | 25.0 | 30.3 |
| UTZAB | Zabid | PI | 40.7 | 49.2 | 51.3 | 43.9 | 46.3 |
| National Average | | PI | 55.4 | 59.6 | 60.2 | 58.9 | 58.5 |

Values for indicator G.1 are nearly complete. Only view values for the third and fourth quarter are missing (Ibb, Taiz and Dhamar).

As reflected by Table No. (14), the average total water consumption shows a wide range (between 25-115 liter/day). Generally, it can be said that in the coastal areas with a hot climate like in Aden, Mukallah and Hudeidah higher consumptions can be observed (up to 115 l/c*d), whereas the average consumption in the mountainous areas amounts approximately 30-60 liter/day. In Sana'a, the average has increased to 55 liter/person*day, while in Hajjah and Yarim the average of water consumption declines. Good and bad performers will not be appointed for this indicator as water consumption depends mostly on external factors like climate and water availability. This indicator can be assessed if water saving programs are applied.

5.13 G.2 – Average domestic water consumption

Definition: Average domestic water consumption in liters per capita per day, based on the total amount of water billed on domestic connections and the total number of domestic water connections

Calculation: $(BIL33 / (BIL30 * M34 * NOPD)) * 1,000$

Table No. (15): Average domestic water consumption – G.2, 2006, [lpcd]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------|---------------|----|-----------|-----------|-----------|-----------|------|
| UTDES | Ad Dis | PI | 74.7 | 79.7 | 88.4 | 87.3 | 82.6 |
| LCADN | Aden | PI | 81.3 | 84.7 | 86.4 | 86.0 | 84.6 |
| UTSHR | Al Hami | PI | 66.9 | 73.4 | 75.9 | 76.3 | 73.1 |
| UTMAH | Al Mahweet | PI | 21.3 | 22.3 | 22.7 | 22.8 | 22.3 |
| UTRAD | Al Mokha | PI | 41.0 | 47.4 | 48.0 | 45.4 | 45.4 |
| UTRED | Al Reida | PI | 54.0 | 55.4 | 57.0 | 56.0 | 55.6 |
| UTAMR | Amran | PI | 49.1 | 57.7 | 53.3 | 54.1 | 53.6 |
| UTDES | Bajil | PI | 36.6 | 39.1 | 39.1 | 36.0 | 37.6 |
| UTBAF | Bayt Al Faqih | PI | 37.1 | 42.6 | 43.1 | 38.5 | 40 |
| UTDMR | Dhamar | PI | 51.0 | 49.8 | 50.3 | v.m. | v.m. |
| UTMAH | Ghail | PI | 64.3 | 65.0 | 67.5 | 66.1 | 65.7 |
| LCHAJ | Hajjah | PI | 34.3 | 35.0 | 37.6 | 35.3 | 35.1 |
| LCHOD | Hudeidah | PI | 53.2 | 56.2 | 54.2 | 53.4 | 54.3 |
| LCIBB | Ibb | PI | 61.1 | 57.8 | 46.0 | 60.0 | 56.2 |
| UTMAN | Mansouria | PI | 34.8 | 39.4 | 40.1 | 35.6 | 37.5 |
| LCMUK | Mukallah | PI | 68.8 | 77.1 | 74.0 | 73.5 | 73.4 |
| LCBYD | Radaa | PI | 49.8 | 48.5 | 44.9 | 42.4 | 46.4 |

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|----------|----|-------------|-------------|-------------|-------------|-------------|
| UTSAD | Sadah | PI | 44.5 | 49.1 | 50.9 | 42.6 | 46.8 |
| LCSAN | Sanaa | PI | 52.1 | 51.8 | 52.7 | 51.9 | 52 |
| UTAMR | Seiyun | PI | 56.6 | 66.7 | v.m. | 64.3 | v.m. |
| LCTAZ | Taiz | PI | 35.4 | 35.4 | 38.1 | v.m. | v.m. |
| UTYAR | Yarim | PI | 34.4 | 32.7 | 27.3 | 24.4 | 29.7 |
| UTZAB | Zabid | PI | 38.9 | 46.8 | 48.6 | 42.3 | 44.2 |
| National Average | | PI | 49.6 | 52.8 | 55.1 | 52.1 | 52.4 |

In terms of the data completeness, it can be said that all utilities have submitted values. Only in the third and fourth quarter few values are missing (Dhamar, Seiyun and Taiz).

Concerning the consumption patterns, same comments as made for G.1 apply to indicator G.2.

5.14 H.2 – Water supply service coverage and H.4 – Population served with water supply services in urban areas

Definition H.2: Water supply services coverage expressed as the population served by the public water supply network as a percentage of total population in the service area

Calculation: $((BIL30 * M34) / M37) * 100$

Definition H.4: Total population served by the public water supply network calculated as the number of domestic water connections multiplied by the average number of persons per household (national average is 7)

Calculation: $BIL30 * M34$

Indicators H.2 and H.4 monitor the level of water supply services coverage (urban sub-sector). The detailed water supply coverage is shown in Table No. (16) and Figure (4).

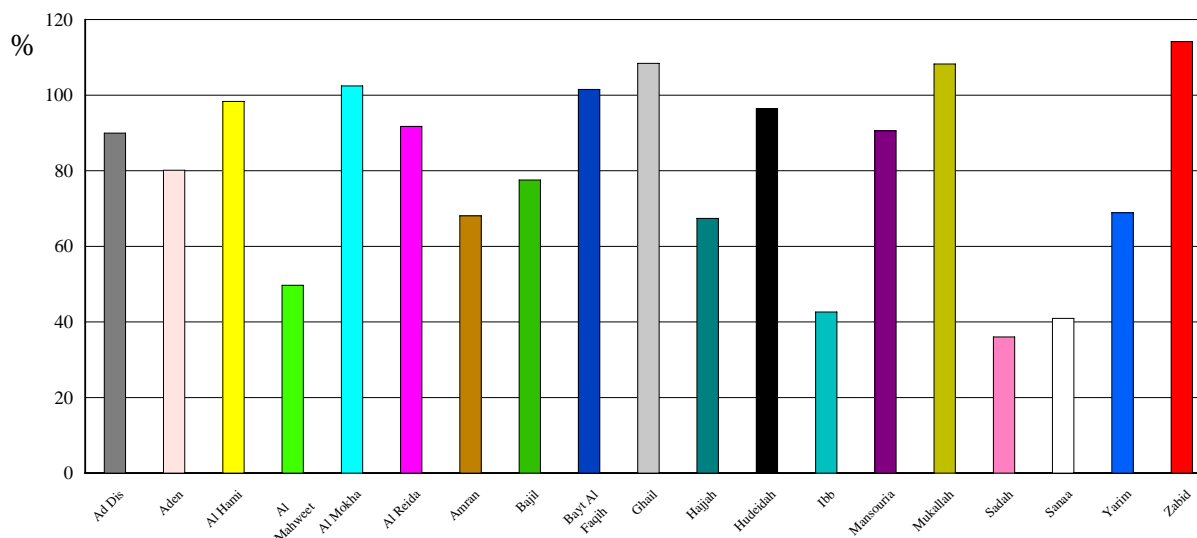


Figure 4: Water supply service coverage - H.2, 2006, [%]

Table No. (16): Water supply services coverage – H.2, 2006, [%]

| Abbr. | Location | | 2006 – Q1 | 2006 – Q2 | 2006 – Q3 | 2006 – Q4 | 2006 |
|-------|---------------|----|-----------|-----------|-----------|-----------|-------|
| UTDES | Ad Dis | PI | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 |
| LCADN | Aden | PI | 78.1 | 78.7 | 79.5 | 80.2 | 79.1 |
| UTSHR | Al Hami | PI | 92.8 | 93.9 | 97.6 | 98.3 | 95.7 |
| UTMAH | Al Mahweet | PI | 49.7 | 49.7 | 49.7 | 49.7 | 49.7 |
| UTRED | Al Reida | PI | 90.1 | 90.6 | 91.0 | 91.8 | 90.9 |
| UTRAD | Al Mokha | PI | 98.1 | 98.9 | 100.4 | 102.5 | 100 |
| UTAMR | Amran | PI | 68.1 | 68.1 | 68.1 | 68.1 | 68.1 |
| UTDES | Bajil | PI | 77.2 | 77.5 | 77.5 | 77.6 | 77.6 |
| UTBAF | Bayt Al Faqih | PI | 99.4 | 100.0 | 100.5 | 101.5 | 100.4 |
| UTDMR | Dhamar | PI | 57.7 | 58.6 | 59.5 | 58.6 | 58.6 |
| UTMAH | Ghail | PI | 105.9 | 106.8 | 107.6 | 108.4 | 107.2 |
| LCHAJ | Hajjah | PI | 65.5 | 66.3 | 66.9 | 67.4 | 66.5 |
| LCHOD | Hudeidah | PI | 94.1 | 95.0 | 95.7 | 96.4 | 95.3 |
| LCIBB | Ibb | PI | 41.5 | 41.7 | 42.1 | 42.6 | 42.0 |
| UTMAN | Mansouria | PI | 86.7 | 88.3 | 89.7 | 90.6 | 90.6 |
| LCMUK | Mukallah | PI | 103.8 | 105.9 | 107.1 | 108.3 | 106.3 |
| LCBYD | Radaa | PI | v.m. | v.m. | v.m. | v.m. | v.m. |

| Abbr. | Location | | 2006 – Q1 | 2006 – Q2 | 2006 – Q3 | 2006 – Q4 | 2006 |
|-------------------------|----------|----|-----------|-----------|-----------|-----------|-------|
| UTSAD | Sadah | PI | 34.7 | 35.6 | 35.5 | 36.0 | 35.5 |
| LCSAN | Sanaa | PI | 39.8 | 40.6 | 40.8 | 40.9 | 40.5 |
| UTAMR | Seiyun | PI | 80.7 | 81.4 | 82.0 | 82.6 | 81.7 |
| LCTAZ | Taiz | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTYAR | Yarim | PI | 66.4 | 67.3 | 68.2 | 68.9 | 67.7 |
| UTZAB | Zabid | PI | 109.7 | 111.5 | 113.1 | 114.2 | 114.2 |
| National Average | | | 77.6 | 78.4 | 79.2 | 79.7 | 79.7 |

The PIIS data record for H.2 is nearly complete. Only for Radaa and Taiz are the indicators missing.

Further, it has to be noted that the population numbers of the PIIS show several irregularities. It seems that the values are incorrect for several towns (a comparison with the Joint Annual Review (JAR) numbers has shown high discrepancies). Additionally, values have not been updated at several locations since 2004. Further, for some utilities values higher than 100% are reported (Ghail (Ba Wazir), Mukallah, Zabid, Bayt al Faqih). Reasons for these errors could either be incorrect population numbers, a lower number than 7 persons per household or the supply of neighboring rural areas, which are added to the urban figure.

The total number of connections that were registered in the PIIS by the end of 2006 amounted 435,878. Of these connections, 399,357 were domestic house connections. To determine H.4 (Population served with water supply services in urban areas), the number of domestic house connections has to be multiplied with the average number of person per household (M34). According to that calculation a total of 2,795,499 persons were supplied. The total population of the 23 towns amounted 4,111,825 by the end of 2006 according to the PIIS. This gives an overall coverage of 67%¹. This is higher than the national average of 61.5% that was reported during the JAR 2006.

Good performers are the utilities that managed to increase their coverage during 2006. Bad performers are the ones that do not make any progress. At this point, no comments on the performance shall be made, since the data quality has to be improved first.

¹ The numbers that are given under the national average in Table No. (16), represents just a simple average and differs due to incorrect population figures from 67 %.

5.15 H.3 – Sewerage service coverage and H.5 – Population served by sanitation services in urban areas

Definition H.3: Sewerage services coverage expressed as the population served by the public sewerage network as a percentage of total population in the service area

Calculation: $((BIL36 * M34) / M37) * 100$

Definition H.5: Total population served by the public sewerage network calculated as the number of domestic sewerage connections multiplied by the average number of persons per household

Calculation: $BIL36 * M34$

Table No. (17) and Figure (5) show the sanitation coverage. The 14 illustrated utilities supply sanitation services out of the 23 water utilities that are part of the PIIS.

Table No. (17): Sewerage services coverage – H.3, 2006, [%]

| Abbr. | Location | | 2006 - Q1 | 2006 - Q2 | 2006 - Q3 | 2006 - Q4 | 2006 |
|-------------------------|------------|----|-----------|-----------|-----------|-----------|--------|
| LCADN | Aden | PI | 67.3 | 67.7 | 68.5 | 69.0 | 68.125 |
| UTMAH | Al Mahweet | PI | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 |
| UTAMR | Amran | PI | 51.4 | 51.4 | 51.4 | 51.4 | 51.4 |
| UTSHR | Dhamar | PI | 33.9 | 34.1 | 34.2 | 34.3 | 34.12 |
| LCHAJ | Hajjah | PI | 36.0 | 36.4 | 36.6 | 36.6 | 36.4 |
| LCHOD | Hudeidah | PI | 55.1 | 55.4 | 55.6 | 55.9 | 55.5 |
| LCIBB | Ibb | PI | 33.1 | 33.3 | 33.3 | 33.9 | 33.4 |
| LCMUK | Mukallah | PI | 67.0 | 81.6 | 82.0 | 82.3 | 78.23 |
| LCBYD | Radaa | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| LCSAN | Sanaa | PI | 31.8 | 32.5 | 32.6 | 33.0 | 33.0 |
| UTDES | Seiyun | PI | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 |
| LCTAZ | Taiz | PI | v.m. | v.m. | v.m. | v.m. | v.m. |
| UTYAR | Yarim | PI | 55.9 | 56.9 | 57.8 | 59.1 | 57.43 |
| UTZAB | Zabid | PI | 99.8 | 100.7 | 104.4 | 104.8 | 102.43 |
| National Average | | | 45.3 | 46.8 | 47.4 | 47.7 | 47.7 |

In terms of data completeness, again the values of Radaa and Taiz are missing. Besides this, the data set is complete. During the analysis it has to be taken into

account that the same irregularities of the population numbers apply to this indicator as for indicator H.2.

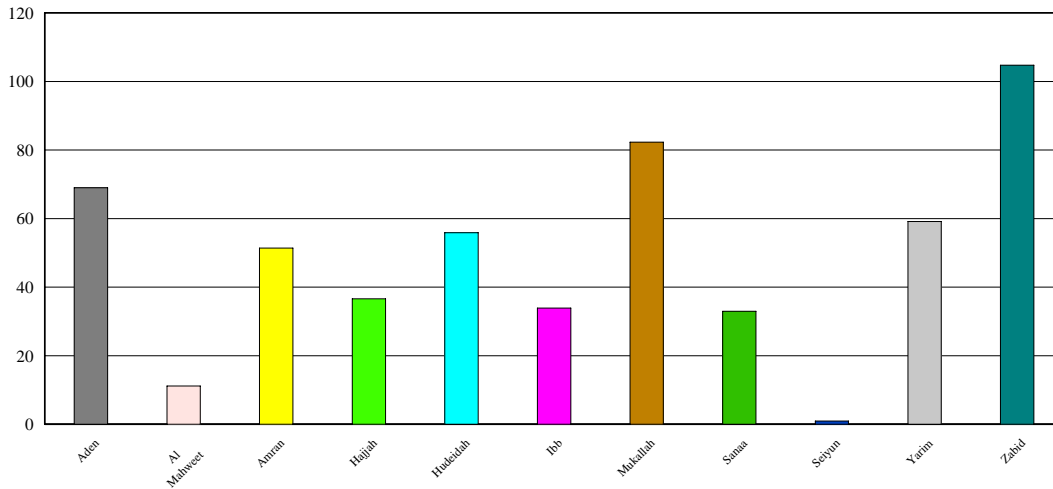


Figure 5: Sewerage services coverage – H.3, 2006, [%]

The total population that was supplied in the PIIS towns amounted 2,795,499 at the end of 2006. The total number of sanitation connections amounted 272,653 and supplied 1,765,925 persons by the end of 2006 (indicator H.5). These numbers lead to an overall sanitation coverage of 51%. This is also above the national average of 32.6%, which was obtained as result of the JAR 2006.

Good performers are the utilities that managed to increase their coverage during 2006. Bad performers are the ones that not make any progress. At this point, no comments on the performance shall be made, since the data quality has to be improved first.

6. General Observations and Recommendations

This is the second annual Performance Indicator Information System report, but the first annual report that was prepared by the PIIS Unit of the General Planning Department in collaboration with the PIIS working group. According to the advice of the last years report, the MWE Planning Department is gradually taking over the work on the PIIS and reporting. For the upcoming period it is planned to improve the PIIS, the reporting quality and all processes between the utilities, MWE and stakeholders, step by step. Therefore, it has to be acknowledged that further improvements and developments are needed.

6.1 Data Submission and Quality

This report showed that the PIIS data collection is ongoing, but still further improvement is needed. After the successful set up and installation, focus has to be given in future on the consolidation of the system. Nevertheless, major weaknesses are the data submission on time and the completeness and quality of the data. First measures for enhancing processes were already taken by the MWE and the PIIS Unit, such as the initiation of the monthly PIIS reports. The PIIS Unit verifies data completeness and quality on a monthly base and reports the results back to the utility. Still, feedback is rare from utilities. MWE emphasizes on the following measures to improve monitoring on the local and national level:

- Further training courses for system users are needed, addressing both IT knowledge (PIIS responsible), but also definitions and interpretations of the indicators to use it as a management tool (Financial Managers, Technical Managers, General Managers).
- At present, the PIIS is rarely used as an internal monitoring tool within the utilities although it supplies useful information for decision taking. Utility managers have to understand the added value of the system. PIIS data should be used as the basis for discussion for the Board of Directors. The starting point for the annual investment planning have to be the data from the PIIS.
- The utilities should establish internal quality testing mechanisms for the provision of basic data. Specially, manually entered data need to be controlled.
- Utilities should emphasize on the provision of basic data, to be able to submit values of the indicator for this report. Basic data lack specially for 'Training expenses per personnel costs' (A.2.2), 'Non-Revenue Water' (B.1), 'Bacteriological quality of water distributed' (C.1), 'Effluent quality of wastewater treatment plants' (C.2), 'Total Actual Cost Coverage' (E.1.1), 'Water expenses per poor household income using up to 5 m³' (F.3) and 'Expenses for sewerage per poor household income using up to 5 m³' (F.4).
- The provision of basic data like 'Total population in service area' (M37) or 'Monthly income for poor household' (M31) needs to be revised and decided on at the national level.

- The PIIS should be maintained regularly and problems should be solved immediately by the IT specialist of the utility or Yemen soft via the maintenance contract.
- Questions and ideas should be answered in a formal way from the utility to the PIIS Unit of MWE. The improvement of the software and the system use is a two-way responsibility between the Ministry and the users.

Even though the data submission and quality is still weak in some cases, the ongoing process of performance monitoring and improvement of understanding the importance of it can be considered as a great step forward.

6.2 Utility Performance

Disregarding the data weakness, a comparison between the 2005 and 2006 data proves that performance for most several key indicators has been improving. For only few indicators performance declined since 2005. Although not all key indicators of the 2005 report are identical, following observations can be named about the comparison from 2005 and 2006 and the other indicators:

- The 'Numbers of staff per 1,000 connections' (A.1.2) increased slightly from 10.7 to 10.9 on average. This shows that the utilities still have not started cutting down on overstaffing.
- The 'Training expenses per personnel costs' (A.2.2) cannot be judged properly due to poor data availability.
- The majority of utilities managed to decrease their Non-Revenue Water in 2006. Especially the big suppliers improved their performance (e.g. Aden: reduced from 34.7% NRW to 32.6%, Sana'a: from 43.4 to 38.8%, Mukallah: from 35.8 to 32.4%).
- The 'Bacteriological quality of water distributed' (C.1) cannot be assessed properly due to poor data availability.
- The 'Effluent quality of wastewater treatment plants' (C.2) cannot be assessed properly due to poor data availability.
- According to indicator D.2 ('Continuity of water supply services') about 52% of utilities are able to supply drinking water 12-24hrs/day. Around 9% of utilities provide water between 6-12 hrs/day, 13% less than 6 hrs/day. The remaining utilities did not provide sufficient data for the analysis.
- The 'Total Actual Cost Coverage' (E.1.1) cannot be evaluated properly due to rather incomplete data.
- The 'Operational actual cost coverage' (E.2.1) showed a positive development in 2006. It increased on average from 107.1% to 122.1%.
- The 'Collection efficiency' (F.1) increased at the national level from 90% to 97 % within one year.
- The 'Debt period' (F.2) decreased from 191 to 172.3 days in 2006.
- Indicator F.3 ('Water expenses per poor household income using up to 5 m³') indicates that tariffs have been increased slightly on average. The

value increased from 0.9% to 0.95%. Values of indicator F.4 ('Expenses for sewerage per household income using up to 5 m³') remained constant, except in Yarim and Amran tariffs were increased. The overall percentage of water supply and sanitation expenses per poor household income increased from 1.48% to 1.5% and stays therewith still far below the threshold value of 5%.

- The 'Average total water consumption' (G.1) state on average nearly constant.
- In view of 'Water supply service coverage' (H.2) and 'Sewerage service coverage' (H.5) no statements on the annual development will be made, since the population numbers were not adjusted according the forecasted population growth. But it shall be note that according to the PIIS a total of 15,044 water (H.8) and 17,426 (H.9) sanitation connections were constructed in 2006.

In order to get an impression, which utility has submitted most data and which utility seems to be performing best according to the selected key indicators, a final utility ranking was performed. An overview table of the ranking was added in Annex 3.

The results of the ranking can be summarized as followed: All indicators that can be influenced directly by management of the utilities have been chosen for the ranking. Indicator D.2, F.3, G.1, G.2, H.2, H.3, H.4 and H.5 are not part of the utility ranking since utilities cannot directly influence these indicators and should therefore not be evaluated on the basis of them. Best performers received the mark 1. The worse the performance the lower the number was assigned to the utility. The overall ranking was done by forming a simple average of the individual ranking results. Finally, the utilities were sorted according to the results.

The ranking matrix showed that no key indicator could be formed for Taiz and Dhamar since their values for the fourth quarter were missing. Therefore, both utilities had to be excluded from the ranking. Utilities for which most of the key indicators could be formed are Hajjah, Mukallah and Sana'a.

According to the results of the matrix, the autonomous public utility of Ghail (Ba Wazir) received the best grades, followed by Ad Dis and Ibb. Worst performers are Al Mahweet and Sadah.

It has to be taken into consideration that this ranking is rather simple, since it only takes few key indicators into account and no weights are applied to the indicators. Nonetheless, it can be assumed that the overall trend of the analysis can be regarded as correct.

6.3 Recommendations

As conclusion it can be said that the PIIS System is a very important tool that supports MWE to carry out its task to monitor the performance of the urban water and sanitation sector after decentralisation. However, further development and improvement of the use of PIIS is needed so that early tracking and intervention of any deviation of those utilities can be achieved. The annual and long-term plans of the utilities should be more and more based on reliable results of the PIIS. To achieve an overall performance improvement, utilities have to pay more attention to the PIIS indicators in general and specifically to the selected and discussed key indicators. This will help the Yemeni government and the donors to define priorities in their investment allocations.

ANNEX

Annex 1 – Overview of discussed key indicators, definition and calculation

| No. | Performance Indicator | Unit | Definition | Calculation |
|-------|---|------|--|---|
| A.1.2 | Total number of staff per 1000 water and sanitation connections | No | Number of total staff per 1000 water and sewerage connections at the end of the selected period | $(PAY1+PAY51) / ((BIL2 + BIL3) / 1000)$ |
| A.2.2 | Training expenses per total personnel costs | % | Training expenses as a percentage of the total personnel costs over the selected time period | $(ACC5 / ACC25) * 100$ |
| B.1 | Non-revenue water | % | Total water produced minus total water billed as a percentage of total water produced over the selected time period | $((BIL6-BIL7) / BIL6) * 100$ |
| C.1 | Bacteriological quality of water distributed: Number of residual chlorine samples according to standards per total number of samples taken | % | Bacteriological quality of water distributed: Number of samples taken in the water supply network complying with residual chlorine standards as a percentage of the total number of samples taken over the selected time period | $(M13 / M12) * 100$ |
| C.2 | Effluent quality of wastewater treatment plants: Number of BOD-samples according to standards per total number of samples taken | % | Effluent quality of wastewater treatment plants: Number of samples of effluent complying with BOD standards as a percentage of the total number of samples taken over a selected time period | $(M15/ M14) * 100$ |
| D.2 | Continuity of water supply services: A: 12-24 hr/d; B:6-12 hr/d; C: 1-6 hr/d; D: at least once a week; E: less than once a week | - | Continuity of water supply as per category:A:12-24 hr/day; B:6-12 hr/day; C:1-6 hrs/day; D: once a week; E: less than once a week | OM18 |
| E.1.1 | Total actual cost coverage | % | Total COLLECTED revenues (water sales, sanitation fees, service charges, other revenues AND new connection fees) as a percentage of the TOTAL cost (operation, maintenance and depreciation of capital cost) | $(ACC19 / (ACC20 + ACC23)) * 100$ |
| E.2.1 | Operational actual cost coverage | % | Total COLLECTED revenues (water sales, sanitation fees, service charges and other revenues EXCLUDING new connection fees) as a percentage of the OPERATION and MAINTENANCE cost | $(ACC22 / ACC23) * 100$ |
| F.1 | Collection efficiency | % | Total COLLECTED operational revenues (water sales, sanitation fees, service charges and other revenues EXCLUDING new connection fees) as a percentage of total BILLED operational revenues | $(ACC22 / ACC24) * 100$ |

| No. | Performance Indicator | Unit | Definition | Calculation |
|-----|--|------|---|---|
| F.2 | Amounts receivable expressed as debt period | days | Total amount receivables at the end of the selected time period, expressed as the average daily BILLED OPERATIONAL revenues in the selected time period, Unit: days | $BIL29 / (ACC24 / NOPD)$ |
| F.3 | Water expenses for first 5 m ³ per household income for the poor | % | Average monthly expenditure on water services for the households using up to 5 m ³ as a percentage of the monthly income for poor household income | $(BIL32 / M31) * 100$ |
| F.4 | Expenses for sewerage per poor household income using up to 5 m ³ . | % | Average monthly expenditure on sewerage services for the households using up to 5 m ³ as a percentage of the monthly income for poor house | $(BIL40 / M31) * 100$ |
| G.1 | Average total water consumption | lpcd | Average total water consumption in litres per capita per day, based on the total amount of water billed and the total number of connections | $(BIL7 / (BIL2 * M34 * NOPD)) * 1000$ |
| G.2 | Average domestic water consumption | lpcd | Average domestic water consumption in liters per capita per day, based on the total amount of water billed on domestic connections and the total number of domestic water connections | $(BIL33 / (BIL30 * M34 * NOPD)) * 1000$ |
| H.2 | Water supply services coverage | % | Water supply services coverage expressed as the population served by the public water supply network as a percentage of total population in the service area | $((BIL30 * M34) / M37) * 100$ |
| H.3 | Sewerage services coverage | % | Sewerage services coverage expressed as the population served by the public sewerage network as a percentage of total population in the service area | $((BIL36 * M34) / M37) * 100$ |
| H.4 | Population served with water supply services | No | Total population served by the public water supply network calculated as the number of domestic water connections multiplied by the average number of persons per household | $BIL30 * M34$ |
| H.5 | Population served with Sewerage services | No | Total population served by the public sewerage network calculated as the number of domestic sewerage connections multiplied by the average number of persons per household | $BIL36 * M34$ |

Annex 2 – Overview Basic Data that are part of the Key Indicators

| No. | Basic Data | Unit | Frequency |
|-------|---|------|-----------|
| ACC19 | Total collected revenues (operational and capital) | YR | Monthly |
| ACC20 | Total capital cost | YR | Monthly |
| ACC22 | Total collected operational revenues | YR | Monthly |
| ACC23 | Total operational costs | YR | Monthly |
| ACC24 | Total billed operational revenues | YR | Monthly |
| ACC25 | Total personnel costs | YR | Monthly |
| ACC5 | Training expenses | YR | Monthly |
| BIL2 | Number of water connections | No. | Monthly |
| BIL3 | Number of sewerage connections | No. | Monthly |
| BIL29 | Total amount receivable | YR | Monthly |
| BIL30 | Number of domestic water connections | No. | Monthly |
| BIL32 | Average monthly water expenses for first 5 m3 of water | YR | Monthly |
| BIL33 | Water billed on domestic water connections | M3 | Monthly |
| BIL36 | Number of domestic sewerage connections | No. | Monthly |
| BIL6 | Water produced | M3 | Monthly |
| BIL7 | Water billed | M3 | Monthly |
| M12 | Number of residual chorine sample taken | No. | Monthly |
| M13 | Number of residual chlorine sample according to standards | No. | Monthly |
| M14 | Number of BOD samples taken | No. | Monthly |
| M15 | Number of BOD-samples according to standard | No. | Monthly |
| M31 | Monthly income for poor household | YR | Yearly |
| M34 | Number of people per water connection | No. | Yearly |
| M37 | Total population in service area | No. | Yearly |
| OM18 | Continuity of water supply: A: 12-24 hr/d; B: 12-6 hr/d; C: 1-6 hr/d; D: at least once a week; E: less than once a week | Cat. | Monthly |
| PAY1 | Total number of permanent and contracted staff | No. | Monthly |
| PAY51 | Total number of daily workers staff | No. | Monthly |

Annex 3 – Overview Utility Performance Ranking 2006

| Abbr. | Location | A.1.2 | A.2.2 | B.1 | C.1 | C.2 | E.1.1 | E.2.1 | F.1 | F.2 | Average | Overall Rank |
|-------|---------------|-------|-------|-----|-----|-----|-------|-------|-----|-----|---------|--------------|
| UTDES | Ad Dis | 9 | - | 3 | - | - | - | 6 | 4 | 4 | 5.2 | 2 |
| LCADN | Aden | 15 | - | 14 | 3 | 3 | 4 | 5 | - | - | 7.3 | 8 |
| UTSHR | Al Hami | 11 | - | 8 | - | - | - | - | 5 | 5 | 7.3 | 8 |
| UTMAH | Al Mahweet | 17 | - | 11 | - | - | - | 19 | 14 | 18 | 15.8 | 20 |
| UTMOK | Al Mokha | 12 | - | 10 | 1 | - | - | 11 | 11 | 12 | 9.5 | 12 |
| UTRED | Al Reida | 16 | - | 17 | - | - | 3 | 18 | 8 | 7 | 11.5 | 17 |
| UTAMR | Amran | 6 | - | 6 | - | - | 9 | 16 | 18 | 13 | 11.3 | 16 |
| UTBAJ | Bajil | 4 | - | 9 | - | - | - | 9 | 12 | 14 | 9.6 | 13 |
| UTBAF | Bayt Al Faqih | 5 | - | 4 | - | - | 1 | 2 | 15 | 16 | 7.2 | 7 |
| UTDMR | Dhamar | - | - | - | - | - | - | - | - | - | - | - |
| UTGHL | Ghail | 18 | - | 2 | - | - | - | 1 | 1 | 1 | 4.6 | 1 |
| LCHAJ | Hajjah | 14 | - | 5 | 2 | 2 | 2 | 8 | 7 | 17 | 7.1 | 6 |
| LCHOD | Hudeidah | 1 | - | 16 | - | - | 7 | 13 | 10 | 20 | 11.2 | 15 |
| LCIBB | Ibb | 3 | - | - | 4 | 1 | - | 15 | 3 | 6 | 5.3 | 3 |
| UTMAN | Mansouria | 8 | - | 1 | - | - | - | 14 | 16 | 15 | 10.8 | 14 |
| LCMUK | Mukallah | 10 | 3 | 13 | 5 | - | 6 | 3 | 2 | 3 | 5.6 | 4 |
| UTRAD | Radaa | - | - | - | - | - | 8 | - | 8 | 8 | 8.0 | 10 |
| UTSAD | Sadah | 19 | - | - | - | - | 5 | 12 | 17 | 19 | 14.4 | 19 |
| LCSAN | Sanaa | 7 | 1 | 15 | 1 | 4 | - | 10 | 9 | 9 | 7.0 | 5 |
| LCSYN | Seiyun | 13 | - | 12 | - | - | - | 4 | 6 | 2 | 7.4 | 9 |
| LCTAZ | Taiz | - | - | - | - | - | - | - | - | - | - | - |
| UTYAR | Yarim | 2 | 2 | 7 | - | - | - | 17 | 13 | 10 | 8.5 | 11 |
| UTZAB | Zabid | - | - | - | - | - | - | 7 | 17 | 11 | 11.7 | 18 |