

# Resilience - Oriented Indicators Overview

Yemen Water Sector Performance Indicators  
of The Water and Sanitation Local Corporations in  
Aden, Sana'a, Ibb, Taiz and Hodeidah



## 4<sup>th</sup> Quarter

October – December 2020



# C<sup>o</sup>ntents

1	Overview	1
2	Performance Monitoring Methodology	2
3	Emergency Water Sector Performance Indicators	3
4	Technical Analysis	4
	a. Service Coverage, Service Levels and Quality - Piped Water Supply	4
	b. Service Coverage and Quality - Sewerage	6
	c. Production and Consumption	7
	d. Performance of pumps and generators	9
	e. Financial Viability	10
5	Resilience factors	12
	<b>Annex 1 Resilience Emergency Indicators Sheet</b>	<b>13</b>

## List of Abbreviation

<b>BOD</b>	Biological Oxygen Demand
<b>GIZ</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
<b>GIZ-IDWS</b>	GIZ project 'Institutional Development of the Water Sector'
<b>LCs</b>	Water Supply and Sanitation Local Corporations
<b>MWE</b>	Ministry of Water and Environment
<b>NWRA</b>	National Water Resource Authority
<b>PDA</b>	Personal Digital Assistant
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WWTPs</b>	Wastewater Treatment Plant

## 1

## Overview

The urban population in Yemen is supplied with drinking water through a large number of water supply systems. Most systems are public and managed through the Water and Sanitation Local Corporations (LCs) and their affiliated water utilities and branches, and others are private like water tanker suppliers. Sewerage networks are available and cover only a certain percentage of the population.

Since the situation in Yemen has been greatly exacerbated by the conflict and its repercussion in 2015. The LCs are operating under different institutional, administrative, operational, and financial conditions. They are encountering several challenges to secure an enabling environment that allows for service quality improvement, cost recovery and financial sustainability. Network rehabilitation and extension projects funded by government and/or donor organizations, due to the prolonged conflict, have been suspended or completely terminated.

Given the significant impact of water and wastewater services on life and public health of the population, ensuring financial sustainability and good service quality is crucial. Hence, the ability of the LCs to provide acceptable services depends on a wide range of factors, such as adequate infrastructure, access to energy and consumables, qualified personnel, efficient financial and performance-oriented management. Likewise, The current situation confirmed that conflict and fragility can be extremely disruptive to these interrelated elements, and how the quality of service delivery could be degraded to a point of no return or perpetuating the “vicious cycle” of managerial, financial and operational deficiencies, and in due course, leads to customers’ dissatisfaction with the

services they receive, and low revenue collection due to their unwillingness to pay for those services, which sooner or later, undermines the resilience of the service delivery and providers.

One of the utmost consequences of poor sanitation and low access to clean drinking water has had catastrophic hygiene and health effects by forcing the vast majority of the urban population to rely on unsecured alternative water supplies, making them susceptible to water-borne diseases. The outbreak of cholera, on the other hand, has placed a burden on the social responsibility and mandate of the LCs. Yemen has also reported its first case of COVID-19 in April 2020 and the severity of the current response to COVID-19 posed grave detrimental impacts on WASH service provision and sustainability, which are vital to disease prevention, core to survival and protection. To confront and mitigate further severity of pandemics, the WASH Cluster and the other Humanitarian Societies have mobilized the possible resources to support the resilience of the LCs with urgent operational measures to secure the continuity of safe drinking water supply and wastewater treatment.

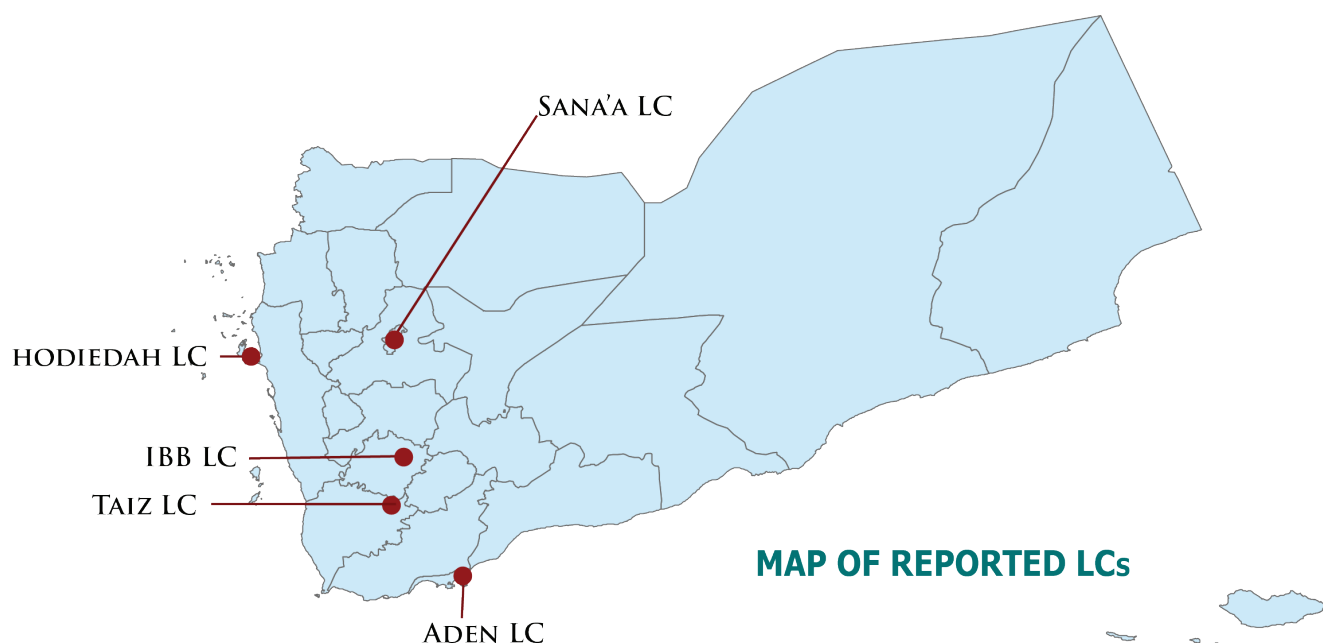
Improving the performance of LCs is challenging because the problems they face are multidimensional. Problems associated with dysfunctional and intricate business processes, cannot be overcome solely by short-term emergency measures. Achieving resilient and sustained service delivery requires a framework that integrates institutional measures with short/mid/long term investments to increase the efficiency and to reverse the dysfunctional equilibria in which the LCs operate.

## 2 Performance Monitoring Methodology

Since the conflict broke out in late March 2015, the Ministry of Water and Environment 'MWE' with the assistance of the GIZ Water Sector Program 'GIZ IDWS', has initiated a process to monitor and report key performance indicators of selected LCs serving in metropolitan cities of Sana'a, Aden, Taiz, Hodeidah and Ibb. These performance monitoring reports are based on financial, technical and operational performance indicators that are commonly used for the urban water sector. In addition, further reviews were integrated in 2019, summing up from 23 to 39 resilience-oriented performance indicators adapted to fit with the contextual situation, monitoring purposes and constitutes a valuable reference for effective evaluation of the impact of relevant sector interventions.

This report covers the period from October to December 2020, together with a brief technical analysis of key

indicators on different ranges of performance of each reported LC. The reporting exercise should not be perceived only as unilateral monitoring by GIZ IDWS, the process was carried out with data submitted and signed by the LCs' management through appointed focal points. Many clarifications were sought on the data provided especially for consistency and reliability of data and indicators. In some instances, estimates were given by the LCs in the absence or lack of systematic information. Nevertheless, GIZ IDWS team made every effort to improve data quality by means of validation, analysis and subsequently, reviewing the results, if necessary, with the LCs for further quality assurance; thus, the data finally presented are the best that could be obtained in the circumstances.



### 3 Emergency Water Sector Performance Indicators

This report measures the resilience of the LCs in terms of the following category of key resilience-oriented performance indicators:

	a. Service Coverage, Service Levels and Quality - Piped Water Supply	<ol style="list-style-type: none"> <li>1. Total population in service area (capita)</li> <li>2. Number of IDPs in service area (capita)</li> <li>3. Number of water connections (No.)</li> <li>4. Number of population served through water supply network (capita)</li> <li>5. Water supply service coverage = population served through water supply network vs total population in service area (%)</li> <li>6. Number of service days of piped water supply per month (day/month)</li> </ol>	<ol style="list-style-type: none"> <li>7. Number of residual chlorine samples taken (No./month)</li> <li>8. Number of residual chlorine samples according to standards (No./month)</li> <li>9. Proportion of bacteriological quality samples of distributed water according to standards = Number of residual chlorine samples according to standards per total number of samples taken (%)</li> </ol>
	b. Service Coverage and Quality - Sewerage	<ol style="list-style-type: none"> <li>10. Number of population served with sewerage connections (capita)</li> <li>11. Number of sewerage connections (No.)</li> <li>12. Sewerage connection coverage = population served through sewerage network vs total population in service area (%)</li> <li>13. Number of BOD-samples of effluent of WWTP taken per month (No./month)</li> <li>14. Number of BOD-samples of effluent of WWTP according to standards per month (No./month)</li> </ol>	<ol style="list-style-type: none"> <li>15. Proportion of effluent quality samples of wastewater treatment plants according to standards = Number of BOD samples according to standards per total number of samples taken (%)</li> <li>16. Average BOD value of raw influent at WWTP (mg BOD<sub>5</sub>/l)</li> <li>17. Average BOD value of treated effluent at WWTP (mg BOD<sub>5</sub>/l)</li> <li>18. Treatment efficiency of WWTP regarding BOD (%)</li> </ol>
	c. Production and consumption	<ol style="list-style-type: none"> <li>19. Total quantity of water produced (m<sup>3</sup>/month)</li> <li>20. Per capita quantity of water produced (l/cap/day)</li> <li>21. Storage capacity (m<sup>3</sup>)</li> <li>22. Storage capacity share per capita (l/cap)</li> </ol>	<ol style="list-style-type: none"> <li>23. Energy costs per m<sup>3</sup> water produced (YER/m<sup>3</sup>)</li> <li>24. Effluent produced (m<sup>3</sup>/month)</li> <li>25. Effluent produced (l/cap/day)</li> <li>26. Effluent treated in wastewater treatment plant (m<sup>3</sup>/month)</li> </ol>
	d. Performance of Pumps and Generators	<ol style="list-style-type: none"> <li>27. Total number of main pumps for the water supply system (No.)</li> <li>28. Number of functional pumps in service (No.)</li> <li>29. Number of working hours of all operating pumps of the water supply system (h/month)</li> <li>30. Number of main functional pumps failures due to technical reasons (No./month)</li> </ol>	<ol style="list-style-type: none"> <li>31. Number of working generators in the operation of pumps (No.)</li> <li>32. Number of working hours of all operating generators used to run the functional pumps of the water supply system (h/month)</li> </ol>
	e. Financial Sustainability	<ol style="list-style-type: none"> <li>33. Total collected operational revenues (YER/month)</li> <li>34. Total billed operational revenues (YER/month)</li> <li>35. Total operational costs (YER/month)</li> <li>36. Collection efficiency = Collected revenues vs. Billed revenues (%)</li> </ol>	<ol style="list-style-type: none"> <li>37. Actual operational cost coverage (%)</li> <li>38. Monthly governmental subsidies (YER/month)</li> <li>39. Percentage of basic monthly salaries paid (%)</li> </ol>



## 4 Technical Analysis

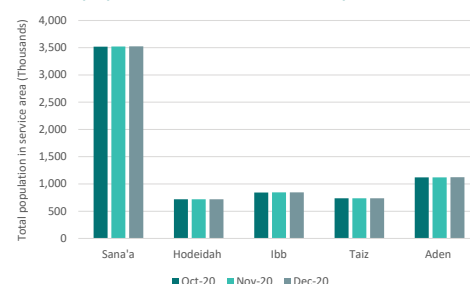
### a. Service Coverage, Service Levels and Quality - Piped Water Supply

The service coverage indicator aims for demonstrating the physical accessibility of households that are connected to the distribution system expressed as a percentage of total number of populations in the served area. While access to infrastructure has advanced slowly in some areas; access to reliable and sustainable water supply remains challenging in general.

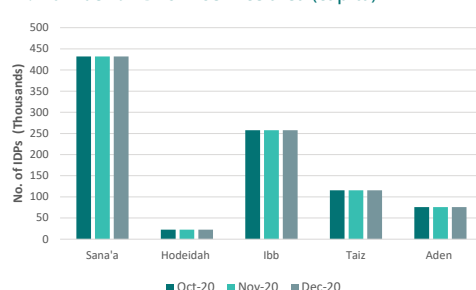
In the service area of the reported LCs, an average of 50% of the total urban population is connected to the public water supply system. Water coverage varies from LC to LC given the urban expansion accompanied by rapid population growth - keeping the LCs barely able to keep pace with adequate service coverage.

The massive influx of IDPs seeking safe areas and shelters had to a large extent aggravated the burden of the LCs to adequately comply with humanitarian aid efforts. However, the unresolved crisis situation in Hodeidah and other hot areas has kept large segment of people who have displaced to Sana'a and Ibb to resettle for an indefinite term, exacerbating the potentials of these LCs to augment the water service domain and connections to keep pace with the prevailing population growth and IDPs. Taiz LC estimated that compared to the existing operational capacity, only 49% of households with connections to the supply network are served. In this quarter, Aden LC was able to maintain 87% of service coverage as a logical consequence of financial support by the government and others to improve public services.

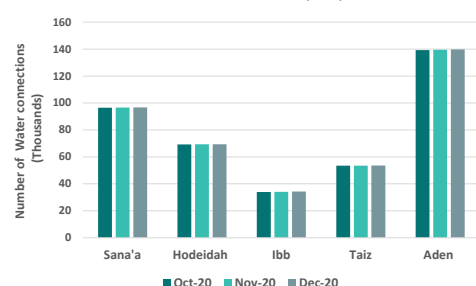
1. Total population in service area (capita)<sup>1</sup>



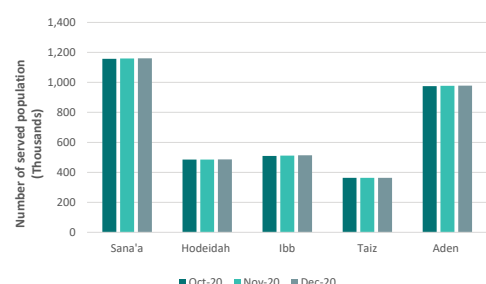
2. Number of IDPs in service area (capita)<sup>2</sup>



3. Number of water connections (No.)



4. Number of population served through water supply network (capita)



5. Water supply service coverage - population served through water supply network vs total population in service area e (%)



1. The LCs do not have a reliable monthly population growth rate projection and were therefore estimated on the basis of an average of 2.5% of annual growth rate.

2. Source: WASH Cluster Response Coverage Jan-Dec 2020 (except IDPs data in Ibb is provided by the LC).



## Number of service days of piped water supply

The scarcity of water resources in Sana'a, Taiz and Ibb has kept the supply of water susceptible to poorly fulfill the pressing demands of the served customers. Sana'a LC, hereby, has a lower water supply frequency maintained on average by approximately 3 times a month. The shortage of water supply in Sana'a city could be due to the low volume of water production compared to Aden and Hodeidah with average supply 30 and 25 days consecutively per month. As a consequence of the massive drop in the water level of wells, Ibb LC has been struggling to optimize water sources despite the significant interruption in the water supply with an average of two days per month across all areas served by the LC. Unlike the previous results this year, an improvement was observed in water supply frequency by Taiz LC serving in this quarter on average 5 days a month.

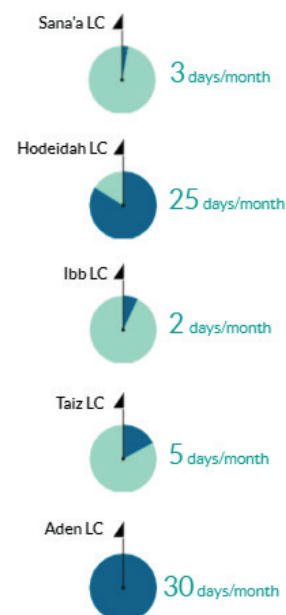
Customers served by intermittent systems are generally not satisfied with the amount of water they receive. Consequently, they try to maximize the amount they draw from the system during supply periods. The amount customers are able to collect depends on their localized pressure conditions. This puts those who are located far away from the main pipelines or at higher altitudes in the service area at a disadvantage. Customers collect and store water when the supply is on to meet their demand through the off-hours. When the supply cycle is short, the majority of customers pursue to draw their entire water demand within this very short period. This results in larger than expected flows in the pipes, causing high pressure losses, which result in low pressures at customers' end connections.

In order to respond as best they can to satisfy their needs. Customers incur a range of so-called coping costs to deal with interrupting water supply. These costs can relate to the purchase of facilities such as additional tanks to store water, domestic pumps because of low pressures, or the need to purchase alternative water supplies (e.g. private sector). Since the poorest customers can least afford such facilities, they are likely to be disproportionately affected by poor access to the public network.

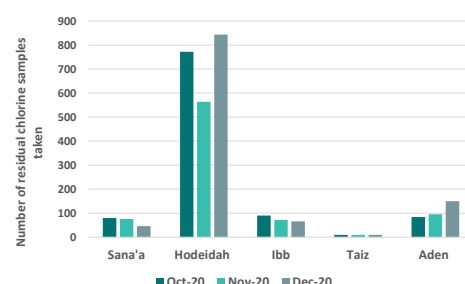
## Bacteriological quality samples of distributed water

Alongside the obvious implications for water quantity, it brings concerns about water quality. In particular, interruption of water supply leads to zero pressure during non-supply periods, allowing contaminants to enter through broken or cracked pipes. These contaminants, which are in close proximity to the water network – are the result of poor or inadequate sanitation and drainage, raising the prospect of contamination. Hence, the water supply sourced by the LCs has been addressed as a suspicious causality of water-borne diseases if not treated, and the LCs were urged as preventive measures to carry out regular chlorination and tests for residual chlorine in the network to meet the required standards. Accordingly, LCs of Sana'a, Hodeidah and Aden have shown compliance with bacteriological quality standards for approximate 100%, but remain doubtful unless the specific procedures and availability of measuring equipment and resources are verified. As for Taiz LC, the water quality treatment facilities (Labs & equipment) were entirely demolished during the armed clashes in the city. Alternatively, the LC has managed to conduct water sample tests either in the labs owned by the National Authority of Water Resources (NWRA Taiz branch) or in Ibb LC.

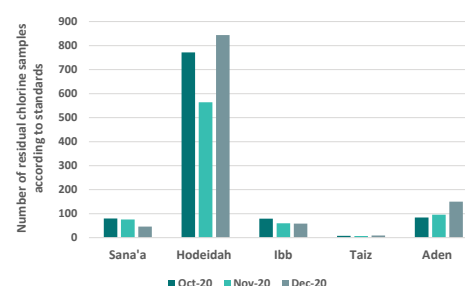
6. Number of service days of piped water supply per month (day/month)



7. Number of residual chlorine samples taken (No./month)



8. Number of residual chlorine samples according to standards (No./month)



9. Proportion of bacteriological quality samples of distributed water according to standards = Number of residual chlorine samples according to standards per total number of samples taken %



## b. Service Coverage and Quality - Sewerage

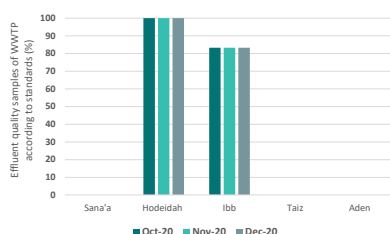
Most of the reported LCs have conventional sewer systems where about 42% of the population are served by the sewer networks. The remaining population discards their wastewater in privately owned cesspits where wastewaters are filtered and absorbed by the soil or pumped out with vacuum trucks either by the LC or by the private sector, given also that the concerned local authorities do not maintain any records of the properties with on-site sanitation.

In this quarter, most LCs are lagging behind adequate sewerage coverage in view of high urbanization rates, lack of investment for sewer networks expansion and infrastructure rehabilitation, etc. All are representing critical factors that constraints the LCs to effectively collect, treat, dispose and/or reuse of wastewater. It is also evident that the amount of sewage that is collected by some Wastewater Treatment Plans 'WWTPs' is higher and beyond the design capacity; therefore, WWTPs failures effectively mean that sewage effluent is being discharged without proper treatment into open areas, waterways, and onto irrigation areas, constituting obvious health risks to residents and huge affected areas.

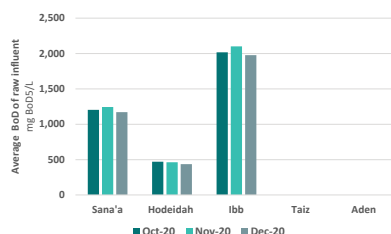
The surrounding poor conditions of insufficient power supply, lack of maintenance and the high volume of wastewater flows that have exceeded the capacity of the WWTPs have imposed poor quality of wastewater treatment to comply with the national standards. However, this report depended on the BOD<sub>5</sub> (a measure of organic pollution) of wastewater since the majority of the WWTPs' laboratories are either not equipped or dysfunctional to measure all test parameters. Additionally, the increase in BOD<sub>5</sub> concentrations could also be attributed to water scarcity and low production and supply frequency.

To demonstrate the wastewater treatment efficiency of the WWTPs by means of BOD<sub>5</sub>. The treatment efficiency of effluent by Sana'a WWTP is 71% on average and the BOD<sub>5</sub> samples according to standards is 0%. The BOD<sub>5</sub> concentrations in the incoming wastewater are higher (1,207 mg/l average) than the BOD<sub>5</sub> design load (500 mg/l). The average treatment efficiency of effluent by WWTPs of Hodeidah and Ibb is 82% and 90%, and the BOD<sub>5</sub> samples according to standards are 100% and 90% respectively. As for the WWTPs of Aden and Taiz, there have long been no tests for BOD<sub>5</sub> since the laboratories are damaged and out of operation, lacking the requisite equipment and materials; both appealing likewise for prompt and expanded assistance for the WWTPs facilities restoration.

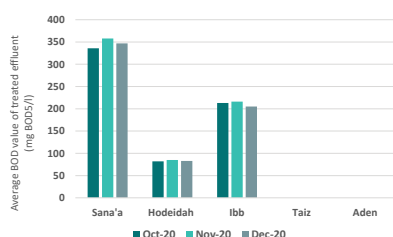
15. Proportion of effluent quality samples of wastewater treatment plants according to standards %



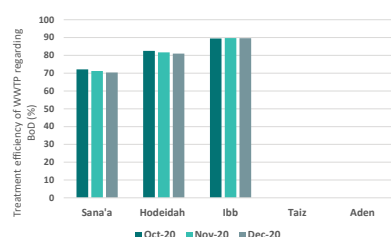
16. Average BOD value of raw influent at WWTP (mg BOD<sub>5</sub>/l)



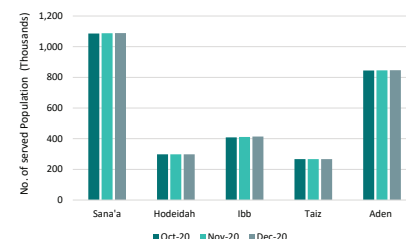
17. Average BOD value of treated effluent at WWTP (mg BOD<sub>5</sub>/l)



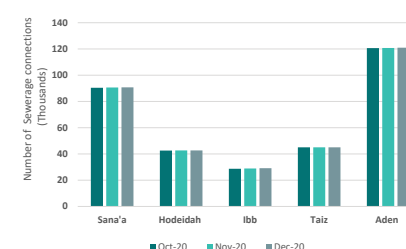
18. Treatment efficiency of WWTP regarding BOD<sub>5</sub> (%)



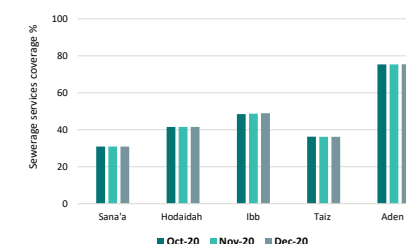
10. Number of population served with sewerage connections (capita)



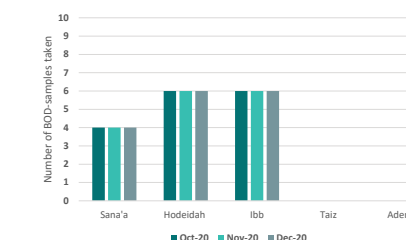
11. Number of sewerage connections (No.)



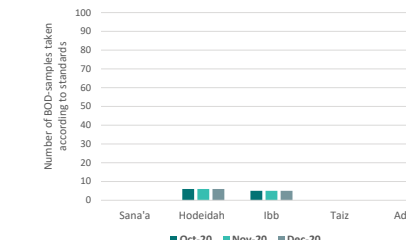
12. Sewerage connection coverage = population served through sewerage network vs total population in service area %



13. Number of BOD-samples of effluent of WWTP taken per month (No./month)



14. Number of BOD-samples of effluent of WWTP according to standards per month (No./month)





## c. Production and Consumption

The storage capacity shares per capita by the LCs of Sana'a, Hodeidah, Ibb, Taiz and Aden are respectively 32, 51, 8, 135 and 97 l/capita. In this regard, the LCs must plan for extending the storage facilities to secure storage and production capacity, frequent demand for water supply and to respond effectively to urgent circumstances.

Average daily per capita of water production varies significantly among the LCs. For instance, LCs of Aden and Hodeidah have posted the highest average share at 105 and 70 l/c/d respectively. Whereas other LCs have quite low water production values per capita reaching an average of 31 l/c/d, as is the case in Sana'a LC, 32 l/c/d in Ibb LC, and 9 l/c/d in Taiz LC. These results may undoubtedly be considered due to lack in the local water resources, inadequate operating and production capabilities.

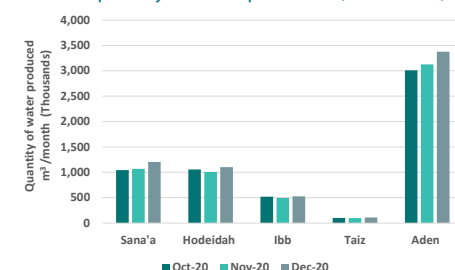
### Energy costs per m<sup>3</sup> water produced

The frequent/entire cut-off of the National Electrical Grid posed a genuine challenge for the LCs to rely on and obtain an adequate amount of fuel for the operation of electric power generators. In addition, strong interactions with the energy system lie not only in the inherent need for energy for water pumping and wastewater treatment but even more so with important implications for operational costs.

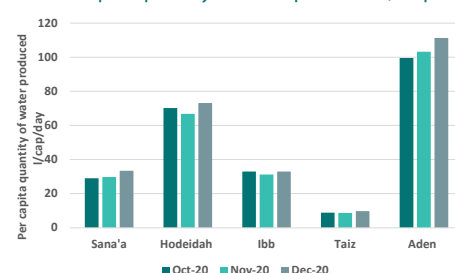
For a thorough assessment of financial performance, the analysis of the energy costs (diesel and electricity) in this report was based on distinguishing the actual costs incurred by the LCs from those subsidized by the Humanitarian Organizations. The LCs were, therefore, requested to split and report their energy costs accounts without computing the costs of subsidized fuel as operating costs. For instance, energy costs account for 0% of the total operating costs in LCs of Taiz and Hodeidah LCs, since fuel is regularly supplied on a monthly basis and paid via the UNICEF, exempting these LCs from massive burdens of running costs and preserving their performance to meet other financial obligations. Unfortunately, fuel subsidies provided to Sana'a LC by UNICEF has been reduced to 75%, forcing the LC to self-supply 871,925 liters of diesel during the last six months of 2020.

Though Ibb LC is one of the recipients of external fuel subsidies albeit on an intermittent basis, it remains largely self-reliant in obtaining fuel to fulfil the needs of power generation with an average cost 134 YER/m<sup>3</sup>. Similarly, Aden LC reimbursed altogether the costs of the public electricity and fuel at an average price of 61 YER/m<sup>3</sup>.

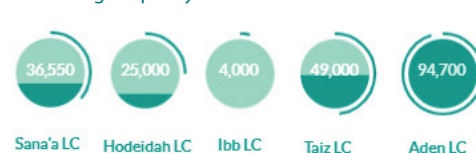
19. Total quantity of water produced (m<sup>3</sup>/ month)<sup>3</sup>



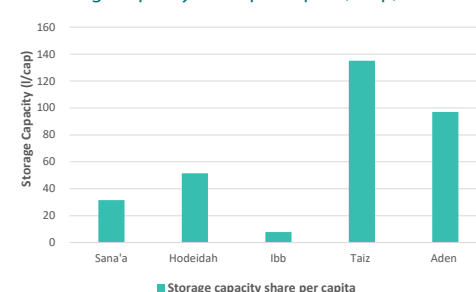
20. Per capita quantity of water produced (l/cap/day)<sup>4</sup>



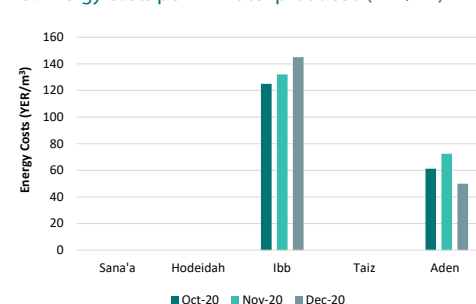
21. Storage capacity m<sup>3</sup>



22. Storage capacity share per capita (l/cap)



23. Energy costs per m<sup>3</sup> water produced (YER/m<sup>3</sup>)<sup>5</sup>



3. The water quantity represents the production, not the billed water.

4. The calculation of per capita share of the water produced is based on LCs figures. The water supply provided by the private sector and/or humanitarian agencies was not monitored by the LCs and hence was not calculated in this report.

5. 1 Euro € ≈ 708 YER

1 US \$ ≈ 594 YER (December, 2020)

Source: InfoEuro (<http://ec.europa.eu/budget/graphs/infoeuro.html>)

## Effluent treated in the WWTPS

The treatment efficiency of generated effluent varies among the LCs and depends on the WWTPs types and various stages of treatment for processing wastewater before disposal. Additionally, the available figures regarding the inflowing wastewater were estimated by the LCs since all the installed flow meters are either damaged or dysfunctional.

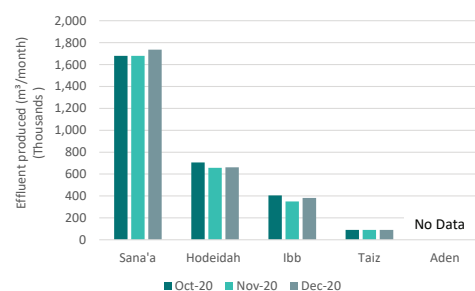
In this quarter, Sana'a WWTP has processed effluent on average 1,698,667 m<sup>3</sup>/month (52 l/cap/day), which constitutes almost 100% of the produced effluent. The design capacity (17,000 m<sup>3</sup>/day) of Taiz WWTP is underutilized, and currently receiving only on an average estimation of inflow 3000 m<sup>3</sup>/day representing only 18% of the nominal capacity of the treatment plant. This explains the implications of many attacks by the farmers drilling holes in manholes and the main transmission line in order to install pumps to use wastewater for agriculture crops and irrigation.

The average treatment of effluent by Hodeidah WWTP is 100% (73 l/cap/day), finding its way into the sea waters. The existing capacity of Ibb WWTP is 5,300 m<sup>3</sup>/day of sewage collection with average effluent generation 15,300 m<sup>3</sup>/day, presenting about 40% overload of the plant. The WWTP lab of Aden LC was damaged as referred to the armed conflict in 2015, causing entire termination of regular measurement of treated wastewater and quality. Anyhow, mapping of existing WWTP operations and particular processes is crucial to outline the current performance and to identify the appropriate rehabilitation measures.

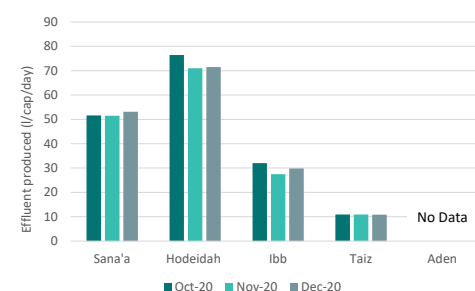
### Treatment systems and capacity of the WWTPs

	WWTP	No. of WWTP	Nominal WWTP capacity m <sup>3</sup> /day	Effluent produced m <sup>3</sup> /day (Q4 2020)	Treatment system
1	Sana'a WWTP	2	50,500	56,622	Activated sludge
2	Ibb WWTP	1	5,300	12,654	Activated sludge
3	Hodeidah WWTP	1	54,000	22,497	Stabilization pond
4	Taiz WWTP	1	17,000	3,000	Oxidation pond
5	Aden WWTP	3	110,000	NA	Stabilization pond

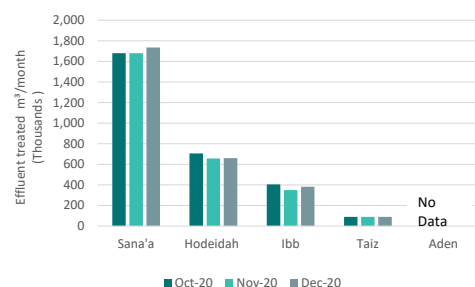
24. Effluent produced (m<sup>3</sup>/month)



25. Effluent produced (l/cap/day)



26. Effluent treated in wastewater treatment plant (m<sup>3</sup>/month)



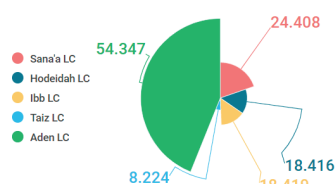
## d. Performance of pumps and generators

Most LCs have attempted with external fuel subsidies to overcome the power shortage by deploying additional electric generators to maintain the water supply. At the same time, full dependence on standby power has taxed excessive operating expenses beyond the LCs' financial capabilities. However, the solar water pumping system was a paradigm shift, introduced effectively in some areas to relieve stressful operational costs despite raising arguments about the future implications of renewable energy use on the local water resources.

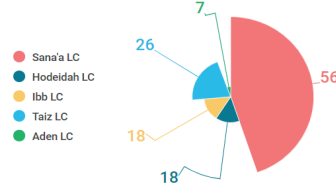
Generally, LC Sana'a has been supported, in addition to electric generators, with solar water pumping systems to reduce power failures and maintain operation of 64% of the main pumps with average 20 damage cases (October and November 2020). Similarly, Hodeidah LC has managed to operate up to 31 of functional pumps in service, with remarkable recurrence of average 19 failures recorded per month.

In an attempt to cope with the water resource scarcity, Ibb LC was able to run 28 of the main pumps operating, while Taiz LC was barely efficient to enhance water production for 9 hours per day by running only 42% of the main pumps, owing to the security situation and limited availability of fuel to switch on the electric generators. Compared to other LCs, Aden LC operated about 90 of the 126 water pumps for water production.

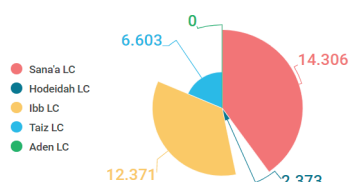
30. Number of working hours of all operating pumps of the water supply system (h/month)



31. Number of working generators in the operation of pumps (No.)



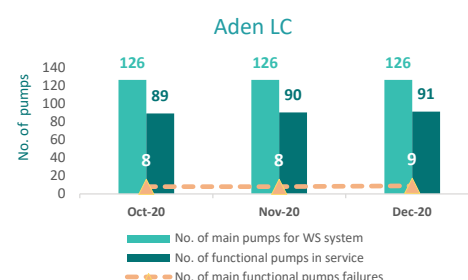
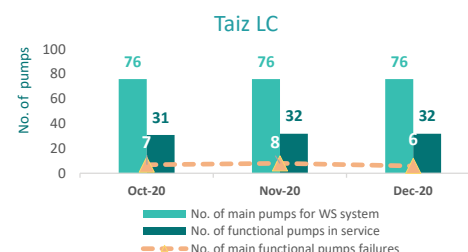
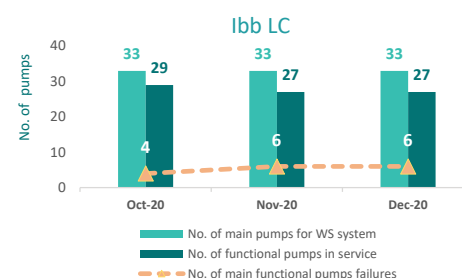
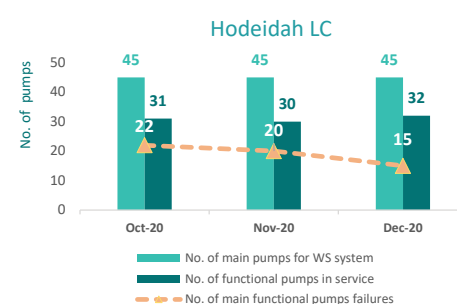
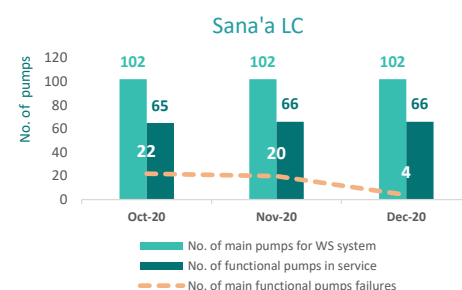
32. Number of working hours of all operating generators used to run the functional pumps of the water supply system (h/month)



27. Total number of main pumps for the water supply system (No.)<sup>6</sup>

28. Number of functional water pumps in service (No.)

29. Number of main functional pump failures due to technical reasons (No./month)



6. The number of pumps represent the pumps in well fields and in pumping station in network.

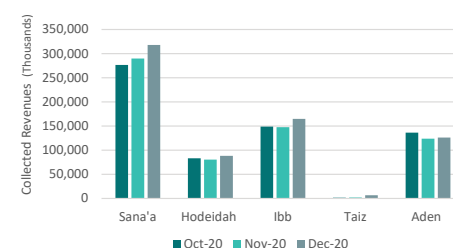
## e. Financial Viability

The financial viability varies significantly among the LCs due to differences in operating contexts, some of them do not reach cost recovery as a result of inadequate services or low tariffs. This becomes more challenging when coupled with a decline in revenue collection rates, causing an increase in receivables from customers and thus a shortage of liquidity.

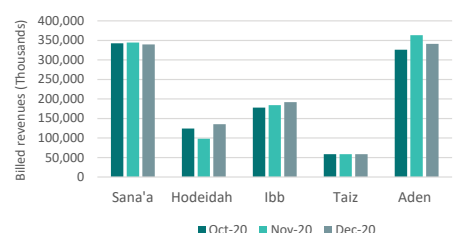
As a result of ongoing efforts to improve their financial resources, service charges were effectively billed by Sana'a LC since the beginning of 2018. In addition, with the support of GIZ Water Program, Sana'a LC has employed the on-site 'Personal Digital Assistants (PDAs)' devices as an innovative approach to improve the quality of billing collection from the customers who ultimately realized the affordable costs of services obtained compared with the private water market. However, the upward patterns in financial recovery for Sana'a LC were attributed to collection efficiency improvement by 86%, seeming proportionate to cover operating costs (including fuel) as averaged in this quarter by 91%. Ibb LC was capable to improve monthly collection efficiency to 83% along with a remarkable regress in cost coverage indeed by 69% on average. Given that LCs of Aden and Hodeidah are exerting efforts to enhance their financial standing against the acceptable level of service provided to their customers, they had reported a decline both in collection efficiency and cost coverage in comparison with Q3<sup>th</sup> quarter 2020.

As the case for Taiz LC, they did not rely on water sales and revenues to cover the operating expenses owing to the fact that energy and wages are largely subsidized. In contrast, the recurring scenario of poor collection efficiency (6%) explicitly demonstrates stagnant management of customers relationship and billing activities. Such circumstances dictate the crucial mobilization of support for Taiz LC to restore resilience and resume business processes, inter alia, effective billing and financial management.

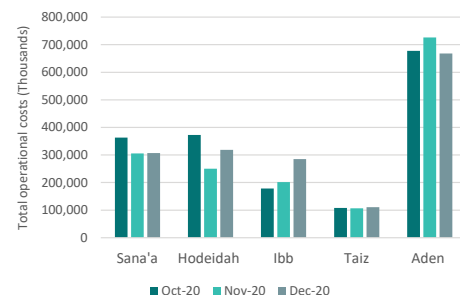
33. Total collected operational revenues (YER/month)<sup>7</sup>



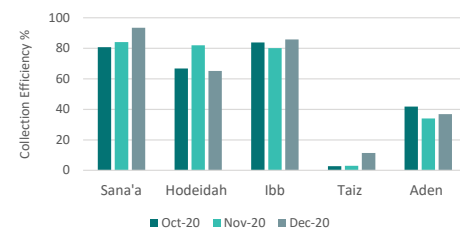
34. Total billed operational revenues (YER/month)



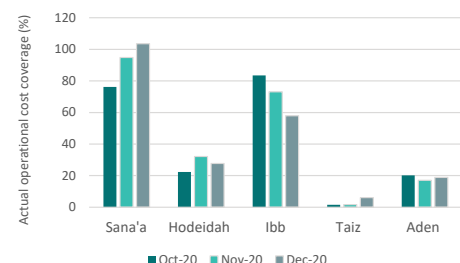
35. Total operational costs (YER/month)



36. Collection efficiency = Collected revenues vs. Billed revenues (%)



37. Actual operational cost coverage (%)



7. Revenues including domestic, commercial & governmental collection

## Monthly governmental subsidies

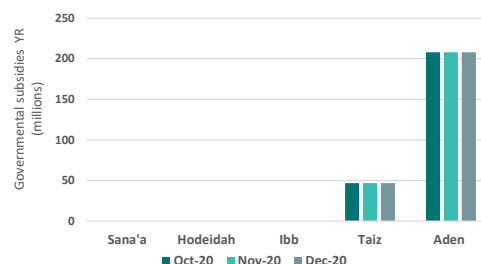
Given the fact that investment support from the government has dropped dramatically since 2015 due to deteriorating economic and financial conditions. In exclusive form, the LCs of Aden and Taiz were among fewer public institutions regularly receiving monthly allocations in kind of financial subsidies from the Ministry of Finance in Aden to pay staff salaries and other operating expenses, while other LCs depend merely on water sales.

## Percentage of basic monthly salaries paid

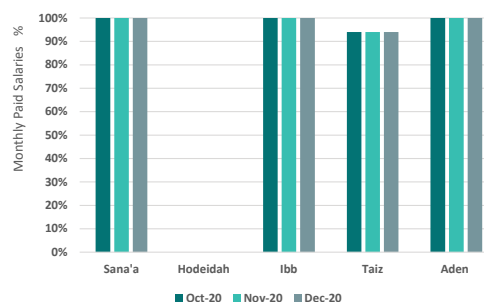
The eventual impact of external support and subsidies has gradually empowered the LCs in managing the salary expenses of employees. It should be noted that payroll is reported for the actual payments received monthly by the employees, regardless of the fact that some LCs reimburse late payments of the basic salaries retroactively.

Though most of the LCs were capable of paying 100% of the base salaries in this quarter (except Hodeidah LC), they are frequently in profound distress and vulnerable to secure the salaries and other heavy entitlements under volatile conditions and unpredictable continuity of external assistance.

38. Monthly governmental subsidies (YER/month)



39. Percentage of basic monthly salaries paid (%)



## 5 Resilience factors<sup>8</sup>

Disruptions of water supply and sanitation services can be caused by adverse effects on any one of the components that make up the service: people (e.g. skilled staff), hardware (e.g. infrastructure, equipment) and consumables (e.g. fuel, equipment, spare parts). Neither of these components is sufficient on its own. It is pointless having the spare parts required to repair electric generators, for instance, if the only technical staff able to install them are lacking the pertaining capacities and skills.

The LCs must increasingly strive to become more resilient and maintain services during/post-conflict. They must, therefore, address long-standing vulnerabilities in order to mitigate the cumulative effects of the conflict and gradually reduce their dependence on external short-term assistance.

At present, external assistance programmes, instead of sporadic crisis interventions, must seek to intervene in technical and investment measures. While these interventions may be essential during relief efforts, the resumption and strengthening of the LCs' capacity are equally synonymous with building resilience. It is the resilience that allows the LCs to maintain the reliable delivery of services in the short, medium and long-term. The table beside presents the identified resilience factors with their expected impact after the implementation of related activities.

RESILIENCE MEASURES AND IMPACT

Main Activity	Resilience Factor	Impact
Technical Assistance – Capacity building	Improve governance and management skills on top level.	<ul style="list-style-type: none"> <li>• Support and guide the LC management during the crisis in the decision making of required actions and measures.</li> <li>• Enable managers and key staff to prepare and introduce customized policies and procedures to increase the performance of the utility.</li> <li>• Enhance the coordination and cooperation among the different stakeholders (donors).</li> <li>• Enhance monitoring, evaluation and accountability of the LC to increase the performance.</li> </ul>
Technical Assistance – Capacity building, Financial support, Consultancy support, equipment support	Enhance the work capacity and skills of the employees. Human resource development	<ul style="list-style-type: none"> <li>• Operate the utility more efficient and organized.</li> <li>• Improve coordination and cooperation among different departments.</li> <li>• Improve and increase the service for customers.</li> <li>• Manage professionally the exceptional work. Environment and the new technologies.</li> <li>• Reduce administrative water losses and increase revenue collection.</li> </ul>
Technical Assistance – Financial support, Awareness building; Coaching, Investments	Strengthen the financial capacity of the utility.	<ul style="list-style-type: none"> <li>• Ensure financial means at least to cover the minimum needs for operation of the utility.</li> <li>• Enable urgently needed repair and maintenance of the infrastructure.</li> <li>• Initiate pro-poor projects.</li> <li>• Keep motivated staff.</li> <li>• Enhance financial sustainability.</li> </ul>
Technical Assistance – Awareness building, Operation Management Support	Improve customer management and customer relation.	<ul style="list-style-type: none"> <li>• Increase service coverage and numbers of customers.</li> <li>• Enhance billing and collection procedures.</li> <li>• Increase collection efficiency and revenues.</li> <li>• Establish good customer relation to improve payment moral.</li> </ul>
Investment – Rehabilitation, Maintenance, Extension	Increase water service coverage and supplied quantities.	<ul style="list-style-type: none"> <li>• Increase water availability for urban residents.</li> <li>• Improve water supply condition.</li> <li>• Reduce physical water losses.</li> <li>• Increase number of customers.</li> <li>• Improve water quality.</li> </ul>
Investment – Rehabilitation, Maintenance, Extension	Improve and extend sewer system.	<ul style="list-style-type: none"> <li>• Improve hygiene and health situation for urban residents.</li> <li>• Protect environment and water sources.</li> <li>• Increase number of customers.</li> </ul>
Investment	Provide renewable energy system (Photovoltaic).	<ul style="list-style-type: none"> <li>• Operate water and sanitation facilities sufficiently.</li> <li>• Operate LC offices during working hours.</li> <li>• Reduce operation and maintenance costs.</li> </ul>

8. GIZ IDWS/Damage Assessment Study DAS Stage 3 – Part 1: Resilience Strategy Report – Enhancing the Resilience of the LCs during Conflict and in Post-conflict Scenario - 2018



# Annex 1 Resilience Emergency Indicators Sheet October -December 2020

Urban Water Sector - Sana'a LC, Aden LC, Hodeidah LC, Ibb LC & Taiz LC

No.	Data / Indicator	LC	Unit	1 <sup>st</sup> Q			2 <sup>nd</sup> Q			3 <sup>rd</sup> Q			4 <sup>th</sup> Q		
				Jan-20	Feb-20	Mar-20	April-20	May-20	June-20	July-20	Aug -20	Sept -20	Oct-20	Nov -20	Dec -20
1	عدد السكان في المراكز الحضرية المخدمة من قبل مزود الخدمة (شهري في نهاية الشهر)  Number of population of urban centers	Sana'a	Cap	3,485,825	3,489,311	3,492,801	3,496,293	3,499,790	3,503,289	3,506,793	3,510,300	3,513,810	3,517,324	3,520,841	3,524,362
		Hodeidah		711,283	711,994	712,706	713,419	714,132	714,846	715,561	716,277	716,993	717,710	718,428	719,146
		Ibb		836,670	837,507	838,344	839,183	840,022	840,862	841,703	842,544	843,387	844,230	845,074	845,920
		Taiz		730,360	731,090	731,821	732,553	733,285	734,019	734,753	735,488	736,223	736,959	737,696	738,434
		Aden		1,111,019	1,112,130	1,113,242	1,114,355	1,115,469	1,116,585	1,117,701	1,118,819	1,119,938	1,121,058	1,122,179	1,123,301
2	عدد النازحين الى مناطق امتياز مزود الخدمة (شهري في نهاية الشهر)  Number of IDPs in service area	Sana'a	Cap	431,896	431,896	431,896	431,896	431,896	431,896	431,896	431,896	431,896	431,896	431,896	431,896
		Hodeidah		22,536	22,536	22,536	22,536	22,536	22,536	22,536	22,536	22,536	22,536	22,536	22,536
		Ibb		257,500	257,500	257,500	257,500	257,500	257,500	257,500	257,500	257,500	257,500	257,500	257,500
		Taiz		115,678	115,678	115,678	115,678	115,678	115,678	115,678	115,678	115,678	115,678	115,678	115,678
		Aden		75,827	75,827	75,827	75,827	75,827	75,827	75,827	75,827	75,827	75,827	75,827	75,827
3	إجمالي عدد توصيلات المياه في نهاية الشهر - يشمل المنزلي، التجاري، والحكومي وغيره  Number of water connections	Sana'a	No.	95,443	95,570	95,748	95,955	96,053	96,055	96,200	96,286	96,375	96,480	96,636	96,744
		Hodeidah		68,862	68,895	68,926	69,007	69,051	69,091	69,158	69,203	69,245	69,300	69,361	69,407
		Ibb		33,227	33,313	33,374	33,399	33,415	33,543	33,649	33,734	33,861	33,975	34,088	34,251
		Taiz		53,171	53,203	53,268	53,275	53,299	53,361	53,389	53,412	53,465	53,497	53,521	53,595
		Aden		136,891	137,374	137,625	137,967	137,967	137,967	137,967	137,967	138,107	139,330	139,573	139,828
4	عدد السكان المخدمين بالمياه من قبل مزود الخدمة (شهري في نهاية الشهر)  Number of population served through water supply network	Sana'a	Cap	1,145,316	1,146,840	1,148,976	1,151,460	1,152,636	1,152,660	1,154,400	1,155,432	1,156,500	1,157,760	1,159,632	1,160,928
		Hodeidah		482,034	482,265	482,482	483,049	483,357	483,637	484,106	484,421	484,715	485,100	485,527	485,849
		Ibb		498,405	499,695	500,610	500,985	501,225	503,145	504,735	506,010	507,915	509,625	511,320	513,765
		Taiz		359,189	359,872	359,945	360,197	360,848	361,142	361,384	361,940	362,276	362,801	362,780	363,034
		Aden		958,237	961,618	963,375	965,769	965,769	965,769	966,749	966,917	969,612	975,310	977,011	978,796
5	نسبة عدد السكان المخدمين بالمياه من قبل مزود الخدمة من إجمالي السكان (شهري في نهاية الشهر)  Water supply service coverage = population served through water supply network vs total population in service area	Sana'a	%	33	33	33	33	33	33	33	33	33	33	33	33
		Hodeidah		68	68	68	68	68	68	68	68	68	68	68	68
		Ibb		60	60	60	60	60	60	60	60	60	60	61	61
		Taiz		76	76	76	76	76	76	76	76	76	49	49	49
		Aden		86	86	87	87	87	86	86	86	87	87	87	87
6	عدد ايام تزويد الخدمة خلال الشهر (لتزويد المياه من خلال شبكة التوزيع)  Number of service days of piped water supply per month	Sana'a	day/ month	2.50	2.50	2.50	3	3	3	3	3	3	2.50	2.50	2.50
		Hodeidah		25	25	25	25	25	25	25	25	25	25	25	25
		Ibb		1	1	1	1	1	1	1	1	2	2	2	2
		Taiz		1	1	1	1	1	1	2	2	2	5	4	5
		Aden		30	30	30	30	30	30	30	30	30	30	30	30
7	إجمالي عدد عينات الكلور المأخوذة من شبكة المياه خلال الشهر  Number of residual chlorine samples taken	Sana'a	No./ month	62	64	42	37	40	50	25	52	50	80	76	46
		Hodeidah		846	789	853	836	836	786	479	787	736	772	564	844
		Ibb		118	112	120	96	86	72	102	102	98	90	72	66
		Taiz		12	10	16	18	13	20	10	10	16	10	10	10
		Aden		72	74	175	120	93	96	180	-	99	84	96	150
8	إجمالي عدد عينات الكلور الإيجابية المأخوذة من شبكة المياه والتي تتوافق مع المعايير  Number of residual chlorine samples according to standards	Sana'a	No./ month	62	64	42	37	40	50	25	52	50	80	76	46
		Hodeidah		846	789	853	836	836	786	479	787	736	772	564	844
		Ibb		103	105	100	88	75	60	88	93	87	79	60	59
		Taiz		12	10	16	13	15	15	18	10	12	8	7	9
		Aden		72	74	175	120	93	96	180	-	99	84	96	150
9	درجة نقاوة المياه المزودة بكتريولوجيا  Proportion of bacteriological quality samples of distributed water according to standards = Number of residual chlorine samples according to standards per total number of samples taken	Sana'a	%	100	100	100	100	100	100	100	100	100	100	100	100
		Hodeidah		100	100	100	100	100	100	100	100	100	100	100	100
		Ibb		87	94	83	92	87	83	86	91	89	88	83	89
		Taiz		100	100	100	72	115	75	180	100	75	80	70	90
		Aden		100	100	100	100	100	100	100	-	100	100	100	100

No.	Data / Indicator	LC	Unit	1 <sup>st</sup> Q			2 <sup>nd</sup> Q			3 <sup>rd</sup> Q			4 <sup>th</sup> Q		
				Jan-20	Feb-20	Mar-20	April-20	May-20	June-20	July-20	Aug -20	Sept -20	Oct-20	Nov -20	Dec -20
10	عدد السكان المخدومين بشبكات الصرف الصحي من قبل مزود الخدمة (شهري في نهاية الشهر)	Sana'a	Cap	1,070,976	1,072,428	1,074,564	1,076,928	1,077,912	1,078,500	1,079,964	1,083,312	1,084,236	1,085,304	1,087,656	1,088,832
		Hodeidah		296,233	296,352	296,450	296,709	296,821	299,019	297,101	297,290	297,472	298,137	298,375	298,529
		Ibb		418,455	419,535	420,465	421,200	421,410	423,255	424,755	426,045	427,965	408,900	411,255	413,805
	Number of population served with sewerage connections	Taiz		265,144	265,406	265,648	265,700	265,931	266,141	266,152	266,225	266,257	266,771	266,887	266,937
		Aden		830,620	832,762	834,057	835,695	835,695	835,702	836,850	836,990	82,971	844,340	845,278	846,832
11	إجمالي عدد توصيلات الصرف الصحي - يشمل المنزلي، التجاري، الحكومي وغيره	Sana'a	No.	89,248	89,369	89,547	89,744	89,826	89,875	89,997	90,276	90,353	90,442	90,638	90,736
		Hodeidah		42,319	42,336	42,350	42,387	42,403	42,717	42,443	42,470	42,496	42,591	42,625	42,647
		Ibb		27,897	27,969	28,031	28,080	28,094	28,217	28,317	28,403	28,531	28,647	28,918	29,098
	Number of sewerage connections	Taiz		44,912	44,935	44,940	44,962	44,982	44,983	44,990	44,993	45,042	45,045	45,049	45,054
		Aden		118,660	118,966	119,151	119,385	119,385	119,385	119,385	119,386	119,550	120,620	120,754	120,976
12	نسبة عدد السكان المخدومين بشبكات الصرف الصحي من قبل مزود الخدمة (شهري في نهاية الشهر)	Sana'a	%	31	31	31	31	31	31	31	31	31	31	31	31
		Hodeidah		42	42	42	42	42	42	42	42	41	42	42	42
		Ibb		50	50	50	50	50	50	50	51	51	48	49	49
	Sewerage connection coverage	Taiz		65	65	64	64	64	64	64	64	64	36	36	36
		Aden		75	75	75	75	75	75	75	75	7	75	75	75
13	عدد عينات الـ (بي أو دي) المجمعة من محطات المعالجة خلال الشهر	Sana'a	No.	6	5	4	4	4	5	4	4	4	4	4	4
		Hodeidah		2	-	2	6	6	6	6	6	6	6	6	6
		Ibb		5	6	6	6	6	6	6	6	6	6	6	6
	Number of BOD-samples of effluent of WWTP taken per month	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
14	عدد عينات الـ (بي أو دي) المجمعة من محطات المعالجة المطابقة لمعيار التدفق خلال الشهر	Sana'a	No.	0	0	0	0	0	0	0	0	0	0	0	0
		Hodeidah		2	-	2	6	6	6	6	6	6	6	6	6
		Ibb		4	5	5	5	5	5	5	5	5	5	5	5
	Number of BOD-samples of effluent of WWTP according to standards per month	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
15	كفاءة المعالجة في محطات معالجة الصرف الصحي	Sana'a	%	0	0	0	0	0	0	0	0	0	0	0	0
		Hodeidah		100	-	100	100	100	100	100	100	100	100	100	100
		Ibb		89	75	75	91	91	91	90	90	90	83	83	83
	Proportion of effluent quality samples of wastewater treatment plants according to standards = Number of BOD samples according to standards per total number of samples taken	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
16	متوسط قيمة الـ (بي أو دي) للمياه المتدفقة (الخام) إلى محطة معالجة مياه الصرف الصحي	Sana'a	mg BOD <sub>5</sub> /L	1,520	1,292	1,268	1,340	1,328	1,320	1,205	1,152	1,094	1,205	1,244	1,172
		Hodeidah		535	-	450	362	420	540	400	385	395	470	464	436
		Ibb		2,085	2,180	2,099	2,084	1,981	1,836	1,973	1,848	1,798	2,018	2,102	1,978
	Average BOD value of raw influent at WWTP	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
17	متوسط قيمة الـ (بي أو دي) من المياه المعالجة (الخارجة) من محطة معالجة مياه الصرف الصحي	Sana'a	mg BOD <sub>5</sub> /L	611	345	330	337	356	342	336	344	367	336	358	347
		Hodeidah		81	-	84	207	95	90	85	80	80	82	85	83
		Ibb		225	235	226	224	213	226	243	227	221	213	216	205
	Average BOD value of treated effluent at WWTP	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
18	كفاءة المعالجة لمحطة مياه الصرف الصحي فيما يخص الـ (بي أو دي)	Sana'a	%	60	73	74	75	73	74	72	70	66	72	71	70
		Hodeidah		85	-	81	43	77	83	79	79	80	83	82	81
		Ibb		89	89	89	89	89	88	88	88	88	89	90	90
	Treatment efficiency of WWTP regarding BOD	Taiz		-	-	-	-	-	-	-	-	-	-	-	-
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
19	إجمالي كمية المياه المنتجة	Sana'a	m <sup>3</sup> /month	1,098,936	1,051,786	1,193,185	1,216,162	1,128,250	1,165,038	1,056,549	1,073,258	1,037,057	1,042,158	1,068,841	1,203,100
		Hodeidah		1,189,959	1,094,403	1,122,242	1,110,556	1,198,930	1,168,189	1,145,570	1,084,850	1,069,302	1,055,510	1,005,601	1,101,472
		Ibb		422,809	410,000	398,793	419,461	442,481	392,322	442,683	442,994	473,744	520,797	494,513	525,187
	Total quantity of water produced	Taiz		142,791	139,474	152,634	151,655	133,979	119,408	107,160	131,829	108,199	100,031	97,035	109,782
		Aden		3,267,100	3,253,328	3,267,100	3,253,328	3,376,256	3,314,826	2,939,571	2,969,485	3,000,170	3,009,880	3,126,052	3,376,978

No.	Data / Indicator	LC	Unit	1 <sup>st</sup> Q			2 <sup>nd</sup> Q			3 <sup>rd</sup> Q			4 <sup>th</sup> Q		
				Jan-20	Feb-20	Mar-20	April-20	May-20	June-20	July-20	Aug -20	Sept -20	Oct-20	Nov -20	Dec -20
20	نصيب الفرد من المياه المنتجة  Per capita quantity of water produced	Sana'a	l/cap/day	31	30	33	34	32	33	30	30	29	29	30	33
		Hodeidah		80	73	75	74	80	78	76	72	71	70	67	73
		Ibb		27	26	26	27	28	25	28	28	30	33	31	33
		Taiz		8	8	9	9	8	7	6	8	6	9	9	10
		Aden		110	109	109	109	113	111	98	99	100	100	103	111
21	الطاقة التخزينية الشهرية المتاحة  Storage capacity	Sana'a	m <sup>3</sup>	36,450	36,450	36,450	36,450	36,450	36,450	36,450	36,450	36,550	36,550	36,550	36,550
		Hodeidah		25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
		Ibb		4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
		Taiz		49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000
		Aden		94,700	94,700	94,700	94,700	94,700	94,700	94,700	94,700	94,700	94,700	94,700	94,700
22	نصيب الفرد من الطاقة التخزينية المتاحة  Storage capacity share per capita	Sana'a	l/cap	32	32	32	32	32	32	32	32	32	32	32	31
		Hodaidah		52	52	52	52	52	52	52	52	52	52	51	51
		Ibb		8	8	8	8	8	8	8	8	8	8	8	8
		Taiz		88	88	88	88	88	87	87	87	87	135	135	135
		Aden		99	98	98	98	98	98	98	98	98	97	97	97
23	تكلفة الطاقة لكل متر مكعب منتج من المياه خلال الشهر  Energy costs per m <sup>3</sup> water produced	Sana'a	YER/m <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	0	0
		Hodaidah		0	0	0	0	0	0	0	0	0	0	0	0
		Ibb		300	334	376	344	366	291	246	288	143	125	132	145
		Taiz		0	0	0	0	0	0	0	0	0	0	0	0
		Aden		68	66	62	72	72	67	77	75	62	61	72	50
24	كمية المياه المنتجة - المعالجة أو غير المعالجة - التي تتدفق من محطة معالجة الصرف الصحي  Effluent produced	Sana'a	m <sup>3</sup> /month	1,488,000	1,392,000	1,488,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,736,000
		Hodeidah		684,250	747,150	781,150	799,000	892,500	746,300	745,450	780,300	708,050	706,350	657,050	661,300
		Ibb		452,435	442,483	455,433	437,663	429,835	440,591	489,184	458,396	431,436	405,789	350,649	382,398
		Taiz		210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	90,000	90,000	90,000
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
25	كمية المياه المنتجة - المعالجة أو غير المعالجة - التي تتدفق من محطة معالجة الصرف الصحي  Effluent produced	Sana'a	l/cap/day	46	43	46	52	52	52	52	52	52	52	51	53
		Hodeidah		75	81	85	87	97	81	81	85	77	76	71	71
		Ibb		35	34	35	34	33	34	37	35	33	32	28	30
		Taiz		14	14	14	14	14	14	14	14	14	11	11	11
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
26	كمية مياه الصرف الصحي المعالجة التي تتدفق من محطة المعالجة  Effluent treated in wastewater treatment plant	Sana'a	m <sup>3</sup> /month	1,488,000	1,392,000	1,488,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,736,000
		Hodeidah		684,250	747,150	781,150	799,000	892,500	746,300	745,450	780,300	708,050	706,350	657,050	661,300
		Ibb		452,435	442,483	455,433	437,663	429,835	440,591	489,184	458,396	431,436	405,789	350,649	382,398
		Taiz		210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	90,000	90,000	90,000
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
27	إجمالي عدد المضخات الرئيسية  Total number of main pumps for the water supply system	Sana'a	No.	102	102	102	102	102	102	102	102	102	102	102	102
		Hodeidah		45	45	45	45	45	45	45	45	45	45	45	45
		Ibb		31	32	32	33	33	33	33	33	33	33	33	33
		Taiz		76	76	76	76	76	76	76	76	76	76	76	76
		Aden		126	126	126	126	126	126	126	126	126	126	126	126
28	عدد المضخات الرئيسية العاملة والتي تضخ المياه خلال الشهر  Number of functional pumps in service	Sana'a	No./month	61	64	67	65	65	64	63	61	62	65	66	66
		Hodeidah		35	34	33	34	35	34	34	32	32	31	30	32
		Ibb		27	28	27	28	28	28	27	26	27	29	27	27
		Taiz		36	36	38	35	35	34	34	35	35	31	32	32
		Aden		96	98	97	94	91	93	92	87	94	89	90	91
29	عدد ساعات عمل (تشغيل) المضخات (كل المضخات العاملة والتي تضخ المياه) في الشهر  Number of working hours of all operating pumps of the water supply system	Sana'a	h/month	25,865	25,038	28,991	28,415	26,237	27,296	24,200	25,300	22,845	23,847	24,408	27,770
		Hodeidah		19,896	18,687	20,522	18,938	22,368	19,898	19,685	19,074	18,626	18,416	17,461	18,709
		Ibb		18,414	17,248	18,414	17,820	18,414	14,580	21,142	19,778	20,460	19,778	17,820	18,419
		Taiz		10,522	10,227	11,042	10,756	9,918	8,082	7,817	9,201	6,809	8,224	7,832	9,722
		Aden		56,072	55,192	56,882	54,971	54,411	54,056	51,385	51,884	52,688	51,559	54,347	58,390

No.	Data / Indicator	City	Unit	1 <sup>st</sup> Q			2 <sup>nd</sup> Q			3 <sup>rd</sup> Q			4 <sup>th</sup> Q		
				Jan-20	Feb-20	Mar-20	April-20	May-20	June-20	July-20	Aug-20	Sept-20	Oct-20	Nov-20	Dec-20
30	عدد الأعطال الناتجة عن أسباب فنية خلال الشهر للمضخات الرئيسية العاملة في ضخ المياه  Number of main functional pumps failures due to technical reasons	Sana'a	No./ month	4	21	26	23	23	31	11	16	21	22	20	4
		Hodeidah		15	17	20	20	14	17	16	19	25	22	20	15
		Ibb		4	4	5	5	5	5	6	7	6	4	6	6
		Taiz		5	12	7	9	12	14	10	6	16	7	8	6
		Aden		5	4	3	7	9	8	10	10	11	8	8	9
31	عدد المولدات العاملة في تشغيل المضخات  Number of working generators in the operation of pumps	Sana'a	No.	52	54	59	56	56	51	52	46	52	55	56	56
		Hodeidah		17	18	18	17	18	18	18	18	18	18	18	18
		Ibb		17	18	18	19	19	19	18	18	18	19	18	18
		Taiz		31	32	29	25	25	24	24	26	26	25	26	27
		Aden		7	7	7	7	7	7	7	7	7	7	7	7
32	عدد ساعات عمل (تشغيل) المولدات (كل المولدات العاملة المستخدمة في تشغيل المضخات خلال الشهر) Number of working hours of all operating generators used to run the functional pumps of the water supply system	Sana'a	h/ month	10,051	10,776	12,560	11,966	9,937	11,097	7,790	8,233	10,859	17,784	13,138	11,997
		Hodeidah		3,953	3,232	4,096	3,834	3,467	3,026	3,403	2,602	3,257	3,498	1,753	1,868
		Ibb		11,594	11,088	12,276	11,970	12,369	11,970	11,880	11,532	11,250	12,958	11,880	12,276
		Taiz		7,755	7,956	7,758	7,328	6,829	5,238	4,973	6,011	6,147	6,799	6,383	6,627
		Aden		-	-	-	-	-	-	-	-	-	-	-	-
33	قيمة الإيرادات الشهرية المحصلة  Total collected operational revenues	Sana'a	YER/ month	250,525,158	279,778,052	271,855,470	263,425,357	214,755,532	247,312,221	278,339,254	206,410,356	252,448,432	276,598,436	289,610,995	317,694,216
		Hodeidah		62,685,786	68,265,317	72,544,237	55,681,676	55,995,572	61,982,857	73,926,963	59,893,345	74,957,172	83,056,486	80,357,008	88,140,365
		Ibb		121,789,124	136,355,581	134,095,608	122,010,885	107,623,597	148,005,490	136,355,581	128,982,629	142,174,436	148,853,099	147,555,878	164,848,436
		Taiz		2,574,634	3,025,700	3,053,230	2,098,536	3,085,601	2,904,230	1,703,773	1,176,177	6,037,820	1,651,875	1,779,450	6,726,480
		Aden		149,122,423	138,997,097	140,651,059	138,997,097	140,651,059	90,664,355	93,653,864	82,964,915	116,358,622	136,331,706	123,709,287	125,964,735
34	قيمة الإيرادات الشهرية المفوترة (قيمة مبيعات المياه الشهرية المفوترة)  Total billed operational revenues	Sana'a	YER/ month	350,044,974	315,675,128	344,062,362	333,177,437	328,546,997	350,044,974	348,412,689	319,839,753	350,208,897	342,626,062	344,349,050	339,676,886
		Hodeidah		136,277,298	131,477,500	127,706,007	130,868,670	132,360,379	138,003,777	138,476,076	142,915,387	130,700,503	124,376,631	98,005,054	135,151,073
		Ibb		151,390,035	159,664,558	144,703,575	154,462,867	158,427,464	163,138,132	152,492,745	157,942,421	169,429,605	177,641,482	184,085,705	192,037,159
		Taiz		58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550	58,619,550
		Aden		344,859,483	334,880,861	340,684,867	334,880,861	340,684,867	320,750,115	343,153,567	325,478,032	326,926,250	326,295,469	363,301,965	341,133,195
35	إجمالي التكاليف التشغيلية  Total operational costs	Sana'a	YER/ month	175,302,297	204,469,708	241,500,800	199,819,066	188,711,681	224,943,074	259,337,161	227,706,158	305,826,775	363,200,955	305,433,482	306,634,000
		Hodeidah		160,127,432	175,285,720	179,936,960	436,169,970	247,059,519	107,846,416	269,977,754	159,864,376	120,814,445	372,487,763	250,182,787	318,778,652
		Ibb		165,322,725	163,496,062	170,314,523	171,908,406	184,551,952	244,932,911	133,704,768	160,604,711	177,567,005	178,217,965	201,777,556	284,779,108
		Taiz		127,569,040	129,078,100	130,153,720	127,443,460	127,984,420	113,769,940	116,275,240	118,324,420	115,903,960	107,621,425	106,426,345	110,948,605
		Aden		683,900,568	675,328,587	669,804,540	675,328,587	669,804,540	679,736,635	726,230,331	716,126,570	677,564,053	677,528,580	726,176,504	668,246,342
36	نسبة التحصيل  Collection Efficiency	Sana'a	%	72	89	79	79	65	71	80	65	72	81	84	94
		Hodeidah		46	52	57	43	42	45	53	42	57	67	82	65
		Ibb		80	85	93	79	68	91	89	82	84	84	80	86
		Taiz		4	5	5	4	5	5	3	2	10	3	3	11
		Aden		43	42	41	42	41	28	27	25	36	42	34	37
37	التغطية التشغيلية المحصلة للتكلفة  Actual operational cost coverage	Sana'a	%	143	137	113	132	114	110	107	91	83	76	95	104
		Hodeidah		39	39	40	13	23	57	27	37	62	22	32	28
		Ibb		74	83	79	71	58	60	102	80	80	84	73	58
		Taiz		2	2	2	2	2	3	1	1	5	2	2	6
		Aden		22	21	21	21	21	13	13	12	17	20	17	19
38	قيمة الإعانات (المعونات) الحكومية الشهرية لمزود الخدمة  Monthly governmental subsidies	Sana'a	YER/ month	0	0	0	0	0	0	0	0	0	0	0	0
		Hodeidah		0	0	0	0	0	0	0	0	0	0	0	0
		Ibb		0	0	0	0	0	0	0	0	0	0	0	0
		Taiz		46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589	46,828,589
		Aden		208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312	208,026,312
39	نسبة الرواتب الأساسية الشهرية المدفوعة للموظفين  Percentage of basic monthly salaries paid	Sana'a	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Hodeidah		100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
		Ibb		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Taiz		94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%
		Aden		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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Aden LC, Hodeidah LC, Ibb LC, Sana'a LC, Taiz LC are responsible for the content of this publication.

