

Yemen: Water supply and sanitation systems in provincial towns / work-intensive infrastructure measures under the water supply and sanitation project for provincial towns (Amran and Yarim)

Ex post evaluation report

OECD sector	14020 / Water supply and sanitation – large systems	
BMZ project ID	Projects a + b) 1989 66 160 / 2001 65 787 Project c) 2002 65 165	
Project executing agency	National Water and Sanitation Authority (NWSA)	
Consultant	JV Gitec / Dorsch	
Year of ex post evaluation	2008	
	Project appraisal (planned)	Ex post evaluation (actual)
Start of implementation	a) Q1 1993 b) Q1 1999 c) Q3 2002	a) Q2 1996 b) Q1 2000 c) Q4 2002
Period of implementation	a) 36 months b) 24 months c) 6 months	a) 36 months b) 57 months c) 16 months
Investment costs	a+b) EUR 55 million c) EUR 3.5 million	a+b) EUR 65.1 million c) EUR 3.5 million
Counterpart contribution	a+b) EUR 9.7 million c) EUR 0.5 million	a+b) EUR 7.3 million c) EUR 0.5 million
Financing, of which FC funds	a+b) EUR 23.8 million c) EUR 3 million	a+b) EUR 57.8 million c) EUR 3 million
Other institutions/donors involved	GTZ	GTZ
Performance rating	a+b) 3 c) 3	
• Relevance	a+b) 2 c) 2	
• Effectiveness	a+b) 3 c) 2	
• Efficiency	a+b) 2 c) 2	
• Overarching developmental impact	a+b) 2 c) 2	
• Sustainability	a+b) 3 c) 3	

Brief description, overall objective and project objectives with indicators

The overall project is an open programme (PTP I Programme; Provincial Towns Programme I) consisting of two sub-programmes (a + b) and a complementary project under the Anti-Terrorism Package (ATP) (c). The project covered the renewal and expansion of existing drinking water supply systems in eight provincial towns in Yemen (Bajil, Bait al Faqih, Al Mansuriyya, Zabid, Al Mukha, Amran, Yarim und Hajjah), and measures to centralise waste

water collection and treatment in three towns (Hajjah, Amran, Yarim). The waste water management measures for Amran and Yarim had initially been postponed under the open programme and were resumed in 1998. In 2001, they were complemented by a separate project (b). The programme's objective was to meet basic regional demand for hygienically safe drinking water in the towns involved in the programme, and to improve operation of water supply systems and sanitary conditions in the towns where waste water treatment was included in the programme. The overall project objective was to help improve the health situation in the towns involved in the programme. Moreover, the ATP project (c) aimed to make a direct contribution to the fight against poverty in two programme towns (Amran and Yarim) by creating temporary jobs mainly for the lower income strata. This measure was also intended as an indirect contribution to conflict prevention. The target group of the project comprised the inhabitants of the towns covered by the programme (2005). The Financial Cooperation (FC) programme was implemented along with a series of Technical Cooperation (TC) projects designed to strengthen the institutional set-up of Yemen's water supply and sanitation sector. The most recent phase of these projects will be subject to a separate evaluation by GTZ in the summer of 2008.

The overall investment cost of the PTP I and ATP programmes was EUR 68.6 million. The two sub-programmes of the PTP I used EUR 57.8 million and the ATP project EUR 3.0 million in FC funds. There was a 23% cost overrun relative to the budget drawn up at project appraisal. The central 'National Water and Sanitation Authority' (NWSA) acted as project executing agency during the preparation and implementation phases of the project. Independent local and regional water entities, called local corporations (LCs), were, and continue to be, responsible for operating the facilities.

Project design / major deviations from the original project planning and their main causes

At the project appraisal stage, plans were drawn up to rehabilitate the existing water supply systems of ten provincial towns (i.e. Al Bayda and Sadah in addition to the eight towns mentioned above) as part of an open programme, and to expand the waste water collection and treatment facilities in Hajjah and Yarim. The waste water management measures in Yarim, and also in Amran, which had initially been postponed, were incorporated into the programme in 1998 and 2001. In Al Bayda, the emergency measures introduced as part of the feasibility study achieved substantial improvements, which is why the town was taken off the list. Implementation in the town of Sadah was initially deferred, and later Sadah was given a project of its own.

The programme on 'work-intensive infrastructure measures under the water supply and sanitation project for provincial towns (Amran and Yarim)' was a sub-component of the programme and was implemented from 2002 onwards as part of a set of measures to combat terrorism. Household connections to the water supply and sanitation networks were installed to increase the connection rates in the old parts of the two towns.

The efforts made by German Development Cooperation (DC) to strengthen Yemen's water sector are based on a division of labour and close collaboration between Financial and Technical Cooperation and technical cooperation in a broader sense. Technical cooperation plays a major role in institution building, as was highlighted by the project on the 'institutional development of the water sector'. Under the PTP I programme, GTZ was responsible for setting up and determining the structure of the project executing agency, decentralising the sector and enhancing its efficiency, and raising awareness of drinking water supply and sanitation issues.

The projects constructed water supply systems with a daily capacity of 26,800 cubic metres of drinking water. This is deemed sufficient for some 350,000 people, while the connected population was 212,000 inhabitants in 2005 and approximately 250,000 in 2007. The waste water disposal capacities that were built amount to a total of 6,200 cubic metres per day, which is sufficient for approximately 100,000 inhabitants, with 61,000 and 67,000 people connected to such disposal facilities in 2005 and 2007 respectively. Owing to these measures, sanitary conditions have markedly improved both in the area served by the disposal facilities and in

downstream areas. However, two of the provisional solutions in Hajjah that were chosen for cost reasons and are currently processing approximately 20% of the waste water, will soon have to be replaced by a solution where the waste water is pumped to the main treatment plant. The capacity of the drinking water and waste water facilities that were built in Tihama region and Hajjah are deemed appropriate. In the mountain towns of Amran and Yarim, however, the planned supply capacity has not been fully implemented as groundwater supplies are excessively depleted by agricultural users who compete for scarce water resources; this has an adverse effect on the drinking water supply. In Amran, the LC has only recently been able to tap an adequate number of high-yield wells to ensure sufficient supplies to the network. In Yarim, the water resources available to the LC do not suffice to maintain an adequate supply level. Extra demand is met by private water sellers who operate water tank trucks.

By and large, the programme measures were appropriate to resolve the core issue of insufficient drinking water supplies and waste water disposal capacities for the population. The quality of the facilities built is rated as satisfactory. From today's point of view, the project would be implemented in more or less the same manner. However, it would seem crucial to pay more attention to constraints resulting from limited groundwater availability, and to implement the proposed measures in the framework of an integrated water resource management concept.

Key results of the impact analysis and performance rating

In summary, the PTP I programme (a+b) and the ATP measure (c) are evaluated as follows:

Relevance (sub-rating PTP I: 2 / ATP: 2): From the perspective of both the Yemeni side and German DC, the relevance of a reliable water supply system for the eight provincial towns is still very high, even from today's point of view. This is also true with regard to the MDGs. In view of their insufficient technical standards, the rudimentary systems that existed prior to the project were no longer adequate to keep pace with the strong population growth and ever-higher resource constraints. Therefore, the underlying rationale of the project was factually correct. However, faced with tricky water resource management issues, Yemeni decision-makers have not been able to effectively address conflicts between agricultural (and industrial) usage and drinking water demand; the lack of coherence in dealing with these issues shows that they still have a long way to go before an integrated water resource management concept is fully operational. The donors have at last agreed on a common position concerning their sector policies, and KfW has played a central role in bringing this about. This is why the relevance of the programme is rated at 2, and the same applies to the ATP project, given the ripple-on effects of network expansion in Amran and Yarim. In terms of the main action chain of creating jobs and income for the poor, a rating of 2 appears equally justified, even though the project's contribution to conflict prevention was perhaps somewhat elusive.

Effectiveness (sub-rating PTP I: 3 / ATP: 2): The open programme made a large contribution to achieving the water supply objectives in the Tihama towns, and a moderate to large contribution in the highland towns. In Yarim, however, the contribution was small (due to the resource situation mentioned earlier). As far as the objectives in the field of waste water disposal were concerned, the attainment rate was low to moderate. The small ATP follow-up project achieved its objective of creating jobs very well and was very effective in making an indirect development contribution through the expansion of the network in Amran. However, this is not true for Yarim (at least for the time being), due to the shortage in water supplies. Generally speaking, the contribution of the overall project to improving the supply situation of the population was satisfactory, but in Yarim the effectiveness was unsatisfactory, and only modest improvements were achieved regarding waste water disposal in the three towns. On a volume weighted basis, the three individual components make for an effectiveness rating for PTP I that is still in positive territory, but only just so (3), while the ATP programme is rated at 2.

Efficiency (sub-rating PTP I: 3 / ATP: 3): The programme measures, which were designed to renew the entire water supply network, were an appropriate technical and economic solution. On the one hand, it would not have been possible to rehabilitate the existing rudimentary

systems, on the other, an improvement of alternative supply channels (tanker trucks) does not offer any benefits to the economy. It does make sense, however, to combine such measures with projects that address waste water disposal issues in order to improve the sanitary conditions in the towns concerned, and this combined effort could have been extended to the Tihama towns as well. Now that the most important towns of that area (Bajil, Bait al Faqih and Zabid) have implemented their own FC sanitation projects, this aspect has essentially been dealt with. In view of the sometimes difficult topography, the specific investment costs of the water supply and sanitation systems are deemed appropriate, amounting to EUR 140 per person connected to the water supply system and EUR 550 per person connected to the waste water disposal system. The fairly high water and sewage rates relative to the average income of the population have prompted people to reduce consumption. Collection is efficient in all towns. The annual accounts show that all towns, except Yarim, are able to cover their operating costs. However, efficiency was affected by the lengthy implementation process. The delays were due to political developments and programme extensions. Overall, the funds used and the expenses incurred were in line with the impact that was achieved. The efficiency is rated at 3. The ATP programme, which was designed to complement the open programme, essentially shows a favourable cost-benefit ratio, but due to the delays incurred, its efficiency sub-rating is no higher than 3.

Overarching developmental impact (sub-rating PTP I: 2 / ATP: 2) Despite some shortcomings in the attainment of the project objectives, it is fair to say that the health risks to the towns' residents have been substantially reduced (overall objective). Although no firm conclusions can be drawn from the health statistics available, the figures indicate some positive trends. According to health care centres, the incidence of water-induced diseases in the towns covered by the programme has decreased considerably since the time of project appraisal. In the mountain towns, positive health effects may be ascribed particularly to improved sanitary conditions. Although the programme may not be the only factor responsible for the improved health situation, there appears to be a strong linkage. A scientific study financed by the study fund will be conducted as part of the comprehensive evaluation due in 2008/2009 and will use quantitative methods to analyse in more depth the causes and effects in some of the towns involved. From today's perspective, the overall objective should be defined more broadly so as to take account of the effects on regional politics and the general impact on sanitary conditions within the towns. Also, more attention should be paid to the impact on water resources. The improvement of sanitary conditions in the central towns of Hajjah and Amran may have a considerable impact on regional politics, as the two towns have become the seats of governors. The strong population influx from rural areas to central local towns is set to continue as marginal living standards in the countryside persist. From a development perspective, it seems to be more desirable if people settle down in local towns rather than migrate to the large cities of Sana'a and Aden (where slums keep growing). Were it not for the programme measures, considerably more funds and resources would be needed today to build a technically efficient water supply and sanitation system, which is one of the requirements provincial towns have to meet to function as local centres. By reducing network losses from approximately 50% to below 20% and encouraging water economy, the programme made a positive, albeit small, contribution to water conservation. Overall, the contribution of the PTP I programme to the overarching developmental impact is rated at 2. The good cooperation with TC was instrumental in achieving these positive effects. As the ATP project was designed to complement the main programme, it is equally rated at 2. Due to limited funds and little evidence of a causal connection, any link between the income generated through the ATP measures and progress made in conflict prevention is of a speculative nature and will not be taken into account.

Sustainability (sub-rating PTP I: 3 / ATP: 3): It is fair to assume that the Yemeni government will keep the LCs afloat and operational by providing them with subsidies, if necessary. Due to the high quality of the construction work, the water supply and sanitation facilities will remain effective over several years and will serve as the technical backbone of the water supply and sanitation systems in the programme towns. It is likely that the improved water supply and sanitation systems can be operated on a sustainable basis. For the foreseeable future, however, Yemen will have to rely on external assistance to meet the sector's finance requirements. At the same time, due to its poor capacity to implement reforms, the country still needs external

support to increase the efficiency of its institutions and carry out sector reforms. In view of sector-related issues, the sustainability of the PTP I programme is rated satisfactory (sub-rating 3), but only just so. The main effects which the ATP project was supposed to produce were not related to sustainability. This project receives the same rating (3) as the main programme, because of the network installations that were built.

Considering the sub-ratings, the **overall rating of the PTP I Programme** (and its two components a + b) is **satisfactory (3)**. This rating is mainly based on the largely positive effects which the programme achieved in terms of its relevance and overarching developmental impact, while its effectiveness and sustainability were rated as just satisfactory. In comparison with the PTP I programme, the **ATP programme's** development objectives were much less ambitious, but it achieved a somewhat higher effectiveness rating. On balance, its overall performance is regarded as **satisfactory (3)**.

General conclusions and recommendations

Any further FC involvement in the Yemeni water sector should be made conditional on the progress made in finding sustainable solutions to the fundamental conflict over scarce water resources between agricultural users and drinking water projects. When projects are set up in a context of competing types of water usage, a DC involvement should only be approved if the political priorities are clearly in favour of drinking water usage and/or if the project concept proposes measures to resolve the conflict and if such measures are intended not only to pave the way for investments but also to accompany the implementation of the project. In that respect, expectations should be kept realistic as to the possible achievements and time lines of far-reaching reform in order to avoid any stalemate in the water sector involvement.

The broad use of German DC resources, the close collaboration and shared responsibilities between Financial and Technical Cooperation, and intensive coordination with other donors should be continued because there is a great need to develop the Yemeni water sector. By and large, the potential effectiveness is good, as a great deal of experience has been acquired over many years of DC work. Reforms of organisational and decision-making structures in the sector need to be pursued further, and as the utilities and sector agencies are still weak, they continue to require strong DC support.

Notes on the methods used to evaluate project success (project rating)

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness (outcome), “overarching developmental impact” and efficiency. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

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| 1 | Very good rating that clearly exceeds expectations |
| 2 | Good rating fully in line with expectations and without any significant shortcomings |
| 3 | Satisfactory rating – project falls short of expectations but the positive results dominate |
| 4 | Unsatisfactory rating – significantly below expectations, with negative results dominating despite discernible positive results |
| 5 | Clearly inadequate rating – despite some positive partial results the negative results clearly dominate |
| 6 | The project has no positive results or the situation has actually deteriorated |

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability): The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected.)

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and an improvement is very unlikely. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. A rating of 1 to 3 indicates a “successful” project while a rating of 4 to 6 indicates an “unsuccessful” project. In using (with a project-specific weighting) the five key factors to form a overall rating, it should be noted that a project can generally only be considered developmentally “successful” if the achievement of the project objective (“effectiveness”), the impact on the overall objective (“overarching developmental impact”) and the sustainability are considered at least “satisfactory” (rating 3).