

**Turkey: Waste Management in Denizli**

**Ex post evaluation report**

<b>OECD sector</b>	14050/Waste management and disposal	
<b>BMZ project ID</b>	a) Real investment: 1998 65 312	
<b>Project executing agency</b>	b) Training measure: 1998 193	
<b>Consultant</b>	ERM Lahmeyer International/Infrastruktur und Umwelt/Kentkur	
<b>Year of ex post evaluation report</b>	<b>2009</b>	
	<b>Project appraisal (planned)</b>	<b>Ex post evaluation (actual)</b>
<b>Start of implementation</b>	a) Q 1 1999 b) Q 2 1999	a) Q 3 1999 b) Q 3 2001
<b>Period of implementation</b>	a) 20 months b) End of main measure Nov. 2000 End of follow-on Sept. 2001	a) 51 months b) End of main measure Oct. 2003 End of follow-on Oct. 2005
<b>Investment costs</b>	a) EUR 10.99 million b) EUR 0.66 million	a) EUR 10.61 million b) EUR 0.77 million
<b>Counterpart contribution</b>	a) EUR 2.21 million	a) EUR 2.31 million
<b>Finance, of which FC funds</b>	a) EUR 8.44 million b) EUR 0.66 million	a) EUR 8.3 million b) EUR 0.77 million
<b>Other institutions/donors involved</b>	/	/
<b>Performance rating</b>	Good result, fully in keeping with expectations, with no major deficits	
• <b>Relevance</b>	1	
• <b>Effectiveness</b>	1	
• <b>Efficiency</b>	3	
• <b>Overarching developmental impacts</b>	1	
• <b>Sustainability</b>	2	

**Brief description, overall objective and project objectives with Indicators**

The project, Waste Management in Denizli, aimed to help the city of Denizli and surrounding municipalities organise an orderly and environmentally sound waste management system. The first step was the construction of a new landfill site, a composting plant and the requisite facility layout and ancillary plants; operating equipment and collection and transport equipment were obtained and the old dumps secured. As part of the training measure, the executing agency was assisted in landfill management, improving the collection system, in introducing a system for sorting

recyclable material, including the informal sector, in monitoring and evaluation and in financial planning and costing.

The overall objective of the project was to make a contribution to reducing the environmental hazards of unregulated refuse disposal. It was also intended to make a major contribution to reducing health hazards for the population. The project objective was to ensure the sustainable and sanitary disposal of municipal waste in the city of Denizli (incl. surrounding municipalities) and the orderly disposal of waste residue. Project objective achievement was to be measured with the following indicators:

- Proper removal and disposal of municipal waste
- Halting waste disposal on interim dumps (apart from building rubble)
- Retaining the recycling ratios at the time of project appraisal at a minimum (paper/cardboard 54%; glass of 29%; metals 29%; plastics 9%)
- Integration of neighbouring municipalities

The set of objectives is also adequate in hindsight.

### **Project design / major deviations from original planning and their main causes**

As planned, the project provided major components for a regulated, environmentally clean disposal system by constructing an orderly landfill site to EU standards and procuring efficient collection and transport vehicles. The introduction of a sorting system for recyclable waste and the construction of a composting plant make up key elements of a sustainable waste management scheme.

The construction work and delivery of material and equipment were carried out properly according to plan (project appraisal). Altogether, the package of measures was appropriate, sufficient to address the problem and served the purpose. The adverse environmental impacts of unregulated waste disposal at project start have been completely eliminated. Landfill operation is very good; the refuse is properly deposited and covered. Recycling activities are playing an increasing role in waste management. Thanks to the separate collection of waste packaging from households (blue bag), the provision of containers for collecting glass and paper and support for private recycling firms, recycling rates have risen. The sector is served by professional, frequently local operators. Recycling rates currently amount to approx. 35%, in keeping with the specifications of the Ministry of the Environment. The composting plant operates below capacity (presently only at 30%) and needs to be gradually developed as part of waste management as a whole.

As already provided for in project design, the involvement of private enterprises in waste management at Denizli has been a key contributory factor to the success of the measure. The waste management authority can concentrate on strategic planning and on innovative measures such as the closer alignment of waste management with resource management.

The awareness of the population of the need for environmentally sound refuse collection was raised through an extensive public relations campaign. The population was included in planning and implementing the measure. This way, the target group has been persuaded of the benefits of clean waste disposal and it participates very well in sorting recyclable material. It values the services provided and is proud of its clean town.

The measures were well suited to reduce the core problems (unregulated waste disposal, environmental and health hazards and the inefficient use of secondary raw materials).

### **Key results of impact analysis and performance rating**

The objective of the project has been attained in full, along with all four relevant indicators:

- All waste incurred in the project area is recycled as far as possible and the residual waste is properly deposited at the Kati Atik Düzenli Depolama Tesis landfill.

- Disposable waste is deposited solely at the new landfill site. No more waste is disposed of at the interim dump.
- Recycling reusable materials (above all paper, glass and plastic) has been continuously increased with the participation of the private sector (with the recycling rate improving from approx. 21.7% at project appraisal to 35%).
- In addition to the 12 municipalities originally planned (under the implementation agreement), altogether 23 neighbouring communities have signed a cooperation agreement with the Denizli municipal authority on the joint use of the new Kati Atik Düzenli landfill. Currently, 18 deliver their collected waste to the landfill for a fee.

**Relevance:** The project aimed at solving a core problem of the target group and the partner country. The intended results chain (sustainable and sanitary waste disposal → contribution to protecting soil and groundwater → contribution to reducing environmental and health hazards → contribution to raising the environmental awareness of the population) has proved to be plausible.

The project conforms with major international goals (MDG 7), the priorities of German development cooperation (sector strategy on waste management) and Turkish environmental policy. The environment act was amended in 2006 and now obliges all towns and municipalities to start operating regulated landfills in the next few years. In 2007, the Ministry of the Environment began to take steps to reform waste disposal charges with the aim of full cost recovery.

The project design is in keeping with current state-of-the-art and was appropriate for the technical capabilities of the project executing agency. Due to its innovative approach, it has set an example for the whole of Turkey. Altogether, we therefore assess project relevance as very good (rating 1).

**Effectiveness:** The project objectives were met in full and could not have been achieved without the development measure. Refuse is collected everywhere in Denizli and 18 smaller surrounding municipalities make use of the official landfill site for the economical and clean disposal of their waste. The solid waste management system meets the technical requirements and legal provisions of the partner country and it approaches EU standards, having already met them in cleanliness and operation. Informal waste collectors are an integral component of the waste management scheme, but their role could be undermined by the market entry of commercial enterprises. The recycling sector has been successively enlarged in close cooperation with the private sector. Various companies use secondary raw materials as primary inputs for their production.

The high degree of ownership by the municipal authority and the personal commitment of the director of the waste management authority and his personnel made a substantial contribution to the success of the project. Despite the rather inimical sectoral framework (national environmental taxation system still not cost-effective), the project objectives were reached and the environmental situation visibly improved. We therefore assess effectiveness as very good (rating 1).

**Efficiency:** At dynamic prime costs of EUR 28.45 (project appraisal: EUR 12.80) and dynamic operating costs of EUR 23.52 (project appraisal: EUR 6.90), the operating costs for waste management are higher than planned. This is warranted for the following reasons: a) The quantities of waste delivered to the landfill site are 40% below the figures in the feasibility study (lower population growth than forecast). b) Additional and previously unplanned services are provided (house to house collection, street cleaning). c) Cost-relevant pilot measures were carried out in the initial phase (e.g. hospital refuse, building rubble, support of waste collectors). Altogether, environmental tax and other revenue (waste deliveries by the neighbouring municipalities and industrial plants) only cover 31% of the operating costs (2006). This figure is very low but still quite good by Turkish standards. The deficit is offset by the municipal budget. The municipal authority has so far paid for all expenditures and met all financial obligations.

The cost-benefit ratio for service delivery is adequate, especially with a view to the

beneficial environmental impacts and the particularly successful commercial use of secondary raw materials.

The efficiency of the composting plant still leaves much to be desired, however (capacity utilisation 30%). Thanks to amended priorities in response to current problems, measures have now been planned to raise capacity utilisation.

The scope of the municipal authority is limited by environmental tax on the one hand, but on the other, income could be raised by a considerable margin with a more efficient collection procedure. The turnover of specialist personnel, most of them qualified in the FC training measures, has also reduced efficiency. Through experience gained from increasing cooperation with the private sector (collection, transport, landfill operation and recycling), efficiency is likely to increase. Altogether, we thus rate efficiency as satisfactory (rating 3).

**Overarching developmental impacts:** The project has made an important contribution to ecological sustainability (MDG 7) and sanitation in the city of Denizli. The environmental and health hazards have been reduced to a considerable extent. The city is clean, there are no more unofficial rubbish dumps, medical refuse is properly collected and deposited separately and all unused waste residue is filled in as per regulations. The flaring of methane gas collected at the landfill site benefits the climate in contrast to unregulated degassing on the previous unofficial dumps. Training in schools has contributed to improving practical environmental awareness.

The project has made a contribution to strengthening local self-governance and sustainable urban development, which is very important, particularly in view of progressive urbanisation (incorporation of 16 municipalities as of 2009).

The overarching developmental impacts can therefore rate as very good.

**Sustainability:** The ownership and acceptance of the project by the municipal authority and all other stakeholders (private disposal and recycling firms, the inhabitants of the city of Denizli, the authorities in neighbouring municipalities) is very high. The project executing agency has shown a high degree of initiative by successfully implementing and continuously developing the waste management scheme.

There are, however, shortcomings in income and expenditure analysis in the municipal authority. Up to 9% of the municipal operating budget is allocated as a subsidy for waste management. To date, the municipal authority has met its financial obligations on schedule. In future, the private sector will be engaging more in waste management as public contracts can be concluded for more than a year, which raises the incentive to invest in waste management. As of April 2009, 16 neighbouring municipalities will be incorporated in the city of Denizli (another 130,000 inhabitants), which will increase the costs for waste disposal and the municipal authority will have to make greater efforts to keep up the present standard in waste management.

The new national rates regulations to be introduced soon would ensure project sustainability. This development will be expedited by the EU accession process, since alignment with EU regulations requires more cost-effective rates.

Project sustainability is impaired by low collection efficiency. Altogether, though, greater awareness of environmental issues among the Turkish public, the forthcoming introduction of cost-covering rates, the EU accession process and the smooth administration of cross-subsidies for costs from the general municipal budget so far indicate good prospects for sustainability. Sustainability is therefore rated as good (rating 2).

### **General conclusions**

Further training in similar projects should comprise daily operational tasks, technical know-how and strategic planning and control. Although the tasks of the personnel of the waste management authority are currently confined to planning and control, they could position themselves to compete professionally with private operators by virtue of their general competencies. Intensive training is essential here.

An enabling national framework with regard to tariff policy and environmental and

social standards is of crucial importance for project success. For example, national provisions (allowing licensed enterprises only) and the keener interest of commercial enterprises in waste as a 'product' (high prices for secondary raw materials) are detrimental to the integration of informal waste collectors in the recycling scheme. National strategies for incorporating the informal sector in waste management or simplified licensing would reinforce the role of informal waste collectors. The economic sustainability of the project also depends on the implementation of a new national environmental legislation. A programme-based approach with flanking sectoral advice at macro level would therefore be an expedient approach for similar measures. The regional offices of the Ministry of the Environment are responsible for supervising environmental impacts. In project implementation, the environmental authority should be involved more in practical waste management to strengthen executive powers of supervisory bodies.

### **List of abbreviations**

EU European Union  
FC Financial Cooperation  
MDG Millennium Development Goal

### **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:

- 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).