KfW

China: Refuse Disposal in Beijing

Ex-post evaluation

OECD sector	14050/Waste Management/Disposal	
BMZ project number	9366055	
Project-executing agency	Bejing Municipal Administration Commission	
Consultant	Lorenz Oeko Consult	
Year of evaluation	**2003**	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation	Q2 1994	Q3 1994
Implementation period	36 months	48 months
Investment costs	EUR 38.30 million	EUR 49.69 million
Counterpart contribution	EUR 18.36 million	EUR 28.91 million
Financing, of which Financial Cooperation funds	EUR 19.94 million	EUR 20.78 million
Other institutions/donors involved	<>	<>
Performance rating	2	
• Significance/relevance	2	
• Effectiveness	1	
• Efficiency	4	

Brief Description, Overall Objective and Project Objectives with Indicators

The project planned to build two household refuse dumps, two sorting and transfer stations as well as a biodegradation plant for improving waste disposal in the two southern inner city districts of Beijing. In addition, vehicles and special containers were supplied for refuse transport and equipment for operating the dumps. The objective of the project was a qualitative and quantitative improvement in household waste disposal in both southern inner city districts (Xuan Wu and Chong Wen) with some 1 million inhabitants at the time. This was intended to make a contribution to resource conservation (overall objective). In a training measure, the operative personnel was trained to run the system properly. The foreign-exchange costs of the project were financed from Financial Cooperation (FC) funds. Rationalizing land use by shutting down the unofficial inner city intermediary refuse depot was an anticipated side-effect. Objectives achievement was to be measured by the following indicators (no indicators were defined for overall objective achievement):

- Two years after startup about 644,000 t a year (about 90% of the forecast refuse volume) can be dealt with by the two financed waste management systems.

- All intermediate depots have been closed in both districts.

Project Conception/Major Deviations from original Project Planning and their main Causes

The project was confined to secondary collection at transfer stations, the subsequent transport of waste, central biological degradation and environmentally safe deposition of residual waste. Primary collection (from households via local collection points to the transfer stations) did not form part of the project, since this function is performed satisfactorily by the individual districts. The individual measures comprised:

(a) Shutdown of intermediate depots operating in the southeast and southwest of the city and complete final deposition of old waste on the new dumps

(b) Erection of two transfer stations for the southwestern and southeastern city zones

(c) Construction of a biodegrading plant for separated waste fractions from the two transfer stations

(d) Conversion and extension of the two existing dumps in Anding (for the southwest waste management system) and Beishenshu (for the southeast waste management system) for orderly dumps with seepage water catchments and pretreatment as well as rainwater drainage

(e) Provision of a transport system (29 trucks, some with trailers and large containers).

(f) Advisory service and training during project implementation

The two parallel waste management systems enable full-coverage disposal in southwest and southeast Beijing. The maximum quantity of waste turnover each amounts to 357,000 t a year. Besides transferring the collected quantity of waste from primary collection in large-scale containers, both transfer stations sort all incoming total waste manually and mechanically into three fractions. The fraction with a diameter greater than 15 mm and less than 80 mm constitutes biodegradable waste. The two other fractions are transported directly to the respective dumps and deposited there. The biodegrading plant has an annual capacity of 120,000 t. At first, the plan was to admit only presorted waste from the Majiaou transfer station. As the plant could not be fully utilized additional market and landscape refuse and presorted waste are now shipped from the southwest system. Both dumps were built to high Chinese standards and are operated in line with approved guidelines. In addition to the orderly fill-in of incoming refuse on mineral-based insulation, refuse seepage collection is also planned and the successive installation of a pipework to collect landfill gas. The respective fill-in volumes amount to about 3.6 and 4.6 million m³, which amounted to a lifetime of 13 – 15 years in the planning phase.

The complementary measures were divided into training for specialists parallel to project implementation funded from a training budget (10/1995 – 12/2000) and subsequent technical advice to optimize selected system components (06/2001 – 7/2002).

For the most part, the overall design for waste management was implemented as envisaged at project appraisal in March 1994. With the installed capacity the household refuse of about 2.5 million inhabitants can be disposed of in an environmentally safe way. The decision for the

proposed disposal system has been basically vindicated. The transportation of waste to the dump or the biodegrading plant was rationalized and final deposition on both dumps significantly improved as compared with before the project.

Key Results of the Impact Analysis and Performance Rating

The project objectives were achieved overall and as measured against the indicators. In comparison with the situation at programme appraisal all the waste is now properly disposed of from the city districts included in the project in a far safer way for the environment. All parts of the system are competently operated. We therefore assess the project as effective with no serious provisos (partial evaluation rating 1). The project approach for the disposal and biological degradation of mixed domestic refuse in cities was state-of-the-art technology at project appraisal. In hindsight, the biological degradation of organic refuse separated at source would have been the better option for economic and technical reasons, especially as it would have obviated the more costly investments in refuse sorting at the transfer stations. Allowing for this, the project conception was commensurate with the problem and appropriate. The project contributed to resource conservation and environmental protection as defined in the overall objective and the target group of about 2.5 million inhabitants in the southern inner-city districts was also reached. The project sets an example for China as evidenced by almost daily groups of visitors, and sends a message to many other Chinese cities. Beyond Beijing, the project has clearly raised awareness of the need to tackle the huge problem of proper, environmentally safe waste management in the whole of China. In BMAC the project had a definite capacity-building impact in our assessment and that of BMAC itself. Altogether, the project can be assumed to have had a considerable spread effect. We therefore attest the project satisfactory relevance and significance subject to the provisos mentioned (partial evaluation rating 2). The uneconomical biological degradation was already mentioned in the appraisal report at the beginning of the project; the prime rationale for the investment was environmental. As the biologically degradable waste fraction is much smaller than expected, the savings in the volume of refuse deposition have also turned out to be far less. As a result, the dumps are filled much faster than planned. The cost-recovery contribution of refuse charges and the proceeds earned from the sale of compost fall far short of expectations. BMAC dependence on budget appropriations from the city has remained more or less the same since project appraisal at over 90%. We consider the 13% rise in operating costs due to increasing dynamic cost prices to be acceptable, but in view of the uneconomical biological degradation and the practical absence of cost recovery through refuse collection charges (lack of allocative efficiency) we gauge the developmental efficiency of the project as slightly insufficient overall (partial evaluation rating 4).

Altogether, accounting for the structural effectiveness of the project and full objectives achievement, we attest it satisfactory developmental effectiveness (Rating 2).

General Conclusions applicable to all Projects

The project evaluated here already functions today as a showcase and pilot project in China. The refuse sorting at the transfer stations and the biological degradation requires a relatively high input and is therefore costly. In our opinion, particularly in biological degradation a more economical option could have produced satisfactory results as well, particularly if separate collection at source had already been accorded greater priority from the project outset.

Legend

Developmentally successful: Ratings 1 to 3
Rating 1 Very high or high degree of developmental effectiveness
Rating 2 Satisfactory degree of developmental effectiveness
Rating 3 Overall sufficient degree of developmental effectiveness
Developmental failures: Ratings 4 to 6
Rating 4 Overall slightly insufficient degree of developmental effectiveness
Rating 5 Clearly insufficient degree of developmental effectiveness
Rating 6 The project is a total failure

Criteria for the Evaluation of Project Success

The evaluation of a project's "developmental effectiveness" and its classification during the final evaluation into one of the various levels of success described in more detail below concentrate on the following fundamental questions:

- Are the **project objectives** reached to a sufficient degree (aspect of project **effectiveness**)?
- Does the project generate sufficient **significant developmental impacts** (project **relevance** and **significance** measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?
- Are the **funds/expenses** that were and are being employed/incurred to reach the objectives **appropriate** and how can the project's microeconomic and macroeconomic impact be measured (aspect of **efficiency** of the project conception)?
- To the extent that undesired **(side) effects** occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms or to carry on with the project activities on its own and generate positive results after the financial, organizational and/or technical support has come to an end.