Summary

Evaluation conducted by: Foundation for Advanced Studies on International Development (FASID)
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Country: People's Republic of China	Project Name: The Project for Improvement of Solid Waste Management in Xi'an City
E/N Date of Signature: August 14, 2003	Grant Limit (Cost): 1.323 billion yen
Local Implementing Agency: Xi'an City	Finish Date: March 3, 2005
Related Cooperation: Development Study, "Study on Solid Waste Management System Improvement Project in Xi'an City" (1990) Loan Assistance, "Xi'an Environmental Improvement Project" (2002-2006, 9.764 billion yen)	
1. Project objective	The Project aimed at improving the solid waste management system in Xi'an City by providing equipments for the Sanmincun Waste Transfer Station (hereafter, the Transfer Station), the Jiang Cungou Landfill (hereafter, the Landfill), and environmental monitoring, thereby improving the city's living environment.
2. Project content	(1) Equipment procurement: - Equipments for the Transfer Station (20 transfer trucks and 25 transfer containers, two sets each of compression equipments, receiving hoppers, feeders, and container sliders, and a set each of hydraulic unit, electrical instrumentation equipment, dust-collecting and deodorization equipment, and spare parts). - Equipments for the Landfill (five dump trucks, three bulldozers, two wheel loaders, a power shovel, a chemical spray vehicle, a road cleaning vehicle, a landfill compactor, a hyetometer, and a flowmeter). - Environmental monitoring equipments (two gas analyzers each for methane, carbon monoxide, hydrogen sulfide, and ammonia; two COD (chemical oxygen demand) meters; and 4 electric conductivity/pH meters). (2) Soft component: Technical assistance and training concerning management of the waste transfer system, appropriate management of the Landfill, and monitoring study concerning the natural/social environment.
3. Relevance	Overall evaluation: A Evaluation detail: (1) Consistencies with policies of China and Xi'an City: The Project was consistent with Chinese policies regarding waste management. China is focusing on waste management as one of the priority areas in order to achieve sustainable development. Xi'an City has been active in establishing a sound solid waste management system. (2) Consistencies with aid policies of Japan: This Project which aimed at improvement of the environment in Xi'an City, is in accordance with "Cooperation towards resolving environmental and other global issues," in the Economic Cooperation Program for China, formulated in October 2001. (3) Local needs:

	Since the urban area of Xi'an City stretches east to west, before the Project, the waste had to be transferred a long distance to the Landfill. The dump trucks caused traffic congestion and secondary pollution. At the Landfill, the lack of heavy machineries made sanitary landfill operations difficult, and there was a need to conduct environmental monitoring on a regular basis. Consequently, the Project was evaluated as highly relevant.
4. Appropriateness and efficiency of facilities/ equipments	Overall evaluation: A Evaluation detail: (1) Application of facilities/equipments: Almost all the equipments were well-maintained and effectively utilized. (2) Appropriateness of facilities/equipments and the total cost of the Project: The final amount was 1.18 billion yen while the grant limit was 1.32 billion yen. This was because locally-made equipments were selected where possible to make maintenance and management easier. The equipments provided for the Project were appropriate and necessary, and Xi'an City has been improving the facilities and equipments since project completion. (3) Cooperation with other projects: The leachate generated by the landfill operation, which is primarily treated in the plant of the Landfill, is re-treated to effluent standards in the Third Sewage-Treatment Plant, which was built with the Japanese loan assistance of "Xi'an Environmental Improvement Project," thus the Project turned out to be an effective cooperation with another project. Taking the above into account, the provided equipments were evaluated as being appropriate and efficient.
5. Effectiveness	Overall evaluation: A Evaluation detail: (1) Waste transfer system: In addition to the Sanmincun Waste Transfer Station, 110 small-scale waste transfer stations were built around the city by Xi'an City and together established an efficient waste transportation system. As a result, coverage of waste collection in target areas increased from 94 % (2002) to 99 % (2009). (2) Sanitary Landfill: As for the Landfill, heavy equipments provided by the Project made the sanitary landfill operation possible in compliance with the Chinese national regulation. At present, cover soil is placed per waste unit almost every day, on a much more regular basis than before (once every ten days). (3) Regular environmental monitoring: Portable equipments for environmental monitoring made periodical monitoring possible in the Transfer Station and the Landfill. Environmental monitoring which had been conducted on an irregular basis before the Project is now conducted regularly, for a broader range of items. (4) Contributing factors for Project's Effectiveness: One of the contributing factors for the Project's Effectiveness was Xi'an City's campaign to obtain the status of a "National Hygienic City," which started in 2004. In this campaign, the Transfer Station and the Landfill were treated as symbols of a "hygienic Xi'an," and all possible measures were

	taken to acquire accreditation, such as the supply of financial and human resources (The city successfully received its Hygienic City status in 2008). Given the above, it can be concluded that the Project was highly effective.
6. Impact (Impact on overall goal etc.)	Overall evaluation: A Evaluation detail: (1) Improvement of the city's environment: By the establishment of waste transfer system, waste collection in the target area has become more frequent and timely. Illegal dumping was reduced and thus improved the city's environment. (2) Reduction of secondary pollution: Secondary pollution caused by waste transport (waste scattering, waste water seeping, odors, etc.) has been substantially reduced. (3) The environment surrounding the Landfill: Environmental issues such as waste scattering near the Landfill have been improved. (4) Positive spillover effects: The Transfer Station has set an example as not only a model waste transfer station but also as a modernized and sanitary waste management facility, receiving as many as 360 visitors since its opening in 2006. It has been utilized for environmental education for school children and college students. Furthermore, the Project has had a positive impact on waste management workers' health conditions due to a reduction in work hours and an improvement in the working environment. (5) Negative impacts: No negative impacts were found. For the above reasons, the strong, positive impact of the Project has been recognized.
7. Sustainability	Overall evaluation: A+ (1) Operation and maintenance system: The operation and maintenance of both the Transfer Station and the Landfill have been well executed. The Transfer Station has never been closed down due to mechanical troubles and the staff members are proud of the advanced facility. The management capacity of these two facilities seems to be high. (2) Procurement of spare parts and additional equipments: Spare parts and additional equipments are mostly procured locally because of the establishment of a joint venture company in Chongging. Both the Transfer Station and the Landfill have already made substantial investments in equipments and facilities since the end of the Project (at the Transfer Station, seven waste transfer trucks, 20 transfer containers, automatic air refresheners, etc.; at the Landfill, a leachate treatment plant, three dump trucks, two bulldozers, one wheel loader, etc.). (3) Financial Situation: Both the Transfer Station and the Landfill are financed by the city of Xi'an. For the Landfill, a methane gas-powered electricity generation plant managed by a French company is providing an additional source of income. (4) Capacity of staff:

	At the Transfer Station, staff members hold weekly study sessions and visit related facilities abroad, in order to brush up their knowledge. These facts show that both the Transfer Station and the Landfill have a high management capacity, and there is a high probability that Xi'an City can sustain the outcome and the impact of the Project.
(1) Measures to be taken	None.
(2) Reasons for the measures to be taken	N.A.
8. Publicity effect (visibility)	Overall evaluation: A Japan's cooperation to the Transfer Station is well known amongst people working in the field of sanitation and residents in the target area(the survey showed 97% recognition rate). The equipment delivery ceremony at the Landfill and the completion ceremony of the Transfer Station were reported widely by the media. As mentioned above, the Transfer Station attracted many visitors not only as a waste transfer station, but also as a clean and modernized model waste-related facility. The Transfer Station produced an introductory promotion video, in which the assistance from Japan is portrayed.
9. Evaluations by the recipient country (Including any diplomatic effects)	(1) The Project has received a very high evaluation by Shaanxi Province and Xi'an City International Economic Cooperation Division, the bureau in charge of city environment, and the people interviewed/surveyed. Websites related to environmental sanitation have recently posted articles which introduce the Transfer Station. (2) A survey regarding the Project was conducted; 149 people, including those living near the Transfer Station and the Landfill as well as others affected by the Project took part in the survey. According to the survey, apart from the odors of the Landfill, participants almost unanimously stated the environmental improvement.
10. Recommendations and lessons learned	(1) Recommendation to China (Xi'an City) The Landfill is situated in a valley, hence it is expected that as landfill operations increase, the site will gradually rise closer to the surrounding residential areas. Since problems such as odors will become more evident, further actions may need to be taken to alleviate such issues. (2) Lessons learned The waste management has been high priority matter of China. In addition, the timing of implementation of the Project coincided with the campaign period of Xi'an City to be certified as the Environmental Hygienic City. The Project therefore could make a big step toward establishing a sound waste management system in Xi'an City. Cooperation in priority areas of partner country makes cooperation smoother because it secures resources such as funds and manpower. In cooperation in the similar field in the future, it should be considered to utilize the Sanmincun Waste Transfer Station for Third Country Training.