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# Best Practices Database

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## Environmental approach to management of municipal-waste in Tehran *Iran*

Best Practice

New for 2002

- Categories:**
- Production and Consumption Patterns:
    - production/consumption cycles
    - waste reuse and recycling
  - Technology, Tools and Methods:
    - research and development
    - technology transfer
  - Environmental Management:
    - environmental health
    - environmental remediation
    - environmentally sound technologies
    - pollution reduction

**Level of Activity:** City/Town

**Ecosystem:** Arid/Semi-Arid

### Summary

Tehran Municipality produces about 6500 Mg of municipal waste every day. The biggest part (95 %) goes to a landfill site located about 30 km south east of the city. In 1980, sanitary landfill was introduced to replace open dumping. It consisted of a deep trench, some as large as a city block and as deep as a 10-story building, where wastes were dumped from the top until the whole trench was filled.

The filled trench was capped with two to three meters of ordinary soil layer. This approach created several problems in terms of managing leachate, preventing pollution of water resources, controlling the emission of carbon dioxide and methane, reducing its negative impact on biodiversity and land consumption. An environmental friendly, cost-effective and ecological sustainability method of the mechanical-biological waste treatment, called the "KAMINZUGVEKFAHREN - SCHW BISCH HALLER MODELL" was introduced in early 2000 on experimental basis. The principal objectives were:

- To reduce the emissions of greenhouse gases CO<sub>2</sub> and CH<sub>4</sub>,
- Avoidance of leachate
- Repatriation of the organic waste-share into the nature cycle
- To conserve land and reduce its consumption
- To impart a better understanding of waste management from a wider environmental perspective

The Method was implemented on a demonstration scale over 3 hectare land, 15000 Mg waste for 3 years to better understand the engineering aspects and to articulate the environmental impact differences. The very good results of the pilot-project led to the takeover of the German system. It is

planned from April 2002 to treat 500 Mg, later 1000 Mg, with this method daily. This procedure suffices the strict environment-standards in Germany and is extremely non-polluting. Through this project, closer cooperation between municipality and the academic institution in the in- and foreign countries has been achieved.

## Narrative

Situation before the initiative began

In 1980, a quasi-public agency (OWRC) was created to manage the shift from open dumping to sanitary landfill. These changes brought visible improvements in keeping the site clean and the disposal, orderly. However the issues of leachate and gas emissions, which impact the environment in various ways, were not being addressed.

Establishment of Priorities

The leadership of O.W.R.C. puts value on the introduction of technologies to the protection of the environment. The existing technology of the sanitary landfill should be replaced slowly with it. This obsolete technology endangers the environment on several paths. Lacking financial methods, which impede this process very much, are problematic. The priorities lie with following points:

- Avoidance of leachate
- Reduction of gas emissions
- Reduction of the land-consumption
- Reduction of the endangering of residents and personnel
- Inferior cost-use with high environment-efficiency
- Production of a compost-similar fertilizer

The beginning should be turned into an ecological certain waste elimination. On this occasion, also aspects should be introduced like recycling and waste-separation. The old condition should be improved systematically with the incipient use of the new method. From these reasons, conversations began with the German side to the introduction of the planned intent. Consensus was reached to go for the German KAMIN2.UGVERFAHREN method. It was also agreed to go ahead with a demonstration project to better understand the, engineering and environmental aspects of this technology and its management implications.

Formulation of Objectives and Strategies

Waste separation, recycling and reduction are the three recognised problems in Tehran waste management. Problems associated with the current landfill practices had not received priority consideration because of the remoteness of the site and the fact that the urban residents do not feel its impacts. By implementing the KAMTN7UGVRRFAHRRN Method, it would reveal the need for addressing the three problems mentioned above and impart a better understanding of dealing with landfill-associated environmental problems in an incremental but progressive manner. The demonstration project was a strategic intervention designed to start a process of change in perception and management ethos within the system toward waste management. The advantages of the new procedure visibly through the pilot project led to a vast interest in the in - and foreign countries. The immediate proximity to the old system and his problems perceive' that clarified the necessity one turns in the waste-politics.

Mobilisation of Resources

After the first meeting between O.W.R.C. and Dr. H. Hashemi, the common project began. As more partner, was included the institute for waste-management of the university Rostock under management of Mr. Prof. SpiUmann. Prof. SpiUmann has developed the procedure, introduced in Tehran, 30 years ago in Germany and constantly until today optimises. German side realized the scientific, technical care and implementation. Since the start of the pilot-project, a German engineer is employed

permanently in the Tran, in order to try on proceeding further and to optimise. The scientific and practical works take place under German management in cooperation with O.W.R.C. - engineers. The expenses of the project were carried by O.W.R.C. All costs for material, manpower and laboratory-analyses were paid completely. The expenses amount until today on altogether 56666.66 US \$.

## Process

The problems that of the initiative faced were different shape. It was much conviction-work and fight necessarily to convince the responsible of the benefit of the project. The next problems were to be found in the implementation of the project. The responsible new expenses and more work always faced with it refusing. Problems are still lacking acceptance with single responsible and the complete new orientation of all responsible in the waste politics. It must now take place public relation for teenagers to relay about the new environment-thought in the waste-economy.

The works to the initiative run on the landfill in Kahrizak. For this reason, it is very difficult other organizations and persons to include. The public relation restricted itself to invitations and visits as well as coverage by means of the press therefore. Visitors of universities, administrations and ministries could be greeted from the in - and foreign countries. The wide public could be involved only over continuous coverage in press and television.

## Results Achieved

Environmental-related projects have a long gestation period. A few environmental impacts cannot be measured unless there are time series data on various parameters. In fact, one purpose in launching an environment-friendly technology is to establish a clear need for systematic data collection without which the extent of the impact would be difficult to measure. However, the pilot project provided data to prove that:

- The German method produces no leachate. Consequently, no damages of the environment originate.
- The volume reduces itself during the biodegradation process about approximately 50 %. Another part of the output is led back as fertilizers into the nature cycle. The quantity of the waste to be deposited reduces itself to one fourth. Land-consumption becomes strongly reduces with it.
- The expenses are immediately as the expenses of the sanitary landfill. But no succession-expenses originate it.
- The KAMINZUGVERFAHREN Method was more management intensive, thereby providing the opportunity for managers to acquire more field specific information than has been the case.
- With the implementation of the project, there is a growing realisation within O.W.R.C. on the critical role its Research Unit plays in addressing the primary aim of the organisation: waste management is an environmentally sustainable manner.
- O.W.R.C. has carried out a number of training of waste managers and technicians from outlying municipalities, and has undertaken at least one mission to a municipality in the northern part of the country.
- O.W.R.C. management decided to expand the pilot project on a quantity of 500 Mg waste daily. In the near future, another increase of the waste-quantity should take place to 1000 Mg.

That temperature-course shows an optimal biodegradations-process. The hygienic harmlessness is guaranteed, since the temperature lay over 60Å°C several weeks.

The gas-composition is for the biodegradations-process optimally. A high activity of the micro-organisms enables the up oxygen-salary. The very slight CO<sub>2</sub> and CH<sub>4</sub> salary spares the environment and the climate.

Actual improvement achieved in people's living conditions:

- No endangering through leachate and gas emissions
- No one of smell annoyances through covering of the garbage
- No expansion of the landfill-surface.

Changes in local policies and strategies:

- Consideration on the environment and protection of the resources
- Calculation of the succession-expenses of environment-damages
- Recycling of the organic-fraction from the rest-waste

Sustainability

With less than 56666.66 US \$ investment the O.W.R.C. was not able only to mobilise twice that amount but also adapt an entirely new system of waste treatment in Iran. While the financial saving was not measurable, the social and economic benefits will have been appreciable. This is because of reduced land consumption, preservation of bio-diversity, reduction in the emission of greenhouse gases and avoidance from leachate. There are also reasons to believe that now O.R.C.W. staff sees waste management as an environmental rather than an engineering issue. This met the aspirations of the government to make development environmental sustainable and also to play a meaningful role in disseminating such knowledge and experience throughout the region. The fact that O.W.R.C. is giving training on the KAMINZUGVERFAHREN, albeit in its preliminary form, suggests a renewed confidence on itself and the commitment to play a role a good public sector company is expected to play.

Financial sustainability:

- Expenses - saving - no ecological after-care-costs
- Protection of land-resources - inferior land-consumption

Social sustainability:

- No endangering of the residents and workers - low gas emissions
- Improvement of the life-conditions - no smell-annoyances

Cultural sustainability:

- Behaviour patterns and heritage - ecological waste management

Ecological sustainability:

- Reducing dependence on non-renewable resources - clean procedure without burdens of the environment

Lessons Learned

While experts have capacity to understand the complexities of nature, they have difficulties in connecting their thoughts and experience with the management that its there for the purpose of addressing issues of substance. One of the biggest challenge the municipality faces is in building the bridge between the experts and the management so that solutions applied are not simply based on political expediency or on some esoteric technical assumptions. They lessons learnt were:

- Expensive or technically sophisticated solutions do not always yield the best result defined in the context of existing management capacity and available resources.
- Learning-by-doing is essential in addressing the areas of concern that are inhibited by a combination of economic, physical and organizational complexities.
- Solution to a problem can provide the foundation on which more developed country; it would be difficult to achieve such a standard without understanding the relationship between nature and the problem. This is because many environmental problems have their solutions in nature, provided the inherent capacity of nature to self-cleanse is understood.
- Transparent and broad-based participation will results in a better solution although it is more time-consuming and complicated. This is especially true of areas where the problem is a product of activities carried out by various segments of the society.
- The relationship between landfill (or the pollution it produces) and the waste that are brought in has direct bearing on the importance of waste separation, recycling and reuse. The new German method of KAMINZUGVERFAHREN is the key to the ongoing recycling and composting activity and credence to the waste separation activity that is underway.

## Transferability

O.W.R.C Tehran is the organization, which puts for the improvement of the waste-management into the Iran the most actively. This lies to the one at the specialist with O.W.R.C. and on the other side caused by the forerunner-role of Tehran as capital. For this reason comes to view annually innumerable delegations from the in - and foreign countries about the activities in Tehran. These delegations take the newest realizations from the waste - and compost sector home then.

The new German KAMINZUGVERFAHREN - procedures was shown representatives of all waste management authorities in this framework in the Iran. The procedure will be introduced in next time in several provinces in the Iran therefore, for example Mazandaran and Gilan. More delegations from the foreign countries, like the Sudan, Lebanon, Cuba, Germany and..... view the pilot-protect. OWRC is now after the 3-year-old pilot-scheme also in the situation to educate scientists and to drive this proceeding it further.

The system is after its scientific adaptation at .the climate circumstances in the Iran also in each other country with aridens - semi arid climate employable. The university Rostock works successfully with this procedure also in Greece and Cuba. In the Iranian television and the press, one reported permanently on the stand of the pilot-project. Consequently also the attention of the population could be reached and the sensitisation opposite waste topics climbed enormously

## Key Dates

April 1996 First meeting of O.W.R.C. with the German representatives as result of an initiative of the president Rafsandjanie

August 1996 Experience-exchange and first agreements

October 1999 Visit of the landfill and first preparations

April 2000 Beginning of the pilot-project

April 2002 Application of the procedure in daily use

## References

1. Fischer, K. et al 1998; Vefbundvofhaben Deponiekrper - Teilvorhaben 7 - Langzeitverhalten von vorbehandelten Siedlungsabfallen und Klarschlamm am Beispiel einer Rottedeponie (Schwabisch Hall); BMBF FKZ 1460799 F
2. Haschemi, H. 1993; Die Rolle der Homogenisierung infolge der Zerkleinerung der Abfalle 7ur Optiilierung des Rotteprozesses. Forum Stadte-Hygiene, Heft 44, S. 28-32
3. Haschemi, H. 1998; Verbessertes Verfahren zur Verrottung von Haus- und Gewerbemull (Schwabisch Haller Modell); Mull und Abfall 8/1998; 3. 502-511
4. Haschemi, H. et al 2002, Habilitationsschrift, Universitat Rostock
5. IUesiu, A. 1999; Jahresbericht der Deponie Hasenbuhl in Schwabisch Hall 1999
6. Spilirnann, P. 1981; Bundesministerium fur

Forschung und Technologie; Forschungsbericht F & R 1430042; Feste Abfallstoffe; Hausmülldeponie Schwabisch Hall - Homogenisierung und Verrottung des Mülls vor der Ablagerung 1981

7. Spillmann, CoUins 1981; Das Ka-minzugverfahren eine einfachere und zielsichere Belüftung als Voraussetzung des aeroben Abbaus im Betrieb einer geordneten Mülldeponie - 2. Forum Stadtehygiene, H32.

8. SpiUmann, P. 1994; Stoffgerechte Behandlung undefinierter Restabfallmenge durch Kombination biochemischer und technischer Behandlungsverfahren ("Bio-Select-Verfahren"), Müll und Abfall 7/94; S. 416-431

9. Zechmar-Lahl, B; Lahl, U. 1996; Mechanisch-biologische Restabfallbehandlung-, Thüringer Umweltministerium Hrsg., Erfurt 1996

10. Stein, W.; Haschemi, H. 1987; Verfahrenstechnische Optimierung der Rotte-Deponie Schwabisch Hall; F+E -Vorhaben (Phase 1-3) FZ 1430216.

11. Breuer, W. 2000, Optimierung des Schwabisch Haller Verfahrens zur Belüftung von Müllrottermieten. Diplomarbeit. Universität Rostock. Institut für Landschaftsbau und Abfallwirtschaft.

12. Tagungsband -11th Euro-Arab; Conferen7. for the Environment. Hrsg. Universität Rostock, April 2000.

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**Type of Partner Support:** Technical Support

Municipality Schwabisch Hall  
Dr. Haschemi

**Type of Organization:** Local Authority  
**Type of Partner Support:** Technical Support

## Financial Profile

Year	Total Budget (US \$)	Partner A (% of the Budget)	Partner B (% of the Budget)	Partner C (% of the Budget)
2000	32500	100%	-	-
2001	68750	100%	-	-
2002	68750	100%	-	-

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