



11 Management of Solid Wastes

Introduction

Sound solid waste management needs to be dealt with from the perspective of multi-sided, multi-component and closely-linked integrated system, with each link being subsequent to the link before and meanwhile forming the basis for the link after. In all cases, it is essential in each stage to employ suitable and adequate means matching with prevailing circumstances, available resources and existing determinants. This is embodied in the adoption of best options consistent with technical standards, environmental safety, and social concord as well as with least possible costs, highest possible resource recovery, adherence to legislation and statutes together with marked flexibility and good understanding of the birth-to-death life cycle.

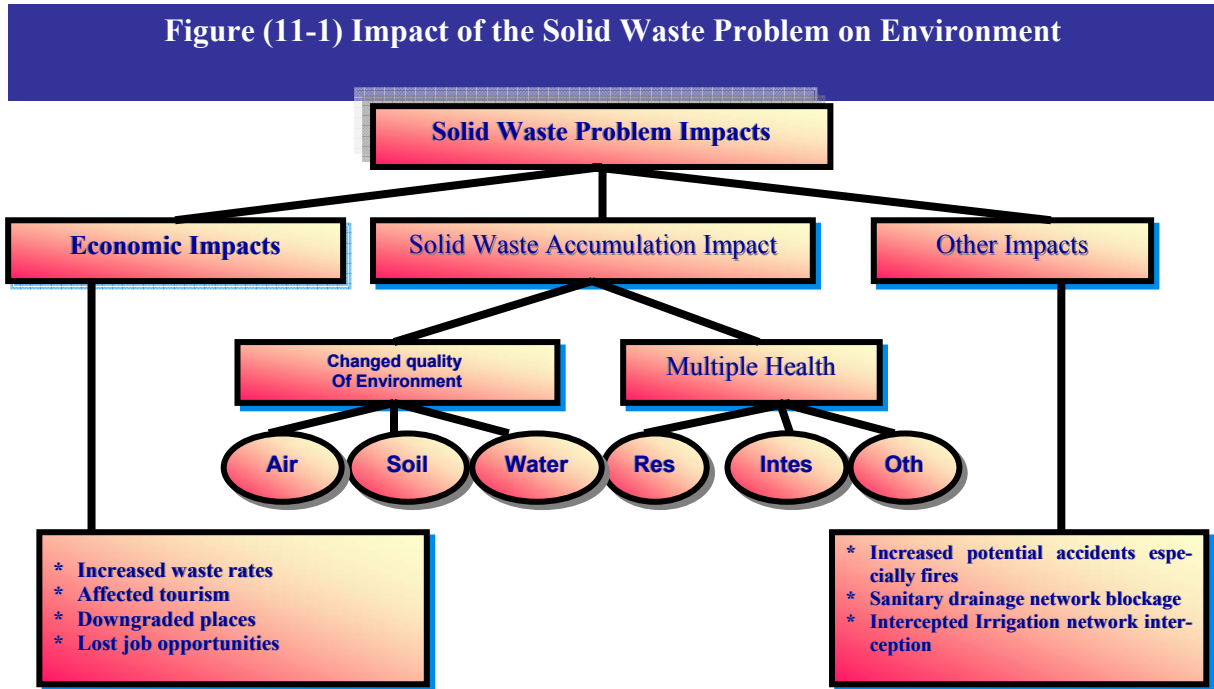
Solid Waste Situation in Egypt

The aggregate quantity of generated solid wastes in Egypt is measured by 65-70 million tons annually according to 2005 estimates. Table (11-1) shows sources and types of waste including the solid, industrial and agricultural, the sludge ensuing from wastewater treatment processes, hospital waste and construction and demolition debris besides wastes from cleaning of canals and drains. It includes as well solid municipal waste (garbage) and household waste (accounting for 60%), and waste from shops, commercial markets, service institutions such as schools, educational institutes, utilities, hospitals, administrative buildings, streets, gardens, markets, hotels and recreational houses not to mention waste of some small factories and camps.

Table (11-1) Sources and Types of Solid Waste

Source	Standard Sources of Waste	Types of Solid Waste
Residential	Single and multi-family residences	Food, paper, carton, plastic, weaving and leather waste, as well as gardens, wood, glass, minerals and ashes waste and special kind of waste (relating for example to large-sized varieties, consumer electronics, white goods, batteries, oils, and car tires) as well as hazardous household waste.
Industrial	Heavy and light industries, construction locations and non-hazardous energy stations.	Waste of cleaning, packaging material, and food, construction and demolition debris, and special non-hazardous waste
Commercial	Shops, hotels, restaurants, markets, administrative buildings and others	Paper, carton, plastic, wood, food, minerals and special wastes
Institutional	Schools, prisons, and government centers	Same type of industrial and commercial waste
Construction and Demolition	New construction sites, road reparations, renovation works and demolition operations.	Wood, iron and steel, dust and others
Localities' Services	Cleaning of streets, cultivation, gardens, beaches and other recreational areas, water treatment stations and liquefied wastes	Street wastes, remains of plant and tree pruning, public waste from gardens, beaches and other recreational places besides sewerage sludge.
Treatment	Heavy and light industries, oil refineries, energy stations and extraction of non-hazardous minerals and their treatment	Industrial treatment, scrap, non-conforming products, and non-hazardous mines waste.

Figure (11-1) shows environmental and y implications of the solid waste problem



Solid Waste Problem in Egypt:

The solid waste problem in Egypt can be summed up in the fact that existing systems neither meet the needs of the society nor provide appropriate service to all its classes due to overarching inadequacy as regards different components, resources, capabilities and potential of the entire system alongside lack of favorable general atmosphere. This has been reflected in widespread garbage pile-ups in several places which form hotbeds of pollution, foresee numerous health-detrimental and environmental risks in applying certain means of handling, transfer and disposal. Table (11-2) shows quantities of accumulations at the level of the Arab Republic of Egypt in accordance with 2005 estimates.

Table (11-2) Amount of accumulated waste in some governorates according to 2005 estimates

Governorate	Accumulations m ³	Governorate	Accumulations m ³
Alexandria	334,830	Kafr El Sheikh	227,000
Beheira	600,000	Demiatta	100,000
Monofia	280,000	Gharbia	1,500,000
Sharqia	510,000	Daqahlia	1,300,000
Mersa Matrouh	146,429	North Sinai	140,000
Port Said	359,040	South Sinai	512,000
Ismailia	350,000	Suez	1,168,550
Fayoum	292,500	Red Sea	11,885,000
Menya	951,000	Beni Suef	150,000
Sohag	281,845	Assiut	250,000
Luxor	107,022	Qena	258,480
Aswan	385,240		
Aggregate accumulations upon their removal from Cairo, Guiza, and Qalubia and the deletion of 14 million m³			22,098,936

Causes of the Problem

1. Absence of the institutional infrastructure capable of planning, regulating, and implementing the integrated system
2. Low-level efficiency of covering collection and transport services that was reduced to less than 30% in some small cities and a maximum of around 50% in some regions of metropolitan cities, and was almost non-existent in informal and rural areas.
3. Operational problems, deficiency of maintenance capabilities and inadequacies in workshops and garages.
4. Meager qualified and trained technical cadres for management and operation processes and their low-level remunerations and wages which discourage requisite expansions to operate further in this field and rather nurture disinterest in it.
5. Massive shortfall in finance provided from all sources plus absence of respective budgets.
6. Lack of sufficient controlled public landfills that conform to environmental conditions besides absence of sanitary dumpsites for safe disposal of solid waste remains.
7. Default on effectuating laws to achieve acceptable levels of the integrated system.
8. Low-level public awareness regarding the solid waste issue thus negatively impacting on attitudes and resulting in the masses' indifference about substantial involvement in the resolution of the problem in question.

Table (11-3) shows different quantities of solid waste varieties which garbage and agricultural trash account for almost 55% of the total of such wastes.

Table (11-3) Different quantities of waste varieties in accordance with 2005 estimates

Type of Waste	Annual Estimated Quantity
Municipal (Garbage)	15-16 million tons
Industrial	4.5-5 million tons
Agricultural	25-30 million tons
Sludge	1.5-2 million tons
Waste from cleaning of drains and waterways	20 million tons
Hospitals	0.1-0.12 million tons
Construction and demolition debris	3-4 million tons

Table (11-4) shows percentages of contents of municipal solid waste in Egypt in compliance with 2005 estimates

Table (11-4) Percentages of contents of municipal solid waste in Egypt in accordance with 2005 estimates

Type of Waste	Percentage (%)
Organic	50-60
Paper and Carton	10-25
Plastic	3-12
Glass	1-5
Minerals	1.5-7
Rags	1.2-7
Other Materials	11-30

(Relative density 0.3 ton/m³., humidity 30-40%)

State Efforts To Counter Challenges Posed To Solid Waste Management

1-Removal of Historic Accumulations

The government represented by the Ministry of State for Environmental Affairs had envisaged an integrated plan for the removal of historic accumulations from Greater Cairo (Cairo-Giza-Qalyobia) where the quantity of historic accumulations inside Greater Cairo amounted to almost 14 million m³. Figure (11-2) shows accumulated quantities in each of the three governorates. Phased removal of accumulations had begun in September 2004 in cooperation with the Military Forces National Service Agency.

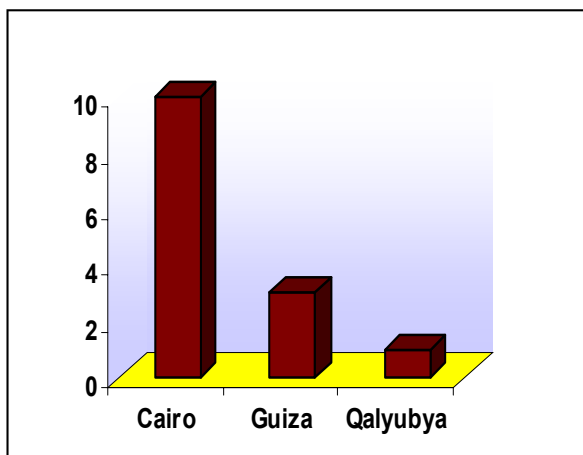


Figure (11-2) Greater Cairo Accumulations in million m³

During 2005, about 7.75 million m³. of historic accumulations had been removed from within Greater Cairo governorates:

- a. Approximately 2.5 million m³. of accumulations were transferred to sanitary dumpsites within each Greater Cairo-located governorate (Al Wafaa Wa Al Ammal Dumpsite in Cairo, Shobrament Dumpsite in Giza and Abu Zabaal Dumpsite in Qalyubia).

- b. Around 8 million cubic meters of accumulations (mostly demolition and construction debris) had been leveled and covered.
- c. Establishment of gardens in Cairo and Giza over an area of around 20.000 meter squares.
- d. Leveling operations, fire-extinctions and clean soil coverage for an area of approximately 185,000 meters plus a sand barrier that is 2.5 meter high and 5 km in perimeter that encircles the Rubeiki landfill in the 10th of Ramadan City had been carried out.

Tables (11-5, 11-6, 11-7, 11-8) illustrates stages of handling historic accumulations

Stages of Accumulation Removals

Table (11-5) First Stage

Governorate	Site	Accumulation Quantity (m ³)
Cairo	Al Gabal Al Ahmer	2,500,000
	Ezbet Al Walda	150,000
Leveling works 55000 m ² in Rubeiki Landfill		
Total		2,650,000 m ³
Guiza	Beshtil	100,000
	Ard El Lewa	50,000
	Al Barageel	50,000
	Embaba Airport	150,000
	Ring Road Tunnels	150,000
Total		500,000 m ³
Qalyubia	Musturod Landfill	250,000
Total		250,000 m ³
Gross Quantity		3,400,000 m ³

Quantities removed were estimated at approximately 600,000 m³. Demolition and construction debris being the remainder of the gross quantity in these sites had been leveled.

Picture (11-1) Ard El Lewa – Guiza Governorate



Picture (11-2) Musturod Landfill - Qalyubia



Table (11-6) – Second Stage

Governorate	Site	Quantity of accumulations (m ³)
Cairo	Ezbet El Zabaleen in Katamia	250,000
	Informal landfill in Katamia (Degla Valley– Wadi Degla)	250,000
	Al Dakhel Al Aley Street in Nasr City (Madinet Nasr)	250,000
	Sand Stone	50,000
	Ezbet El Haganah	30,000
Leveling works 30,000 m ² – Rubeiki landfill		
Total		830,000 m ³
Guiza	Kafr El Gabal nearby Kafr El Gabal compound and Gamal Abdul Nasser Street	50,000
	Abu Rawash	250,000
	Teraat El Zomor	250,000
	Teraat Abdul Al Street	20,000
	Total	570,000 m ³
Gross Quantity		1,400,000 m ³

Quantities removed are estimated at approximately 500,000 m³. Demolition and construction debris, being the remainder of the gross quantity in these sites, had been leveled.

Picture (11-3) Ezbet Al Hagana – Cairo



Picture (11-4) Boulak District – Giza Governorate



Picture (11-5) Salah Eddin Schools – Cairo Governorat



Table (11-7) Third Stage		
Governorate	Site	Accumulation Quantity (m ³)
Cairo	Part of Al Khosous Drain of Tawfykia Lake in regions of Arab Al Tawayla, Arab El Hesn, El Messala, and El Metaraya	500,000
	Corniche el Nil in Tora in front of Suzan Mubarak Schools	50,000
	Leveling works 50,000 m ² in Rubeiki Landfill	50,000
Total		550,000 m³
Giza	Region on the two sides of the Ring Road in Saft El Laban	50,000
	Ring Road Tunnels from Maryoutia to Al Waraq	500,000
	Al Moatamadia region- Ezbet El Zabaleen – Ring Road	150,000
Total		725,000 m³
Qalyubia	Al Khosous Drain- Al Khanka Precinct (Markaz) and Sekat El Ahlia Street in Abu Zabal region	650,000
	Qaha landfill	50,000
	Al Zaytoun and Tanan landfill in Qalyub	25,000
Total		725,000 m³
Gross Quantity		2,000,000 m³

Quantities removed are estimated at approximately 500,000 m³. Demolition and construction debris, being the remainder of the gross quantity in these sites, had been leveled.

Table (11-7) Third Stage		
Governorate	Site	Accumulation Quantity (m ³)
Cairo	Part of Al Khosous Drain of Tawfykia Lake in regions of Arab Al Tawayla, Arab El Hesn, El Mes-sala, and El Metaraya	500,000
	Corniche el Nil in Tora in front of Suzan Mubarak Schools	50,000
	Leveling works 50,000 m ² in Rubeiki Landfill	
Total		550,000 m ³
Guiza	Region on the two sides of the Ring Road in Saft El Laban	50,000
	Ring Road Tunnels from Maryoutia to Al Waraq	500,000
	Al Moatamadia region- Ezbet El Zaba-len – Ring Road	250,000
	Total	72,000 m ³
Qalyubia	Al Khosous Drain- Al Khanka Precinct (Markaz) and Sekat El Ahlia Street in Abu Zaabal region	650,000
	Qaha landfill	50,000
	Al Zaytoun and Tanan landfill in Qalyub	25,000
	Total	725,000 m ³
Gross Quantity		2,000,000 m ³

Quantities removed are estimated at approximately 400,000 m³. Demolition and construction debris-accounting for the gross quantity remainder in these sites- had been leveled .



Table (11-8) Completion of Third Stage		
Governorate	Site	Accumulation Quantity (m ³)
Cairo	Part of Al Khosous Drain of Tawfikya Lake in regions of Arab Tawayla, Arab El Hesn, Al Massala and Al Matarya	450,000
	Batn El Bakara, Ezbet Kheir Allah in Misr El Qadeema (Old Egypt)	100,000
	Leveling works 50,000 m ² in Rubeiki Landfill	
Total		550,000 m ³
Cairo	Al Khosous Drain in El Khanka Precinct (Markaz)	300,000
	Musturod Landfill, Tokh Landfill	100,000
	Total	400,000 m ³
Gross Quantity		950,000 m ³

500.000 m³ had been removed while the rest had been leveled

Picture (11-8) Al Khoussous Extension- Qalyubia Governorate



Picture (11-9) Al Khoussous Extension – Qalyubia Governorate



Picture (11-10) Ezbet Kheir Allah – Cairo Governorate



Development of Informal Areas

Table (11-9) Development of Informal Areas – Al Maasara region (August 2005)

Description of Works	Quantity
Transporting wastes to controlled dumpsites	40.000 m ³
Leveling of demolition and construction debris and providing clean soil coverage	18.500 m ²
Mastic works on pavements	2.000 m ²
Bordure-paints works	1500 m/t
Works related to plant-beds and arborization	15

Picture (11-11) Teraat El Khashab – Al Maasara



Picture (11-12) Al Rashah Street – Al Maasara



Second: Upgrading the Efficiency of Collection and Transport Operations

To avoid recurrence of accumulations, governorates of Guiza, Qalyubia, Daqahlia and Gharbia are supported by equipment specified in Table (11-10).

	Governorate				Total
	Giza	Qalyubia	Daqahlia	Gharbia	
Vehicle 20 Tons	3	6	2	2	13
Trailers	7	15	—	—	22
Dump-ing Trucks	5	—	—	—	5
Pick-up Trucks	9	—	—	—	9
Bull-dozers	1	1	—	—	2

plastic, glass, paper, etc. Therefore, 66 factories had been developed and established up till 2005 to transfer garbage into organic compost. Table (11-11) indicates garbage recycling and organic compost production plants. It can be observed that out of 66 factories, 13 factories are not in operation and 17 not fully operated.

3-Garbage Recycling and Production of Organic Compost (Composting)

Aerobic composting in windrows with recyclables recovery is considered one of the appropriate technologies consistent with Egyptian circumstances, types of wastes and their organic content. Thus it was recommendable to have it included in the environmental action plan for 1992, and accordingly a well studied plan had been developed in collaboration with the Ministry of Local Development and the Ministry of Military Production represented in military factories set to furnish production lines of garbage and waste recycling for the production of organic compost and the recovery of other waste components such as

Table (11-11) Statement on the Current Situation of all Factories – Statement on Garbage Recycling in Governorates

Governorate	Number	Management		Dysfunctional Factories	Remarks
		Government	Private		
Cairo	15	--	13	2	10 plants are privately- operated in Katamya and 15 May City. 3 more factories are operated in Katamya through the private sector. Work in 2 factories in Salam City is suspended due to their deteriorated technical condition.
Giza	4	2	2	--	2 factories are operated by the private sector in Shobrament while 2 factories in Abu Rawash are government- operated.
Qalyubia	--	--	--	--	-----
Alexandria	3	--	3	--	Private Sector-operated
Al Beheira	3	1	--	2	The two Damanhour and Kafr El Dawar plants are suspended. Edko Factory is functional with a one-year guarantee period and run by the government sector.
Matrouh	1	--	--	1	Suspended for the factory's degraded technical condition
Monofia	1	1	--	--	The factory is located in the City of Menouf and is operated within the jurisdiction of the government sector
Gharbia	3	1	2	--	2 factories are operated in Dabra Village-Tanta by the private sector and one factory in Al Mahala El Kobra through the government sector
Kafr El Sheikh	3	1	1	1	Kafr El Sheikh factory is dysfunctional, Beila Factory is privately operated while Sidi Salem Factory is run by the government sector with a one-year guarantee period.
Demiatta	3	2	--	1	Demiatta Factory is government-operated with a one-year guarantee period, however not fully operated. Ras El Bar Factory is not operational.
Daqahlia	7	6	--	1	Two Mansoura-based factories are not fully operational, and so is one factory in Beshla Village – Meet Ghamr Precinct, another one in Belqas City and 2 factories in Aga Precinct. All these factories are administered through the government sector while one factory in Al Mataria City is already dysfunctional.
North Sinai	1	--	--	1	The factory is located in Al Arish City and not operational

Table (11-11) Statement on the Current Situation of all Factories – Statement on Garbage Recycling in Governorates

Governorate	Number	Management		Dysfunctional Factories	Remarks
		Government	Private		
South Sinai	1	--	--	1	The factory is located in Sharm El Sheikh City. It was set ablaze but no prosecution decree has been issued in this regard. The Ministry of Military Production was assigned by the governorate to conduct a study to rehabilitate the given factory, however the case is as is, awaiting investigation findings.
Port Said	1	--	1	--	It is fully operated as part of private sector activity.
Ismailia	2	2	--	--	One factory not fully operational and another dysfunctional. These factories are located on the Ismailia-Suez desert road.
Suez	1	---	1	--	Private sector-driven fully operational factory.
Sharqia	3	1	1	1	Al Zakazik Factory is not fully operational, Abu Kbeer Factory is run by the private sector however not fully operational, and Belbis Factory is dysfunctional.
Beni Suef	2	2	--	--	New Beni Suef and Samsta factories are government sector-operated however not fully operational.
Menya	2	1	--	1	Malawi Factory is government-run however not fully operational. New Menya City Factory is not in operation.
Fayoum	1	--	--	1	Fayyoun-located factory is dysfunctional.
Assuit	1	1	--	--	Government-operated factory is not fully functional.
New Valley	1	1	--	--	Factory is located in Gharga City. It is run by the government sector however not fully operational.
Sohag	1	1	--	--	Factory is not fully operational.
Qena	2	2	--	--	Qena City Factory is government-operated however not fully operational. Nagaa Hamadi Factory is functional with a one-year guarantee period.

Table (11-11) Statement on the Current Situation of all Factories – Statement on Garbage Recycling in Governorates

Governorate	Number	Management		Dysfunctional Factories	Remarks
		Government	Private		
Aswan	2	--	2	--	Aswan and Idfu Factories were delivered to the Care Service Company to be operated under its supervision however still not set in operation.
Red Sea	1	--	1	--	Hurghada Factory is run by the private sector but not yet fully operational.
Luxor	1	--	1	--	Its Factory is privately operated.
Total	66	25	28	13	

Problems Related to Garbage-Recycling Factories and the Production of Organic Compost Can be Attributed to the Following Reasons:

1. Absence of sound management to operate factories with high efficiency
2. Lack of trained labor
3. Periodic dysfunctions and shortage of spare parts
4. Unstable electric currents in most plants
5. Low quality of organic compost production of many factories due to multiple impurities such as glass

Final Disposal Sites

There are three types of solid waste final disposal sites in Egypt:

1-Open Informal and Public Landfills

These are the locations for open and unsystematic disposal of wastes. They provide an environmentally unsound method that leads to spread of fires, reproduction of insects and rodents and contamination of ground water. It also impairs the health of dealers with land filling whether garbage

collectors (Zabaleen) or pickers. Further environmental conditions in dumpsites of local units and in cities are unfavorably met.

2-Government Public Landfills

These are more controlled places for waste disposal where vehicles are allowed in and out and wastes are promptly covered with sand and dust by placing them in layers well pressed and properly covered in at least 15 cm dust thickness.

3-Sanitary Dumpsites

These are land sites designated to health and environmentally safe waste disposal. They are designed and managed in compliance with engineering rules where wastes are spread in layers and adequately pressed and covered with inert substance for wastes to remain safely buried between layers of earth alongside due precautions whether by safe recovery or discharge of resulting gases or sound discharge or treatment of leachate so as to ward off pollution of water sources.

Table (11-12) shows standards applied in determining sanitary dumpsites.

Table (11-12) Standards Taken into Consideration on Identifying Appropriate Places That Can Be Utilized as Sanitary Dumpsites	
Exclusion of agricultural lands	Remoteness from lakes' beaches > 3km.
Exclusion of tourist areas	Remoteness from ground water wells > 1km.
Remoteness from residential areas >1.5 km.	Remoteness from valleys' network > 1km.
Remoteness from sides of main roads > 1km.	Remoteness from ports and airports > 6kms.
Remoteness from sides of sub-roads > 250m.	Remoteness from borders of natural reservations > 5kms.
Remoteness from waterway banks > 2kms.	Remoteness from natural schisms > 1km.
Remoteness from Nile River banks > 5kms.	Remoteness from humid lands > 1km.
Remoteness from Coast-line > 3kms.	

52 sanitary dumpsites within the Republic's governorates had been identified as indicated in the following diagram Figure (11-3). A digital map had also been delivered showing selected waste sanitary dumpsites for each governorate.

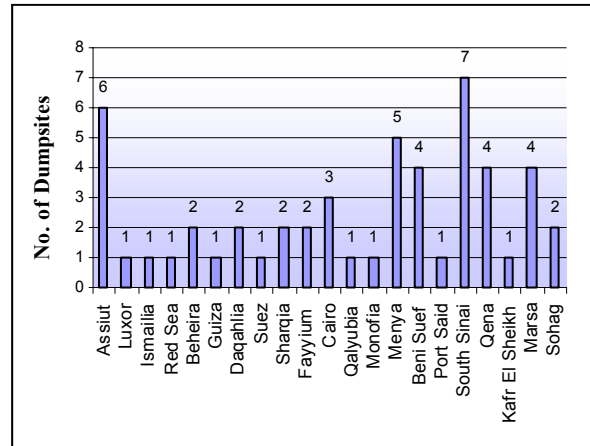


Figure (11-3) Sanitary Dumpsites Within the Republic's Governorates

Map (11-1) Selected Sanitary Dumpsites for Cairo Governorate



Agricultural Waste

Based on Table (11-3), the quantity of agricultural waste is estimated at approximately 25-30 million tons annually as shown in Figure (11-4). Benefiting from such wastes in Egypt can be illustrated as follows:

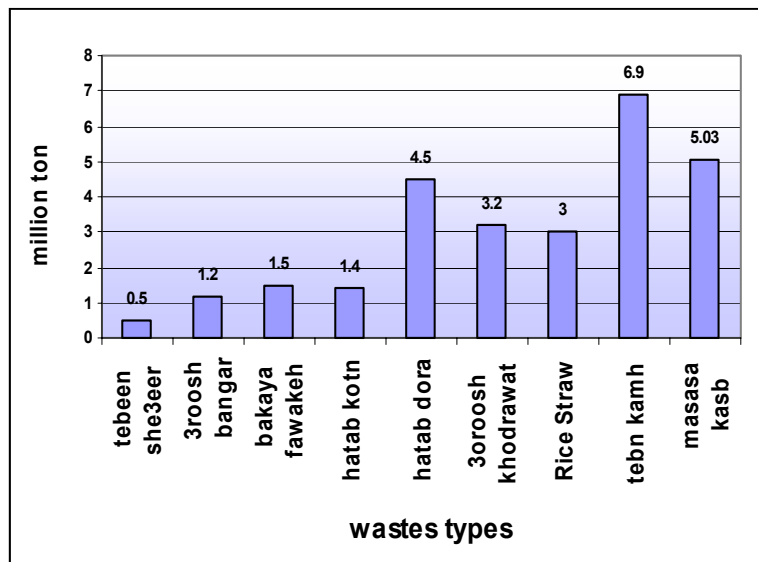
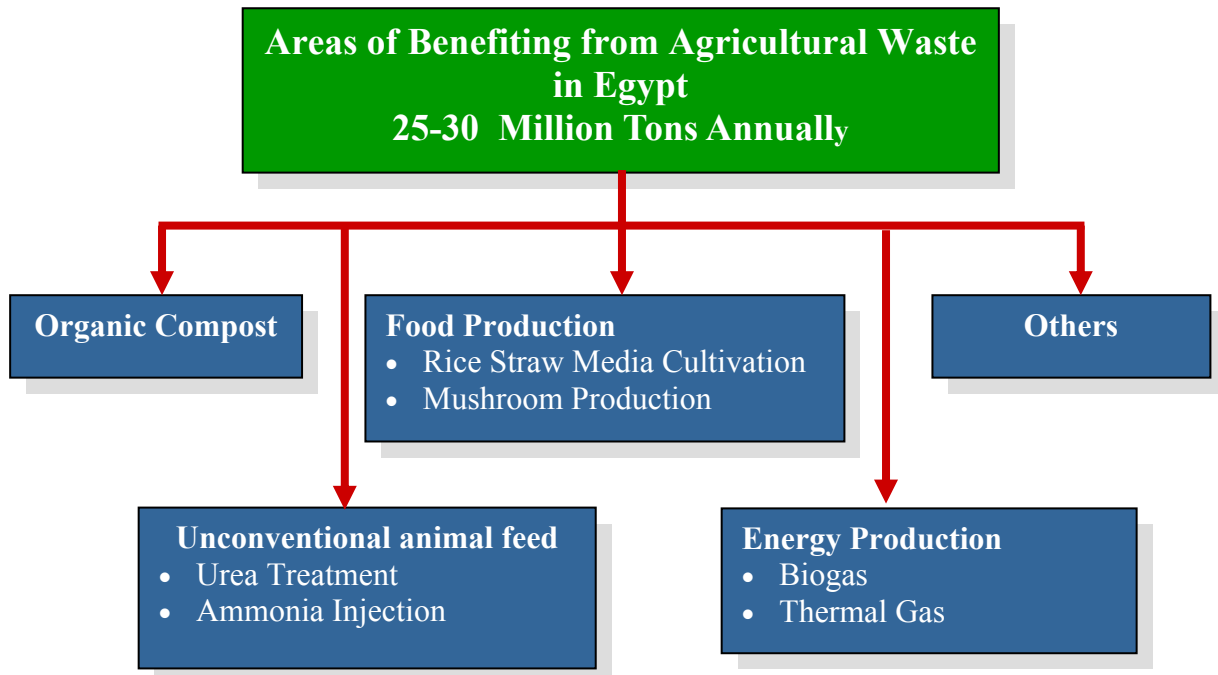
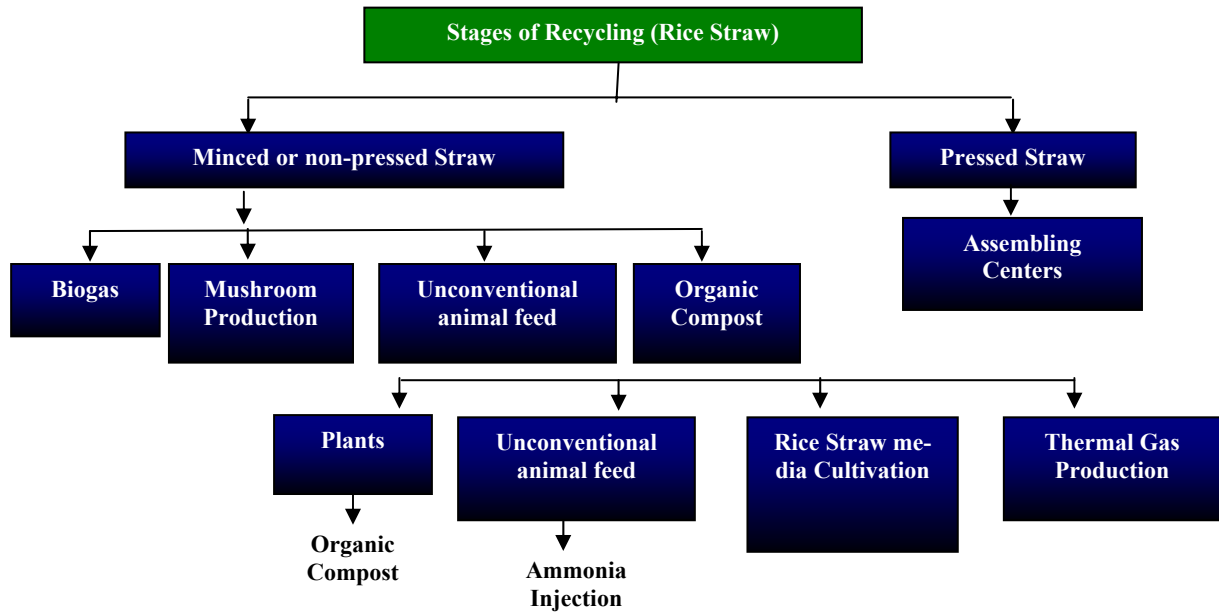


Figure (11-4) Quantity of Agricultural Waste for 2005



Among the most crucial problems in connection with agricultural waste is burning, particularly as regards rice straw which eventually yields massive and harmful air pollution. Figure (11-5) shows rice-cultivated areas in 2005 while Table (11-13) shows resulting straw quantities for the same year.

Table (11-13) Current Situation of Straw Quantities Ensuing from Rice Straw Cultivation (2005)

Total cultivated area	1.4 million tons
Total resulting straw quantity	3 million tons
Quantity pressed	1,106,012 tons
Quantity ground	1, 073, 645 tons
Quantity stored	689,558 tons
Fertilizer pile-ups	94202 tons
Ammonia pile-ups	1200 tons
Urea pile-ups	6690 tons

Table (11-14) indicates the distribution of quantities handled in each rice-producing governorate.

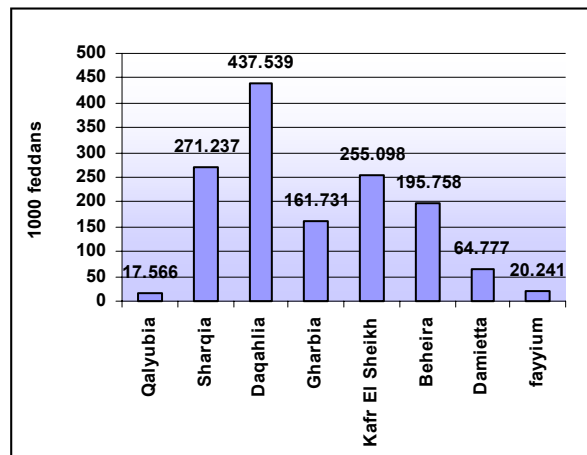


Figure (11-5) Statement of Rice-Cultivated Areas in Governorates for 2005

Table (11-14) Report on Recycling Rice Straw in 2005

Governorate	Areas cultivated (in feddans)	Areas harvested (in feddans)	Harvest (%)	No of Work shops	Quantity (in tons)	Pressed (in tons)	Quantity (in tons)	Ground (in tons)	Quantity Stored (in tons)	Pile-ups Substantiated					
										Fertilizers		Ammonia		Urea	
										no	ton	no	ton	no	ton
Qalyubia	17566	17566	100%	379	1915	12549	101	12497	2281	432	2767	9	80	398	434
Sharqia	271237	271237	100%	1693	6810	226573	-	26751	25766	1537	13449	11	105	707	490
Daqahlia	437539	437539	100%	1694	3874	434680	-	395110	24054	3233	15069	22	180	1090	2111
Gharbya	161731	161731	100%	2699	1594	128040	-	106830	236046	841	7532	55	480	736	738
Kafr El Sheikh	255098	255098	100%	1409	6390	147860	-	140500	195213	877	14585	19	105	466	498
Beheira	195758	195758	100%	5098	212	128016	-	132412	107647	5460	22252	15	115	862	862
Demiattia	64777	64777	100%	765	406	10310	-	6890	93479	1908	16908	14	95	1503	1466
Fayyoun	20241	20241	100%	135	-	17985	-	15655	5072	126	1640	4	40	65	9100
Total	1423947	1423947	100%	13872	21201	1106013	-	1073645	689558	14414	94202	149	1200	5827	6690

Source: Ministry of Agriculture and Land Reclamation – Agricultural Extension Central Department

Problems of Agricultural Waste Recycling

1. Urging farmer to speedily dispose of agricultural waste to vacate and prepare lands for the cultivation of winter crops.
2. Lack of (compressors- grinders -tractors) in sufficient quantities during short time periods to handle agricultural waste in terms of compression, grinding and transport to areas for utilization.
3. Limited involvement of the private sector and investors in agricultural waste recycling operations given high investment cost of such processes.
4. Dispersed agricultural land possessions hinder the process of handling agricultural waste regarding compression.

Efforts of the Ministry of State for Environmental Affairs in Handling Agricultural Waste during 2005

1. Training good farmers who are well versed in agricultural waste and unconventional animal feed recycling and their rehabilitation as a source of information and experience to forge as a model for other farmers to emulate. This can be achieved in cooperation with the Ministry of Agriculture.
2. Organizing extension classes for agricultural guides and small farmers concerning the transfer of agricultural wastes into organic compost or untraditional special animal feed.
3. Urea pile-ups had been substantiated.
4. Ammonia pile-ups had been substantiated.
5. Following up on processes of pressing, grinding and storing rice straw as well

as on the production of organic compost. In this respect.

- a) The Armed Forces National Service Agency (Queen Service Corporation) took part in the processes of collecting, pressing, and transporting rice straw in the Sharqiya Governorate through 4 Precincts (Markaz): namely Belbis-Mashtoul El Souk-Menya El Qamh-Abu Hamad) and provided support in the form of supplying 140 rice straw automated compressors and 60 tractors.



Picture (11-13) Rice Straw Pressing Operations

- b) Upgrading the operational efficiency of 294 rice straw compressors through the Automated Agriculture Sector at the Ministry of Agriculture and their distribution among Delta Governorates during the rice straw harvest season.



Picture (11-14) Rice Straw Pressing Operations



Picture (11-15) Rice Straw Pressing Operations

- c) Operating (2) rice straw-made organic compost plants by the Arab Industrialization Authority in the Sharqyia Governorate in the two sites of (Al Qareen and Al Khattara) with an absorption capacity amounting to 150,000 tons of rice-straw/ factory for the production of 70,000 tons of organic compost for



Picture (11-16) Organic Compost Factory

each factory.

6. Supporting the establishment of (10) mushroom production sites in the Dakhalia Governorate.
7. Helping dedicated civil associations set up agricultural waste recycling centers besides the provision of technical assistance to this end.

8. Disseminating environmental awareness among farmers to the effect of preventing the burning of rice straw and rather availing of it as a profitable income.

Future Plan 2007-2012

1. Evaluate village waste management alternatives
2. Take stock of the Egyptian experience in composting
3. Boost the establishment of integrated waste management systems applicable in urban regions in governorates.
4. Build standard sanitary dumpsites.
5. Implement pilot projects for solid waste management in villages.
6. Promote agricultural waste management projects and ensure their economic utility
7. Step up collection and transport operations in governorates of priority
8. Establish stationing and moving intermediate facilities in some governments
9. Complete the implementation of the plan of removing historic accumulations from Greater Cairo
10. Dispose of remaining informal landfills within Greater Cairo districts
11. Expand waste recycling projects to maximize their benefit
12. Raise environmental awareness by way of holding training courses for environment officials in different governorates and at the civil society level.

References

- (1) National Strategy for Integrated Management of Municipal Solid Waste 2000
- (2) Baseline Document of Solid Waste System in Egypt 2001