

# Introduction to Solid Waste Recycling

## Objectives:

Help the interested and involved parties in understanding the full dimensions of solid waste recycling, its cycle, its levels that have to be addressed every time we conduct a study on Solid Waste Recycling, its relationship with the other services and utilities in the community and sample of the current and future projects.

## Contents:

### First Day:

Introduction to the Program

Definitions of Solid Waste Management (SWM)

Classification of SWM

Sources of Municipal Waste

Special Wastes:

- Home Appliances and Furniture
- Construction and Demolition (C&D)
- Sewage Sludge
- Auto Waste (including Rubber Tiers)
- Electronic Waste
- Dead Animals
- Trees and other Garden Waste

Hazardous Household Wastes

Cycle of Municipal Solid Waste:

Generation:

- Rate (Kg/P/D)
- Composition
- Density
- Other Characteristics

Primary Storage:

- Home
- Gate
- Street (Pooling Site)

Collection:

- Ordinary (Regular)
- Selective
- Special



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- Waste Collection in the Architectural Designs

- Frequency

Street Cleaning (Sweeping)

- Manual
- Mechanical

Other Municipal Services:

- Street Washing
- Washing of Public Facilities

Transportation:

- Routing / Time Estimation
- Sort / Capacity / Mechanism

Secondary Storage (Transfer Stations):

- Necessity
- Design

Treatment:

- Shredding
- Compaction

Disposal

- Incineration
- Recycling
- Land filling

The Levels That Governs Solid Waste Management:

- Technical
- Financial
- Social
- Administrative
- Legal
- Institutional
- Environmental

Problems that Facing Solid Waste Management:  
(Following the same levels)

Waste Reduction Techniques

- Clean technology
- Reuse

Recycle through:

- Sorting of Waste
- At Source (Western System / Egyptian System)
- Informal Sorting (Street / Dumpsite Scavenging)



- Zabbaleen System Sorting
- Sorting at Sorting Centers / Composting Plants
- Selective Waste Collection
- Recycling Centers
- Small and Micro Enterprises (SME)
- Extended Producers Responsibilities

### **Second Day:**

Typical Waste Recycling Techniques for Some Waste Materials:

- Organic Waste
- Composting
  - Aerobic Waste Composting
  - Anaerobic Waste Composting
- Construction Material Production
  - MDF / HDF and Other Alloys
- Fuel
  - Bio-Gas
  - RDF (Constraints for RDF)
- Fodder (Animal Food)

#### Plastic

- Secondary Sorting (Unification of Polymers and Colors)
- Cutting
- Washing and Rinsing
- Granulation / Agglomeration
- Pelletizing
- Recycling
  - Injection
  - Blow
  - Extrusion

#### Glass

- Reuse (in the Original and Other Uses)
- Molding (as Part of the Daily Patch / as a Sole Raw Material)
- Handicrafts (Stained Glass)
- Granulation
  - Aggregate for Water & Wastewater Treatment Plants
  - Sand for Decoration and Paints
  - Tiles (Wall / Roof)



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### **Third Day:**

Field Visit:

- Transfer station
- Composting Plant
- Plastic or Metal Recycling Plant (Private)

### **Fourth Day:**

Metals

- Ferrous
  - Final Products (Casting)
  - Semi Final Products (Casting Ingots / Rolling)
- Non Ferrous
  - Casting

Rubber

- Reuse
  - Kindergartens
  - Protecting Boats and Platforms
- Works from Waste Rubber
  - Protecting Automotive Body
  - Door Mats
  - Flower Pots
  - Chair Bases
  - Slippers
  - Gravel Containers
  - Elastic Strings
  - Rubber Fillers and Joints
  - Birds / Fish Breeding
- De-Vulcanization, Vulcanization and Remolding
- Granulation:
  - Aggregate for Wastewater Treatment Plants
  - Powder for Runways and Soft Roads

Bones:

- Handicrafts
- Animal Fodder
- Extract Fat / Gelatin
- Produce Activated Carbon

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## Dimensions and Relationships of SWM with Other Services and Utilities:

### Marketing

- Demand / Supply

### Economy

- Export / Import

### Labor

- Availability
- Skills

### Laws and Regulations

- Environment
- Labor
- Standards of Industrial Products

### Industry

- Raw Materials (Quantity / Quality)
- Production Techniques

### Agriculture

- Compost
- Irrigation Facilities

### Trade and Counter Trade

- Waste / Pollution Transfer (Producer Responsibility)
- Exchange of Resources

## **Fifth Day:**

### Businesses Relevant To SW Recycling:

- Waste Exchange (Local)
- Stock Market (Local / External)
- Advanced Technology
- Energy

### Case Studies:

- Cairo (The Zabbaleen – Sorting and Recycling)
- Cairo (Helwan – Sorting of Household Waste at Source)
- Sinai (Nweba'a – Sorting of Hotel Waste at Source)
- Uganda – Kampala (Women in Waste Management – Sorting of Market Waste at Source)
- China (Waste Vendors)
- USA and European (Sorting, Waste Exchange, Stock Market, Recycling and Land filling)

### Trainees Participation:

- Short Presentations to their Cases

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- Analysis to their Cases
- Proposals
- Conclusion and Recommendations

### **Target group:**

Municipality Managers, SWM Engineers and Practitioners, Community Leaders, SME Operators and Candidates, Waste Recycling Candidates Operators, Lending Banks and Funding Agencies, Fellows of Environmental Studies.

### **Language:**

- The materials for the trainees will be in English.
- The language of instruction should be in Arabic / English.