

Chapter on

Green Municipal Solid Waste Management

Prepared for
Arab Forum for Environment and Development (AFED)

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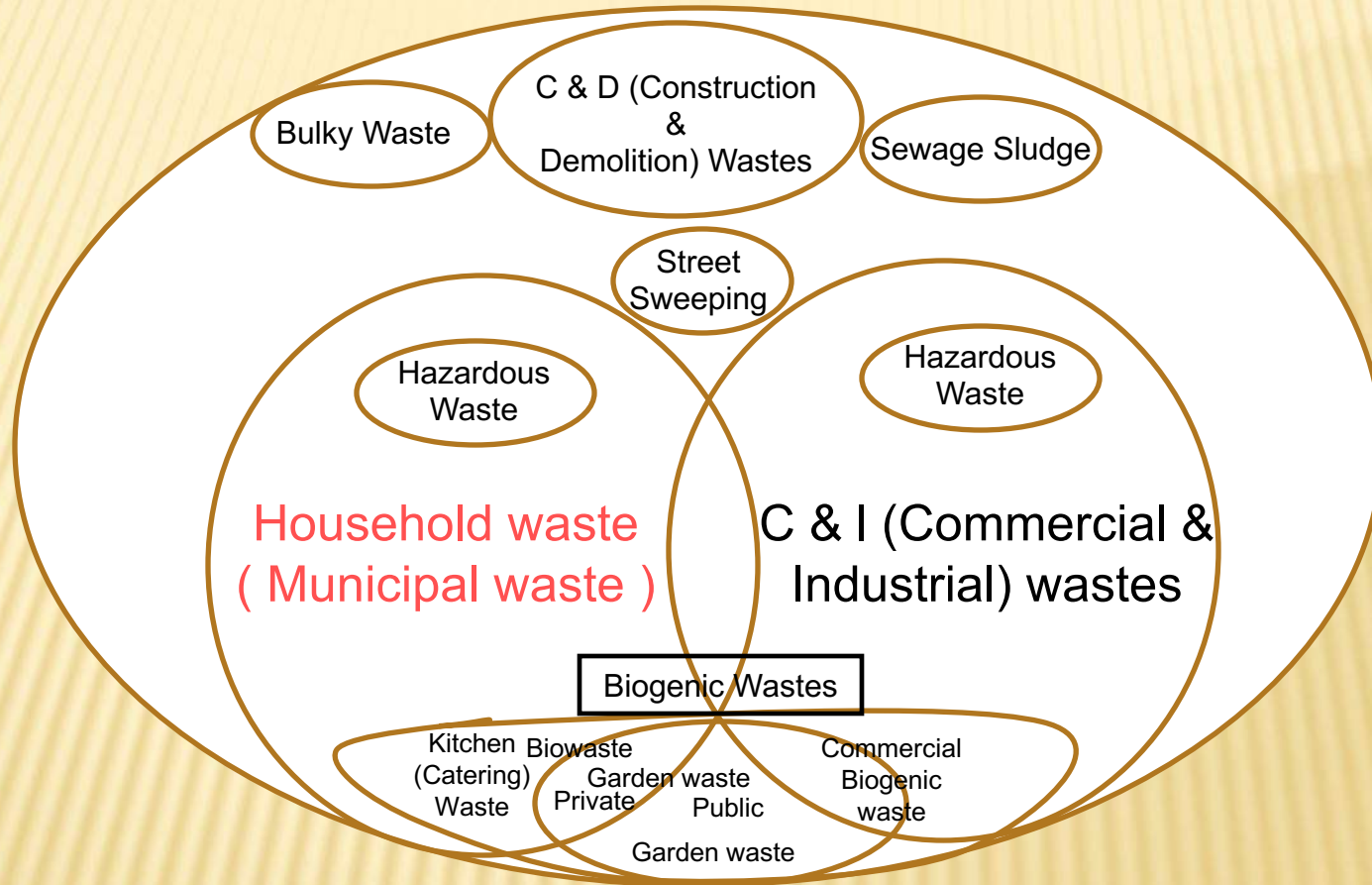
Outline

1. Defining the sector
 2. Current practices
 3. Best Practices
 4. Change to Best Practices
 5. Proposed Policies for the Change
 6. Barriers and Constraints
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1. Defining The Sector

- ✘ There is no published definition of the solid waste sector available in the Arab world.
 - ✘ A common definition for the region is needed.
 - ✘ For the time being, we may adopt an international or a well agreed upon definition of the sector.
 - ✘ EX. UK government defines the waste management subsector as products, systems and services for the minimization, collection, treatment, segregation, recovery, recycling and disposal of waste.
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Solid Waste



Defining The Sector (cont.'d)

Examples of related sectors that can benefit from economic development of the solid waste sector :

- ✘ Manufacturing
 - ✘ Processing
 - ✘ Waste to Energy
 - ✘ Construction
 - ✘ Transportation
 - ✘ Agriculture
 - ✘ Waste Consultancy
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SECTOR BUILDING BLOCKS

Primary Collection

Secondary Collection

Transfer Stations

Material Separation and
Treatment

Disposal

Processing of Materials
and Energy Recovered

Planning & Engineering

Manufacturing

Facility Supply and
Construction

Operation & Maintenance

Instrumentation

Environmental Monitoring

2. Current Practices in MSW Management

Spectrum of practices					
Collection	Curb side	Street Bins	Door to door	Chutes	Underground collection
Transport	Man pulled cart	Donkey cart	Open bed vehicle	Covered vehicle	Compactor vehicle
Transfer	None	Curb side	Vehicle to vehicle	Open lot	Transfer station
Sorting & Treatment	None	Recycling	Recycling and composting	Incineration	Anaerobic digestion
Disposal	Open burning	Curbside dumping	Uncontrolled dumpsite	Controlled dumpsite	Sanitary Landfilling

Pictures of Open Dumping in the Region

Open dump in Cairo



Open dump in Bahrain



Open dump in Damascus



Open dumping in water ways, Egypt



Current situation In Syria

landfills



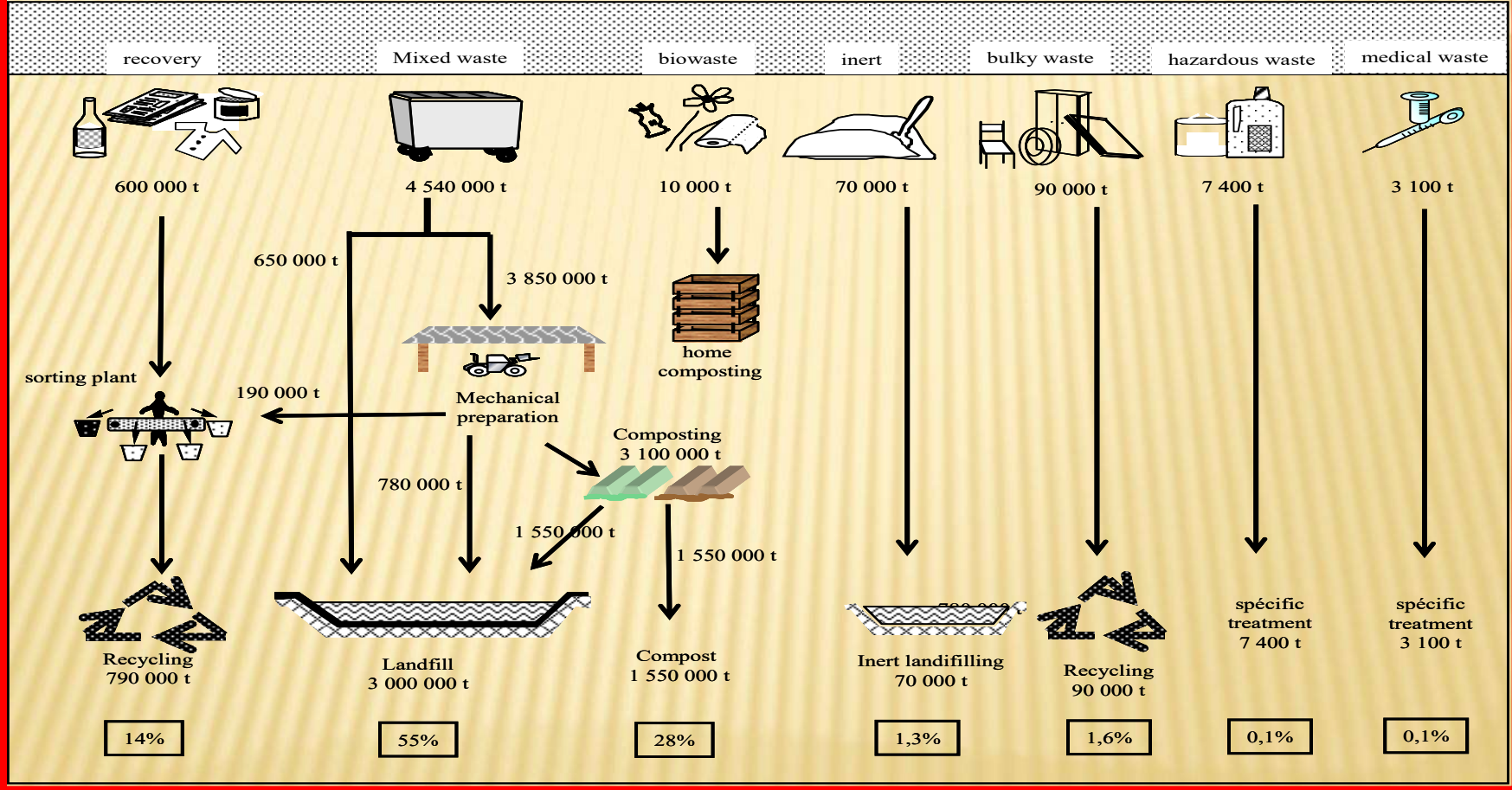
Aleppo



Latakia

Solid waste diagram in Syria

Domestic waste : 5 400 000 t/year



Cross Cutting Issues

- ✘ Lack of national policies and strategies
 - ✘ Lack of an integrated SWM master plan on the regional or local levels
 - ✘ Low standards of waste disposal
 - ✘ Difficulties in financing and cost recovery
 - ✘ Growing amounts of solid waste generated
 - ✘ Lack of coverage of proper waste collection and transport systems
 - ✘ Lack of environmental monitoring at SWM facilities
 - ✘ Insufficient SWM regulations and enforcement
 - ✘ Lack of reliable data for planning and design purposes
 - ✘ Shortage of developed human resources in SWM
 - ✘ Lack of public awareness on SWM
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3. Best Practices

Best practices in green economies developed through evolution of:

1. Concepts
2. Technologies

Aiming at:

1. Pollution abatement
 2. Resource conservation
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Development of Concepts

- ✘ **Limits to Growth (1972):** the earth's carrying capacity shall be exceeded causing a catastrophic reduction in population and production over the following 100 years leading to zero growth.
- ✘ **Questioning consumption:** impact of human activities on the planet as a function of the population, its level of affluence, and a technology factor.
- ✘ **Sustainable development (1989):** development that meets the needs of the present without compromising the ability of future generations to meet their needs.
- ✘ **'Blueprint for a green economy' (1989)** ways to account for value, costs, benefits, and risks of environmental issues.
- ✘ **Beyond GDP as a measure of human wellbeing:** An index measuring wellbeing in financial terms, but subtracts negatives such as pollution, disease, depletion of natural resources

Development of Concepts (cont'd)

- ✘ **The Stern Review of the economics of climate change (2006)** review that 'climate change is the greatest market failure' and that 'the benefits of strong and early action far outweigh the economic costs of not acting'. He presented three action items:
 1. pricing carbon
 2. policy to support low-carbon technologies;
 3. action to remove barriers to energy efficiency

 - ✘ Industrial ecology concepts and applications
 - ✘ Life cycle analysis concepts and applications
 - ✘ Factor 4 concept and applications
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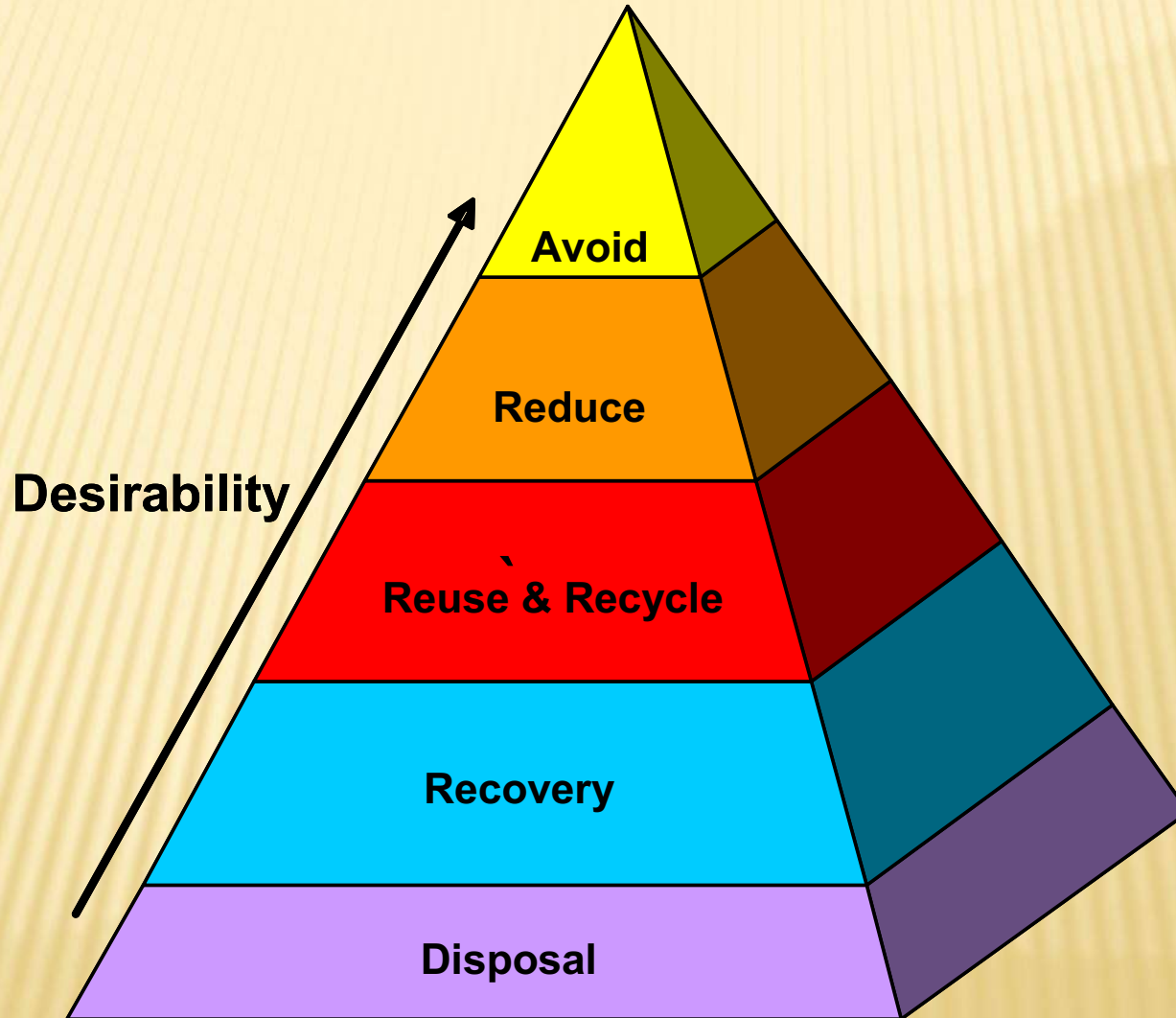
Development of Technologies

- ✘ Shift in the fundamental approach of solid waste management from “getting rid” of waste to a resource management approach of handling discarded resources in ways which do not deprive future generations of some of its value
- ✘ Combinations of waste management activities and technologies are used to divert waste away from landfill disposal and make use of otherwise wasted resources.
- ✘ Greener economies tend to stimulate increased investment in waste management directed towards developing means for waste diversion and resource conservation to reduce residuals going to landfills.

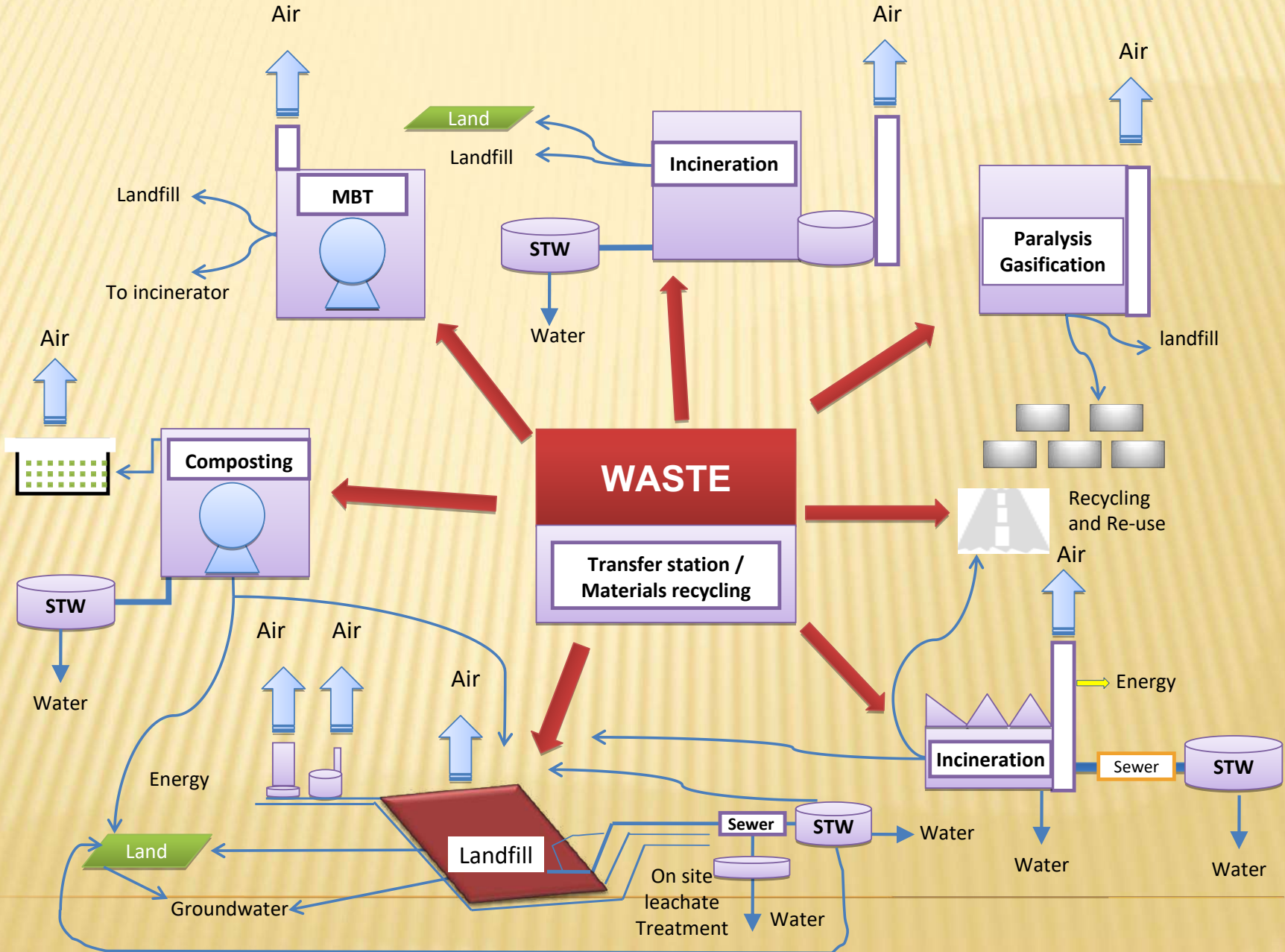
Waste generation scheme

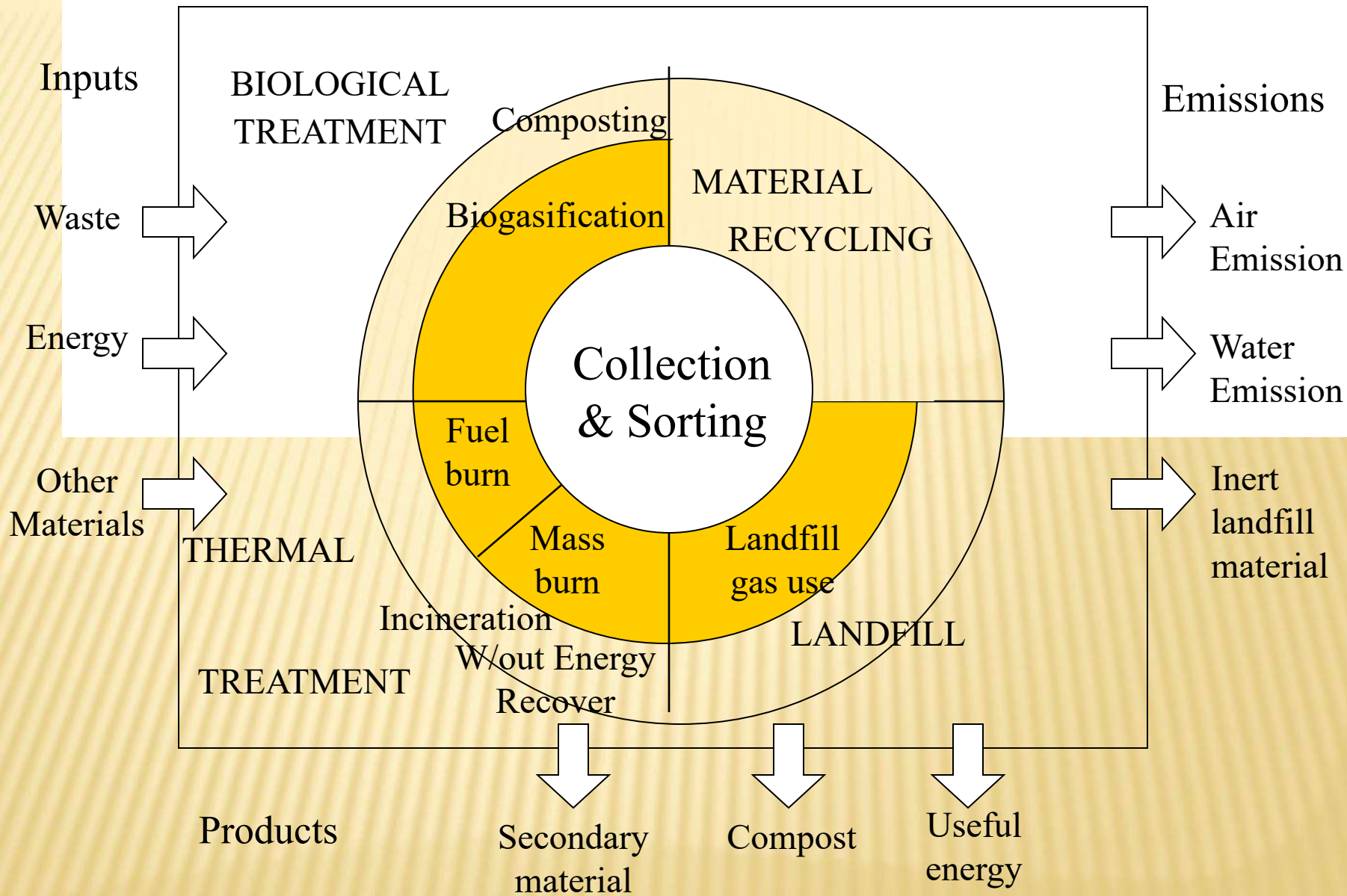


Waste Hierarchy



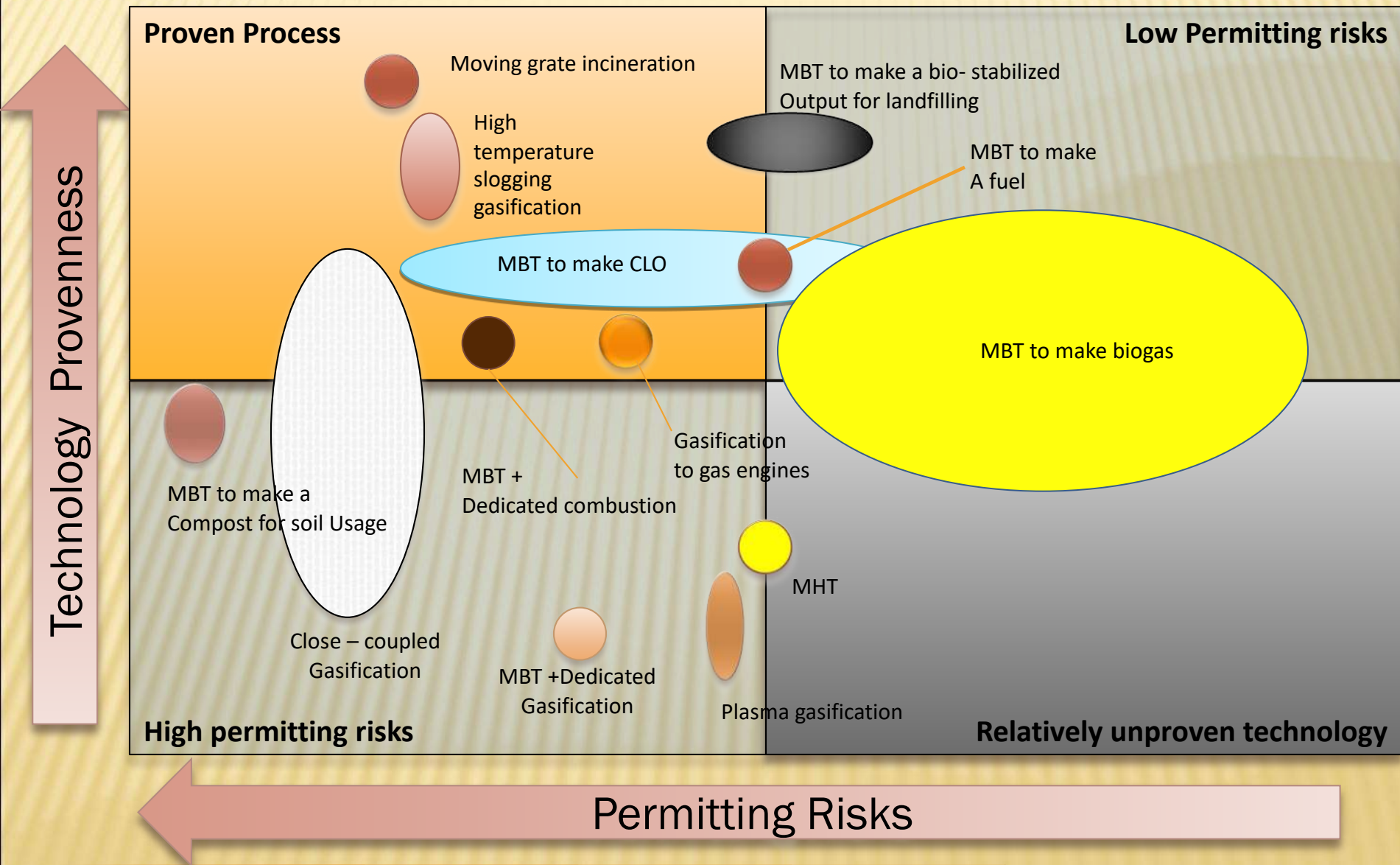
Development of Technologies





Inputs and Outputs from an Integrated Waste management system (A Lifecycle Inventory)

Development of Technologies



Spotlight on Best Practices

✘ Vancouver:

- + Vancouver views the low carbon economy of the future as a great opportunity and is planning how to build and boost the market for green products
- + action plan for becoming the world' greenest city by 2020.
- + vision of diverting at least 70 per cent of solid waste from going to landfill by 2015 with a long term goal of achieving zero waste to landfills. vancouver realizes that waste-to-energy is used by some of the world's greenest cities; however, it poses risks that makes it unprefered
- + The city of Vancouver decided to prioritize waste reduction
- + Supporting the plan through by-laws, education, and expansion of extended producer responsibility programs, taxing plastic bags and polystyrene foam food containers, cups, and utensils.
- + The second priority is to implement city-wide composting programs
- + The third priority is to improve the recycling program for businesses and multi-unit residential buildings.
- + planning new Low carbon economic development zones with zero waste concept.

Spotlight on Best Practices

✘ Stockholm:

- + The city has an unique example of waste treatment system and uses innovative production methods such as vacuum controlled underground transportation of solid waste.
 - + a 100-year old tradition of waste incineration and waste-to-energy management.
 - + The city of Stockholm diverts 100% of its waste as follows :
 - ✘ 25% of the waste produced by the citizens in Stockholm is recycled.
 - ✘ 73.5% is recovered for production of district heating (by incineration).
 - ✘ 1.5% is biologically treated. Swedish legislation does not allow organic waste to be sent to landfill.
 - + Stockholm finances waste management through waste collection fee which is passed by Stockholm City Council.
 - + The Swedish Government has introduced producer responsibility to the packaging and newspapers industries
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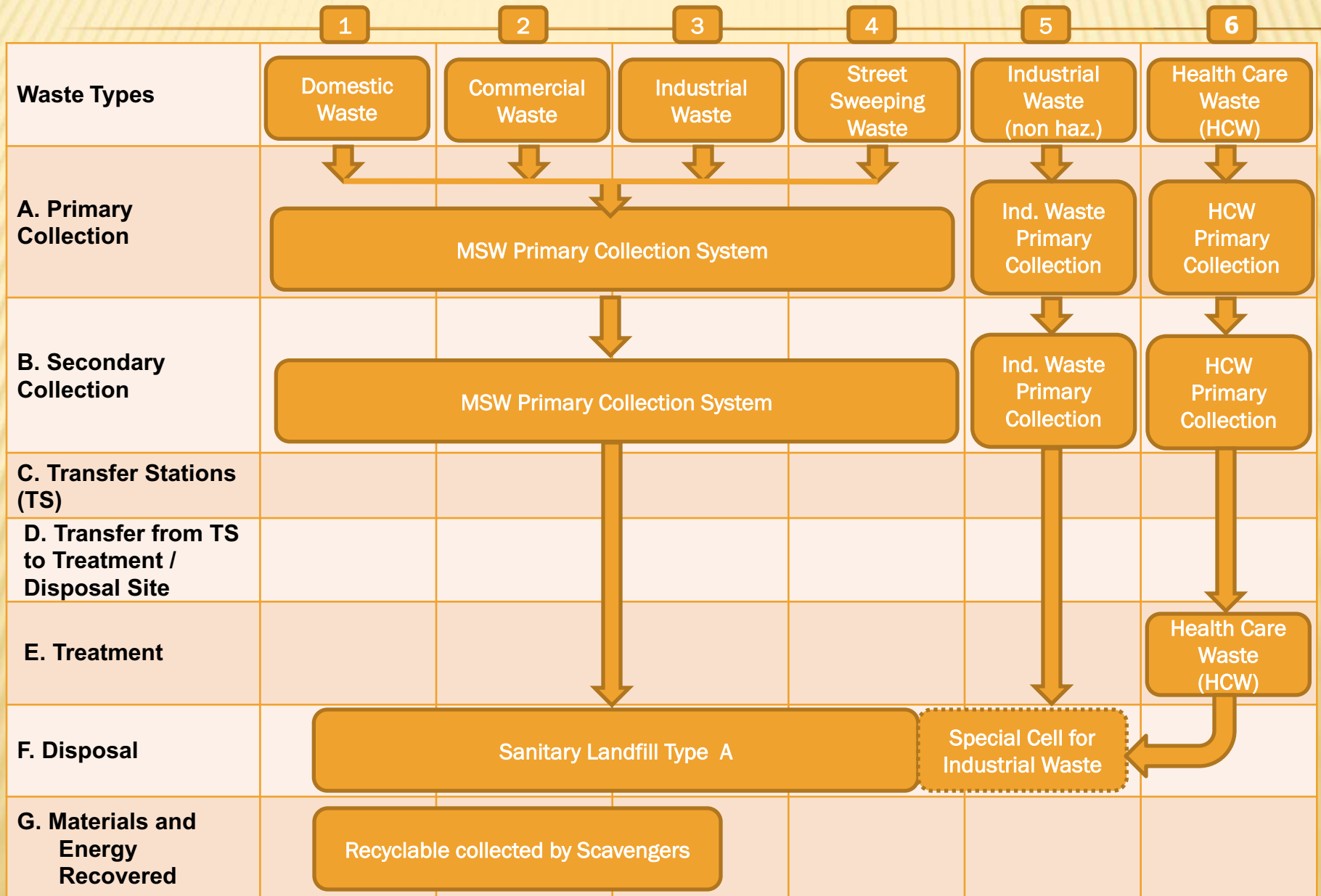
4. Change to Best Practices

- ✘ Objective: to achieve a sustainable SWM practice that relies on waste diversion and resource conservation, and promotes investment in a green economy.
- ✘ Not only technologies and sophisticated treatment processes, but also other activities are necessary to improve SWM (especially waste minimization), expressed as the soft components,
- ✘ There may be several routes to achieving greener SWM, Ex.:
 - + capital investment in advanced technologies to maximize waste diversion while gradually implementing 3R policies. (similar to the Stockholm model)
 - + start with waste minimization (3R) policies for gradual waste diversion (Vancouver Model). This option may be more suitable for developing economies where the availability of capital investments are limited. It also utilizes more desirable alternatives of waste diversion.

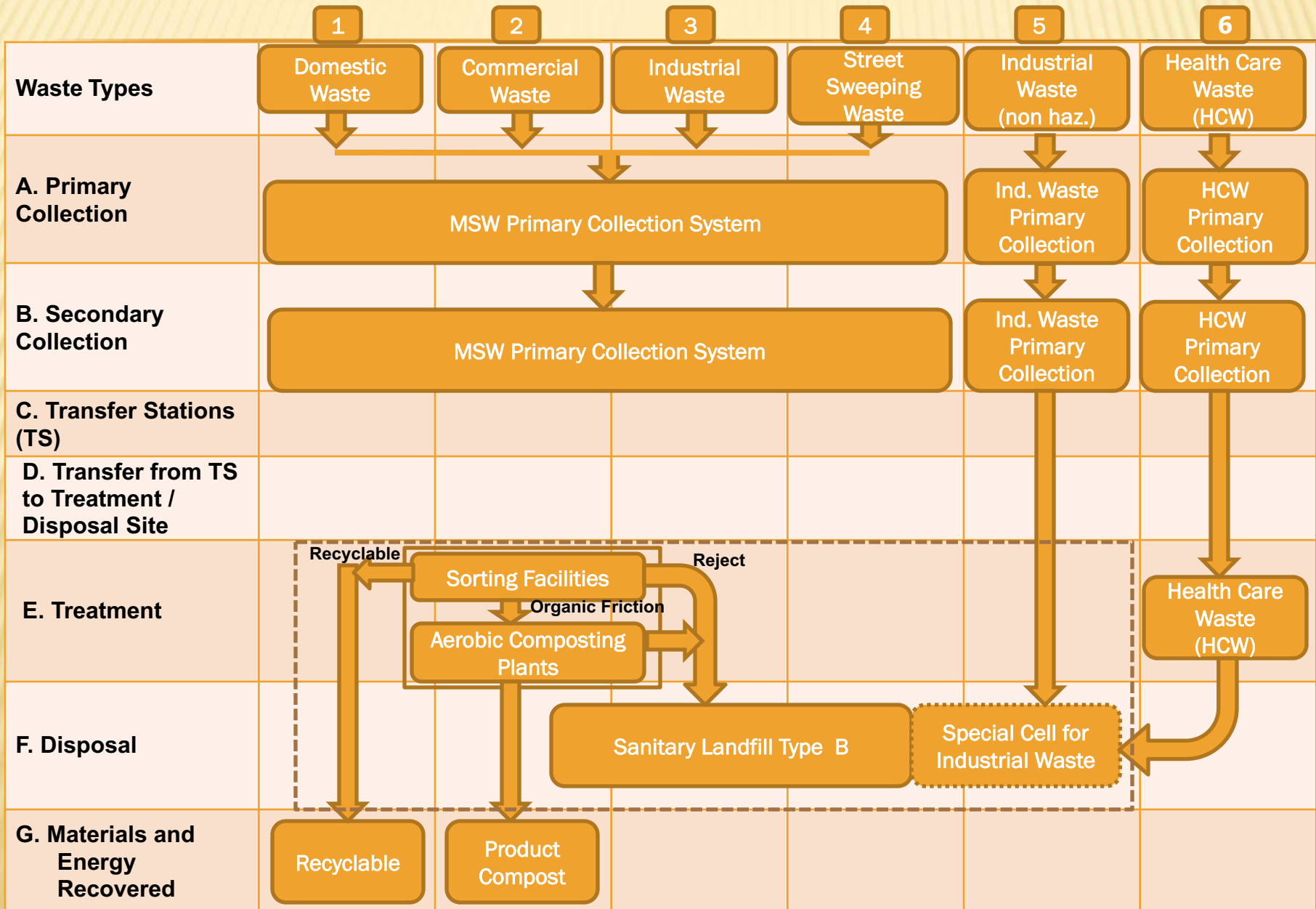
Route to Change

- ✘ Essential need for actions related to “soft components” :
 1. SWM Vision, Strategy, Guidelines and Plans
 2. SWM Institutions
 3. Public Awareness
 4. Human Resources Development on SWM
 5. Information Management System (IMS)
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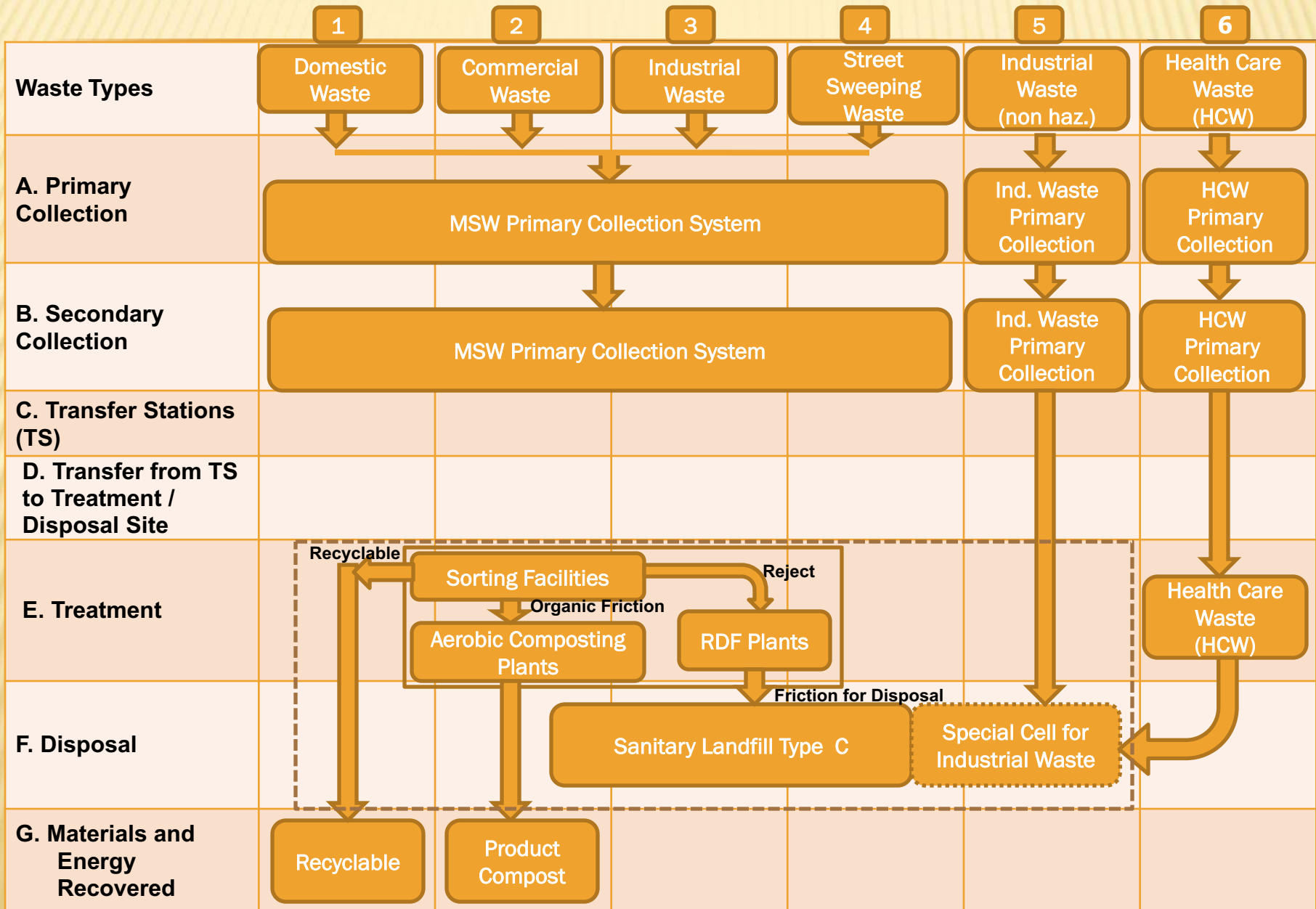
CHANGE TO BEST PRACTICES, STEP 1:



CHANGE TO BEST PRACTICES, STEP 2:



CHANGE TO BEST PRACTICES, STEP 3:



SORTING AND RECYCLING, EGYPT

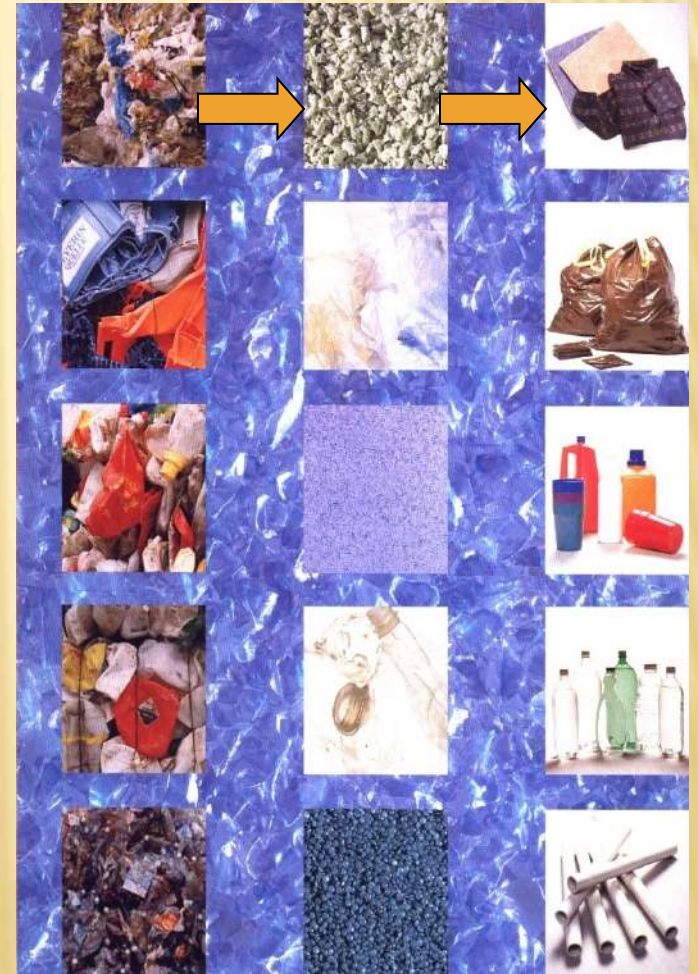


COMPOSTING OF THE ORGANIC FRACTION OF MSW

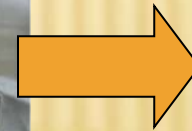
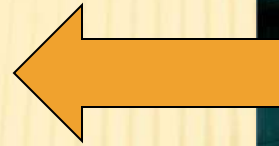


Composting Plant, south Cairo

Additional added value : Plastic Recycling

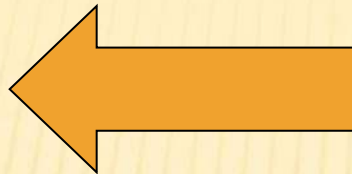


Additional added value : Rubber tires and Home appliances Recycling



Additional added value : Compost By-Products

Humus acid

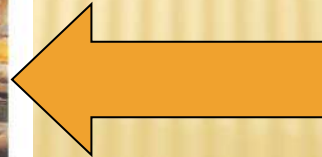


Compost tea extractor

Additional added value : Reject Utilization

RDF Pellets

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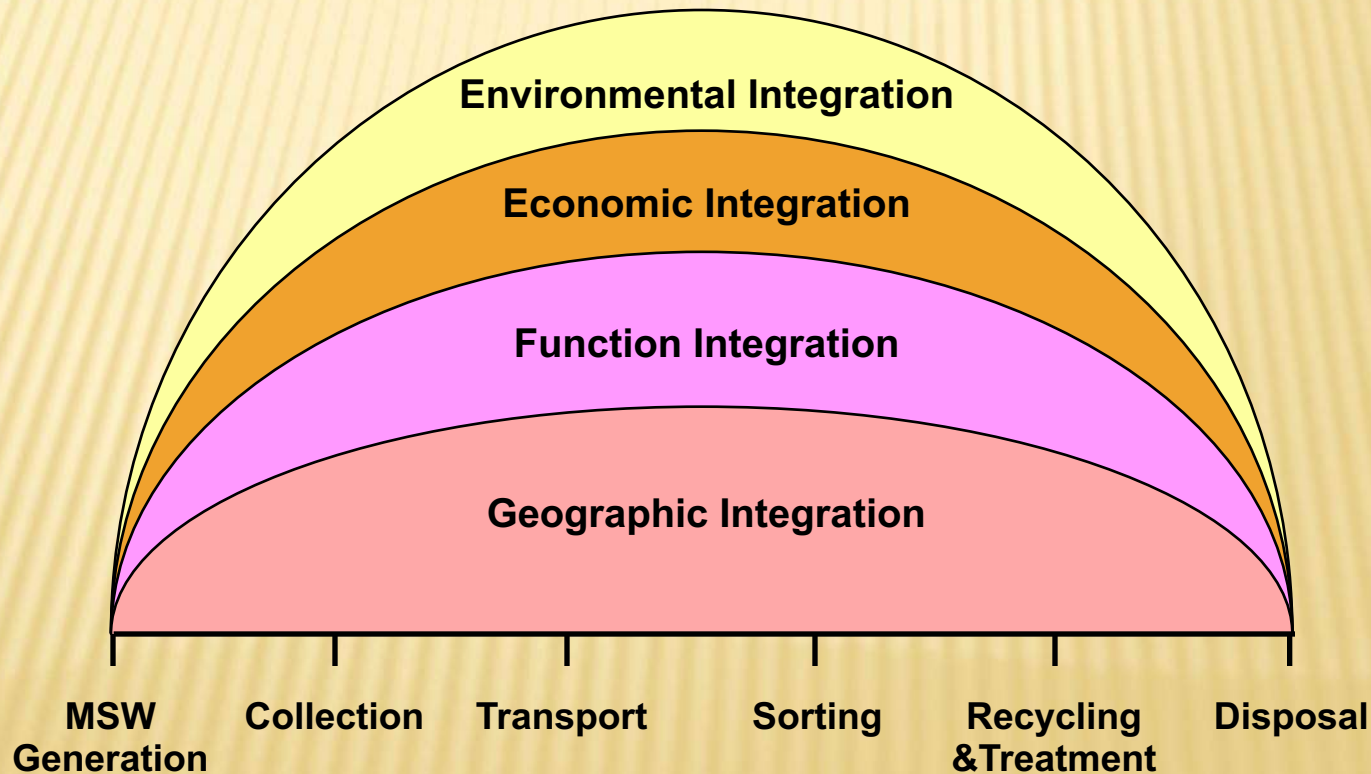
Carbonization

5. Proposed policies for the change

- ✘ Promote sustainable integrated SWM (ISWM) strategies with emphasis on waste avoidance, reduction, reuse and recycling
- ✘ Develop policy, legal and institutional frameworks supportive of ISWM
- ✘ Develop financial frameworks to reflect full cost accounting, user pay and polluter- pay principles
- ✘ Use market incentives to develop recycling market.
- ✘ Building institutional capacity of municipalities on MSWM.
- ✘ Encourage private sector participation and stewardship in ISWM activities
- ✘ Promote sustainable production practices in the industry
- ✘ Raise public awareness of sustainable consumption & production
- ✘ Promote on-site sorting and separation of waste streams
- ✘ Foster regional cooperation in research and development for exchange of experience in the field of MSW management

Final Word on Integrated SWM

- ✘ Integrated solid waste management aims at reducing adverse impacts to human health and the environment resulting from all stages of SWM to a minimum in a sustainable manner.



6. Barriers and constraints

- ✘ People and Governments are concerned primarily on solid waste collection, not on ISWM
 - ✘ Solid waste is managed with weak institutions, lack planning skills and managerial experience
 - ✘ Lack of national policies, strategies, lack of regional master plans
 - ✘ Lack of enabling conditions to enhance PSP
 - ✘ Poor cost recovery, problems in finance
 - ✘ Shortage of developed human resources in SWM and technical expertise
 - ✘ Lack of public awareness on SWM
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بالعربي Barriers and constraints (Cont.'d)

المعوقات الرئيسية التي أخرجت تحقيق تغير جذري في ادارة المخلفات الصلبة هي ذاتها المعوقات التي أخرجت التقدم بمعناه الحقيقي

بالعالم العربي:

نمط الدولة الرخوة ، دول تسن القوانين ولا تنفذها
الشعوب المتعايشة مع الفساد ، الشعوب التي انهارت المنظومة
القيمية بها، تدني احترام الملكية العامة وثبتت الهمم
الحكومات غير المعنية بالتنمية المستدامة وانما هي المعنية بالنمو
الآني بمعناة المالي وليس الأقتصادي
شيوع ثقافة الجهل والتخلف ، بمعنى هدر الأمكانية ، ..