Technology and Public Policy Options for Solid Waste Management:

Application to Recent Cases in the East Mediterranean

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CYPRUS 2016
4th International Conference
on Sustainable Solid Waste Management

Limassol, June 23-June25

Objectives

Discuss MSW challenges in less developed countries related to lack of public policies

Provide a brief description of a Case from the East Mediterranean

Present empirical results of public attitudes towards MSW management options

Trigger debate about the advantages and disadvantages of MSW management options

Introduction

MSW is a natural daily product

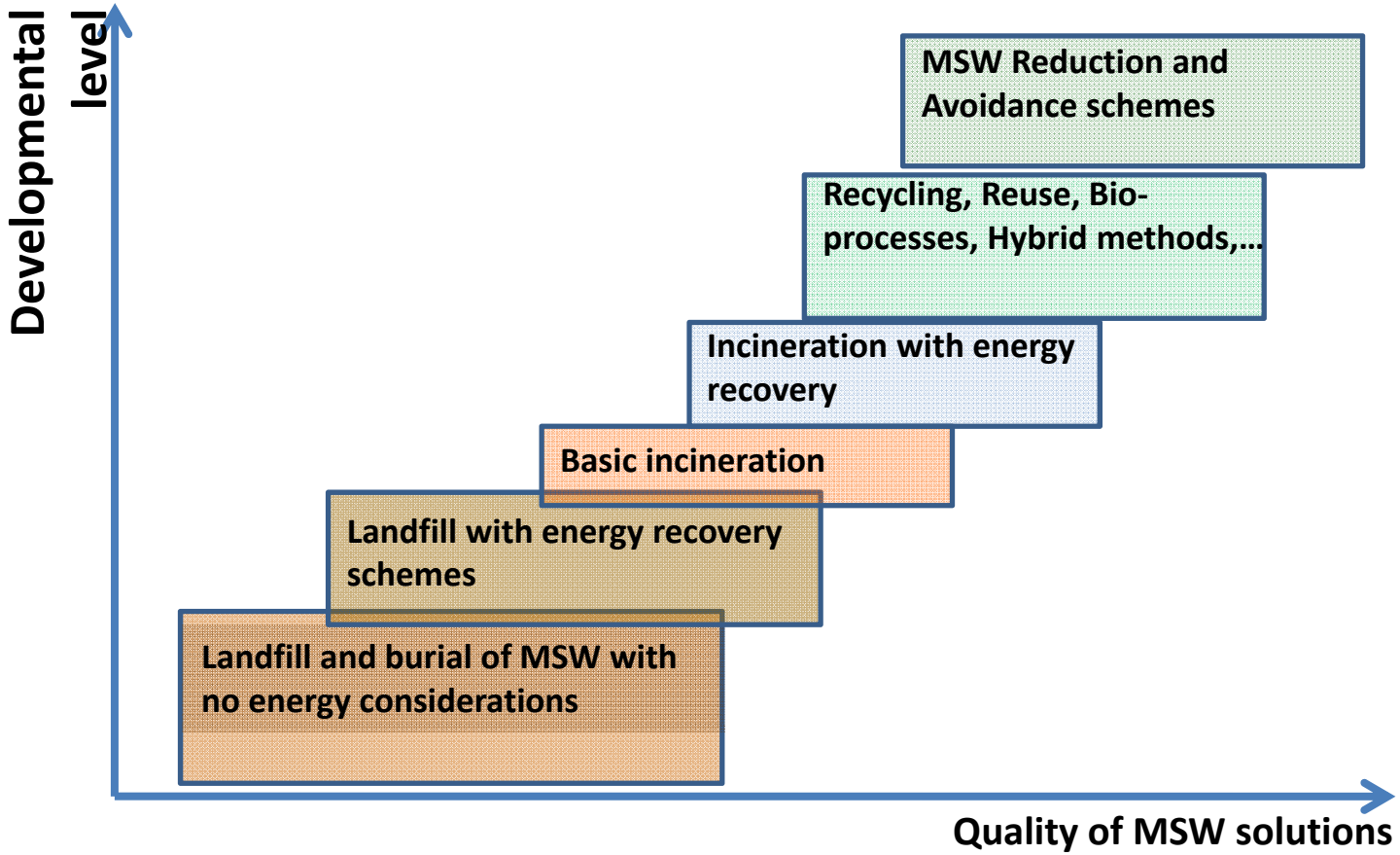
There are several processes and technologies in MSW management that have evolved over the last few decades

Slowly a drift appeared between theoretical research and application

Key success factors are mostly about implementation rather that the attractiveness of the theory

The design of clear, simple, executable public policies is most important to secure acceptance and tangible results

A Hierarchy of Methodologies



Overall qualitative relationship between viable MSW management solutions and the developmental level of the community or country.

Tenets in Policy Design

- Challenges in less developed countries

Clarity	Simplicity	Ease of Implementation
What is the end-user expected to do?	Can the end-user keep up with the process?	Can the end-user keep up with the process?
What level of involvement is expected of public managers?	Is it incentive-based? Or top-down? Is there enforcement involved?	Will the plan materialize as expected?
How would both parties measure success?	Will there be any confusion about results?	Will the end-result be perceived, evaluated in a common frame?

Tenets in Policy Design

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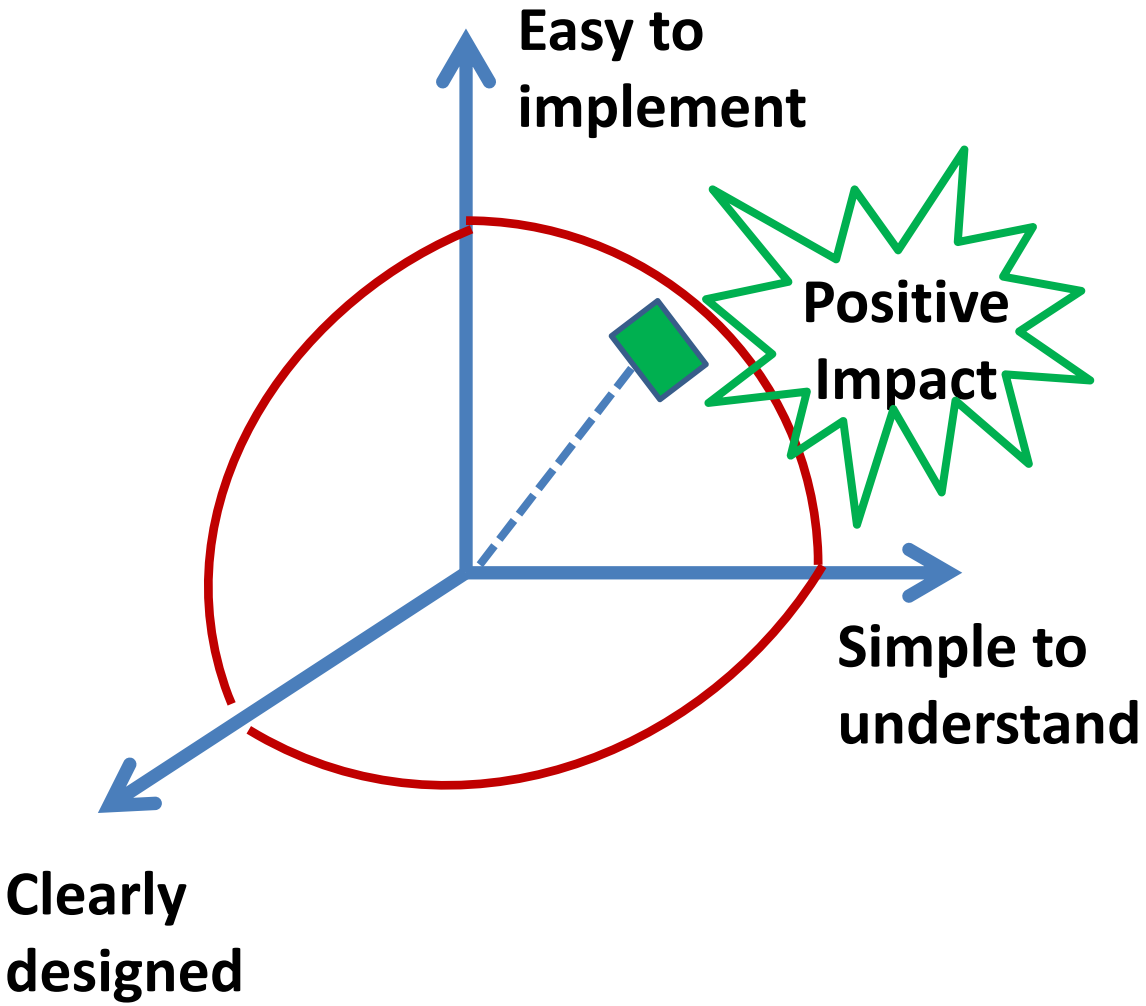


Research, policy frameworks … and good intentions

MSW have issues common to less developed countries, case in point the crisis in Lebanon

Majority of MSW is household refuse

A 1995-1997 study was part of an Environment Emergency Plan

The greater Beirut area (GBA) was supposed to lead in terms of applying modern practices

A 2001 comparison showed 1.44 Mn actual tons compared to projected 0.99 Mn tons as yearly quantity

Research, policy frameworks … and good intentions

In 1998, policymakers decided to interrupt garbage dumps in Burj Hammoud

The Naameh landfill, 18 km south of Beirut - a short-term alternative was born to accommodate landfilling till 2004

Target capacity 2.2 Mn tons over six years … with a sole private contractor …

… but it remained open till 2015 … when it was shut down by escalation and pressure from inhabitants

Public Unease about lack of clarity in direction

No government strategy? Can't keep it home …. Have to throw it somewhere …

Research, policy frameworks … and good intentions

The intent was to

Use the Naameh landfill temporarily

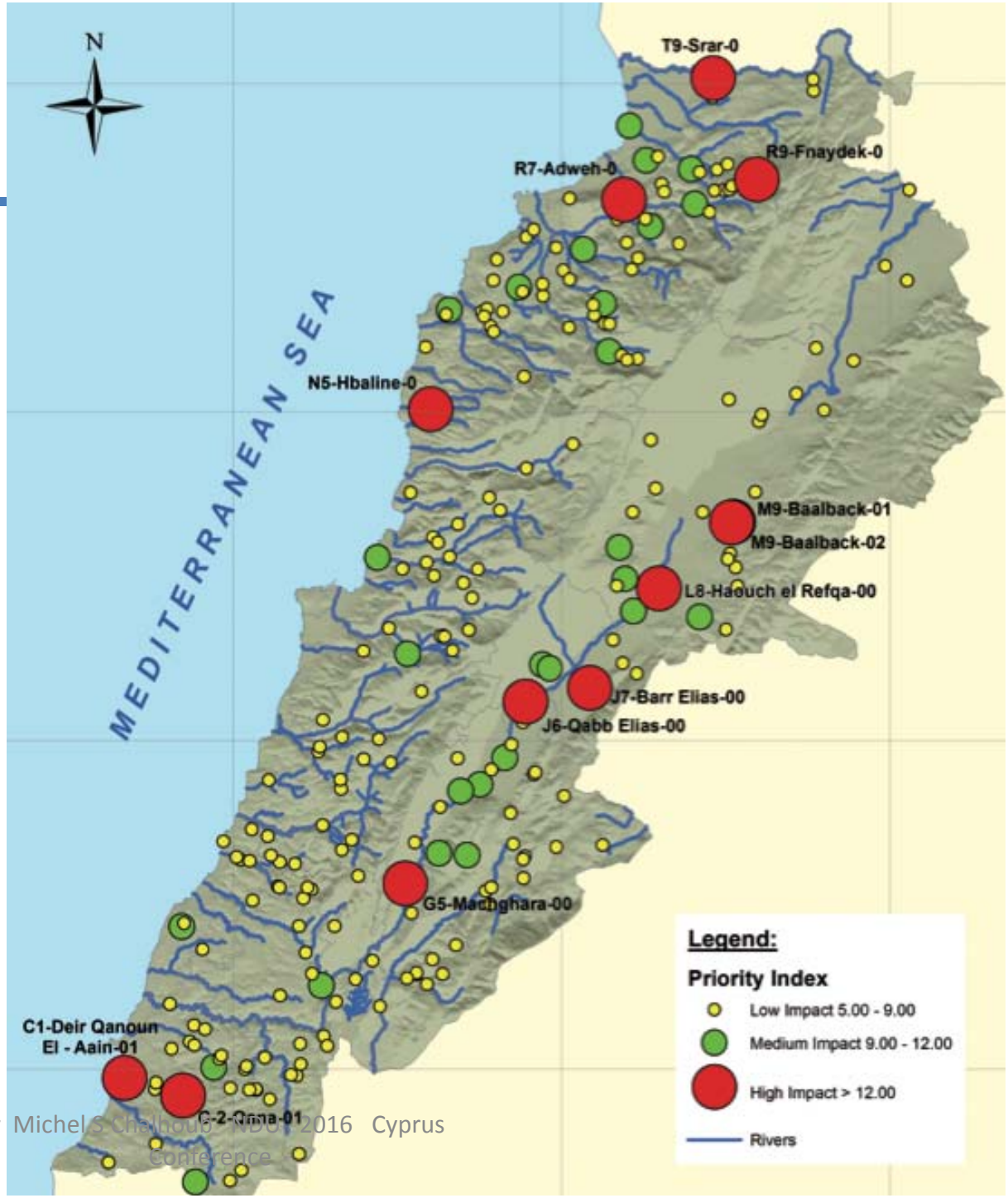
Build awareness about modern techniques

Encourage triage

Phase Naameh out

… As you migrate to better solutions

A priority list was developed ….



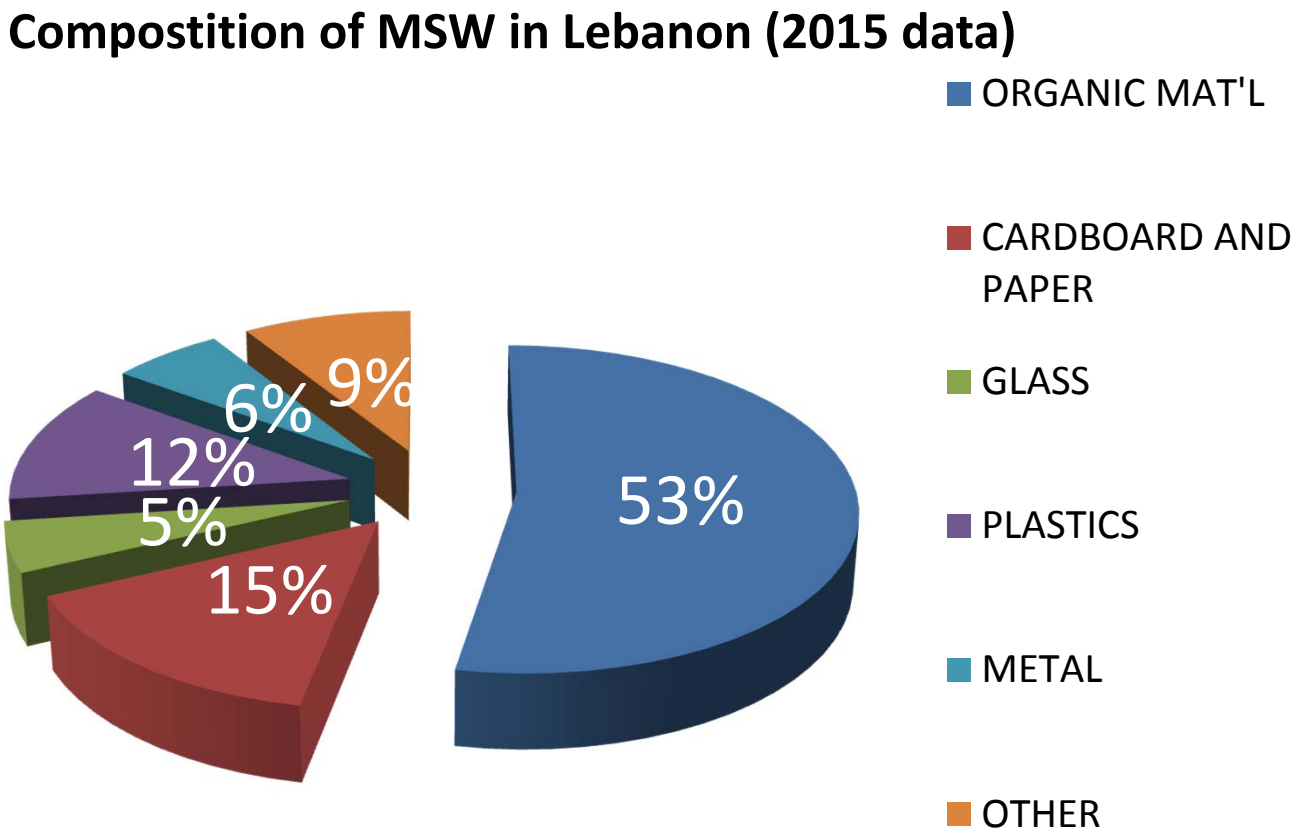
Studies were conducted about MSW composition

MSW Component	GBA (%)	Lebanon (%)
Organic	63	51
Paper and cardboard	18	17
Plastic	7	10
Glass	5	9
Textiles	4	3
Metals	3	3
Construction/Demolition	-	5
Other	-	2

(CDR 2012)

Composition Relatively high on organic components, which favors certain solutions over others

The composition did not change significantly in time



(NCR 2016)

Multiple theoretical solution and very few practical options

Landfills were the only solution [at high volume demand] put into practice for so long

Incineration was not developed into the inclusion of clean air technology and energy recovery schemes

Anaerobic digestion was still considered not ready for implementation

Migration to a new solution reached a dead-end

Little attention was given to the "three tenets"

Contradicting opinions arose; public managers, civic society, end-users ….

Recipe for policy failure

Rush for remedial actions … a bit too late

In which bin should the plastic go ???

Rush for remedial actions … a bit too late

Shall we do the triage by hand? Right here in the neighborhoods? Was that even part of our job?

Policy Failure Confirmed !!

Public discontent escalated [2015-2016]

All technology solutions seemed remote … and theoretical

Some suggestions were even … so out of range …

A proposal to literally "ship" garbage to other countries was put on the table … and was withdrawn within weeks

… in a rather transparent way …

… pubic attitudes had to be gauged empirically

If it is to be burnt, it should not be done randomly

Empirical techniques were used to gauge public attitudes

Public awareness-building about upstream triage

Privatization of part or all of the value chain

$$Y = \beta o + \sum_{i=1}^{5} \beta_i X_i$$

Quality management in daily operations

Reliability of public management authorities

Challenges in daily operations and implementation

Some of the simple empirical techniques were used

Public role upstream

se_1 = 0.052 (≥ α = 0.05)

Privatization

se_2 = 0.028 (≤ α = 0.05)

$$Y = 0.955 + 0.0099\,X_1 - 0.0468\,X_2 + 0.5695\,X_3 + 0.2787\,X_4 - 0.1096\,X_5$$

Quality management

se_3 = 0.050 (≤ α = 0.05).

Public authorities

se_5 = 0.032 (≤ α = 0.05).

Implementation Challenges

se_4 = 0.048 (≤ α = 0.05)

Local community brainstorming and commentary tool

Public awareness-building about upstream triage

Privatization of part or all of the value chain

$$Y = \beta o + \sum_{i=1}^{5} \beta_i X_i$$

Quality management in daily operations

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Conclusions & Recommendations

Excessive, mismanaged MSW raises serious health, logistical, economic, and political problems

The downside is exacerbated in less developed countries

Most desirable solutions comprise waste avoidance, and least desirable are traditional landfills

Incineration, energy recovery, and clean exhaust technology is worth exploring seriously

Conclusions & Recommendations

Empirical study tested public attitude towards

Upstream triage
Privatization, and Quality management
Technological implementation challenges
Reliability of public management

Follow-up research would benefit from a focus on

Collaborative schemes among household-level, municipal level, contractors and investors

Sustainable culture- and incentive-based solutions and less on top-down solutions

Thank you

Please visit us soon

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