

What do people believe about landfill mining?

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Waste management

- Despite the emerging attention towards promoting **3R waste management policies** (Reduce, Reuse, Recycle), **landfilling** remains the **dominant waste management practice** in many parts of the world
- Under the pressure of **resources deficiencies** and **environmental challenges**, certain steps have been taken to encourage integrated waste and materials management policies

Towards LFM concept

- The exploitation of old and existing municipal solid waste landfills via **landfill mining (LFM)** may be a **promising solution** in order to:
 - conserve landfill space
 - reduce the need for new landfill areas
 - eliminate potential contamination sources
 - recover energy from mined waste
 - reuse recovered materials
 - redevelop landfill sites

LFM benefits

LFM projects could....

- create economic opportunities from recovered materials, landfill space and land
- generate social benefits through reduced impacts, provision of secondary raw materials from recycling, job creation, etc.

However...

- recovery of materials and energy resources alone seldom seem to **economically justify** LFM projects
- LFM like any other economic activity, **has to be economically feasible**; otherwise it will **never** be implemented

Improved decision-making processes

- Private costs and benefits alone cannot reflect the **true social worth** of LFM projects
- Environmental and social benefits should be taken into account to come up with **more informed and fair social choices**

This means that we need to...

- identify the ways in which LFM projects **affect human well-being** and
- estimate the **total economic value** of these changes through appropriate valuation techniques

Total economic value

- The monetary measure of the change in society's well-being from a change in the quality of life is based on its **Total Economic Value**
- **Use values:**
 - direct use values (i.e. actual use of an environmental good or service for commercial purposes or recreation)
 - indirect use values (i.e. benefits from ecosystem services and functions rather than directly using them)
 - option values (i.e. value of ensuring the option to use a resource in the future)
- **Non-use values** include altruistic, bequest and stewardship motivations, reflecting the fact that people value resources for moral reasons, unrelated to current or future use

Scope of the survey

The present survey aims for the first time in Greece:

- to **investigate** people's knowledge and attitude about existing MSW management practices
- to **understand** people's beliefs about LFM and its perceived benefits
- to **estimate** people's support and their WTP for LFM projects

The survey was carried out between **April and June 2015** involving residents of the Polygyros municipality. In total **286 questionnaires** were collected via **personal interviews** and the response rate was around 70%

Methodological approach - The CVM

- 'Contingent Valuation', because valuation is contingent on the **hypothetical scenario** put to respondents
- It is a direct (stated preference) valuation method, i.e. it involves directly asking people how much they would be WTP or WTA for a **utility change** through a survey
- It is the most frequently and widely applied stated preference valuation technique – **It has been in use for over 40 years in over 100 countries**

CVM: Criticisms

- Respondents may fail to take payment seriously because they are non-binding or may manipulate the process by distorting their true WTP (i.e. strategic bias)
- Respondents do not understand what they are being asked to value (i.e. information bias)
- WTP-WTA estimates may be inconsistent (i.e. WTP and WTA disparity)
- Validity (i.e. 'accuracy') and reliability (i.e. 'consistency' or 'reproducibility') of estimates, etc.

CVM: Advantages

- The only method available, together with Choice Experiments, for capturing **non-use values**
- It is **consistent** with the theoretically framework of monetary measures of utility changes
- It is applicable to **ex ante** situations
- It is **widely used** through regulations by agencies with environmental responsibilities for natural resource damage assessments and policy evaluations

Main findings...

Survey results

- About 70% of the respondents state that they have seen, heard, or read about solid waste management (SWM) issues from internet, TV, radio, newspapers, magazines, etc., a few times and 6% many times. About 22% of them have never heard anything about SWM
- SWM problem is of equal importance to other environmental issues in their area, for the vast majority of the respondents (i.e. around 90%)

Survey results

- Almost all (i.e. more than 96.5%) believe that the uncontrolled waste disposal is associated with significant problems
- Almost four-fifth of the respondents believe that controlled landfills create less significant problems than the uncontrolled ones, while the rest say that the problems are of equal importance
- More than 70% of the respondents recognize water pollution as the most important disposal related problem, followed by soil pollution (9%), air pollution (6%), and global warming (4%) and deforestation (4%)

LFM benefits

Respondents were asked to evaluate the importance of LFM according to their opinion focusing on **three fields**:

- about **67%** of the respondents characterize the benefits of **resource and energy conservation** as 'very important' and **26%** as 'moderate important'
- about **21%** of the respondents characterize the benefits of **prevention and reduction of environmental pollution and nuisance** as 'very important' and **69%** as 'moderate important'
- about **22%** of the respondents characterize the benefits of **conservation of landfill space** as 'very important' and **45%** as 'moderate important'

Support for LFM projects

To investigate **public support for LFM projects**, respondents were asked to state which the following sentences best reflects their thinking:

- “I feel that there should be a LFM program, and I feel some responsibility for paying for it”: **18.2%**
- “I feel that there should be a LFM program, but I do not really feel that it is my responsibility to pay for it”: **77.3%**
- “I don't think there should be a LFM program”: **4.5%**

In total, more than 95% of the respondents feel that there should be a LFM program

Support for LFM projects

- Average WTP amount for positive bids (excluding zero responses): 50€ per household per year in increased municipal taxes
- Average WTP amount for the entire sample (including zero responses): 12€ per household per year in increased municipal taxes

Support for LFM projects

- The respondents' attitude towards their financial responsibility is associated with the **current economic situation** in Greece
- **More than 50%** of the respondents said that they couldn't afford it due to **low income**
- **About 95%** of the respondents declared annual household income lower than **30,000€** and three-fourths of the respondents lower than **20,000€**
- '**Unemployment**' and '**poor economy**' are mentioned as the most important problem by **more than 85%** of the respondents

Concluding remarks

- Although waste management policies, worldwide, aim at adopting a more environmentally-friendly and resource conserving hierarchy, **waste disposal still remains the most common MSW practice**
- As a means to reduce environmental impacts and conserve natural resources, LFM could be implemented **provided that economic feasibility is ensured**, not only from a private but also from a social point of view
- The **most significant benefits** of LFM are related to **resource and energy conservation**, followed by **prevention and reduction of environmental pollution and nuisance**, and the **conservation of landfill space**

Concluding remarks

- LFM receives wide acceptance from the society, as more than 95% of the respondents feel that there should be a LFM program
- About three-fourths of the respondents rejected to pay in order to financially support LFM programs
- This attitude is associated primarily with the current economic situation, and should not be considered representative of the beliefs of the society. In other words, society's WTP for LFM programs could be much higher under different economic conditions

Thank you for your attention...