

# Sludge Valorization Feasibility Study in United Arab Emirates

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## Introduction:

Valorization is emerging as a strong trend to enhance waste to be valuable materials in United Arab Emirates. More than a million tons (104,319 tons (on a dry-weight basis) of sewage sludge are produced each year. The treatment and disposal of sewage sludge is an expensive, environmentally sensitive and growing problem worldwide. Recycling and use of wastes are the preferred options for sustainable development. However, the challenge is to find cost-effective and innovative methods of disposing or using bio-solids that are acceptable to regulatory authorities as well as to general public. The potential value of sewage sludge as soil conditioner and a source of important plant nutrients has further compounded the interest in turning waste into alternative forms of energy to reduce the carbon footprint

## Main Findings:

Options for sewage sludge handling include three viable options exist for disposal or use of this sludge in UAE i.e. Landfill, Incineration and Recycling into compost for application to farmland, forests, or mine land.

Questionnaire was developed for this study to survey farmers in Ajman emirate and overall 38 farmers in Ajman were interviewed. Of the total farmers interviewed, 20% are using sludge. Of these 10% use dried sludge and 10% composted sludge. The composted sludge is obtained (purchased) from Sharjah municipality. Fifty percent farmers use farmyard manure from their own farms, while 30% are purchasing organic fertilizer in the form of compost, poultry manure and farmyard manure. Currently, there are no users of sludge sewage sludge in Ajman Emirate except farmers. Neither Ajman Municipality nor landscapers apply sewage sludge for landscaping.

Based on the result of the survey and the total numbers of farmers in Ajman emirates, the study concluded that an estimated 626 tonnes of dry sludge can be bought by the farmers annually. This amounts to 16% of the estimated annual dry sludge produced by the sewage sludge company. The market is currently for 25kg bags of dried sludge (98% to 100%)packed into 25kg bags for marketing.

Sales and revenue generation based on the assumptions of potential sales quantity (626 tonnes per a year) and referred prices (0.40 AED/kg), it is estimated that 262,500 AED per annum can be realized from sales of dried sludge. Popularization of the use of sludge to more number of farmers may increase the level of sales and revenue for the company.

## Conclusion:

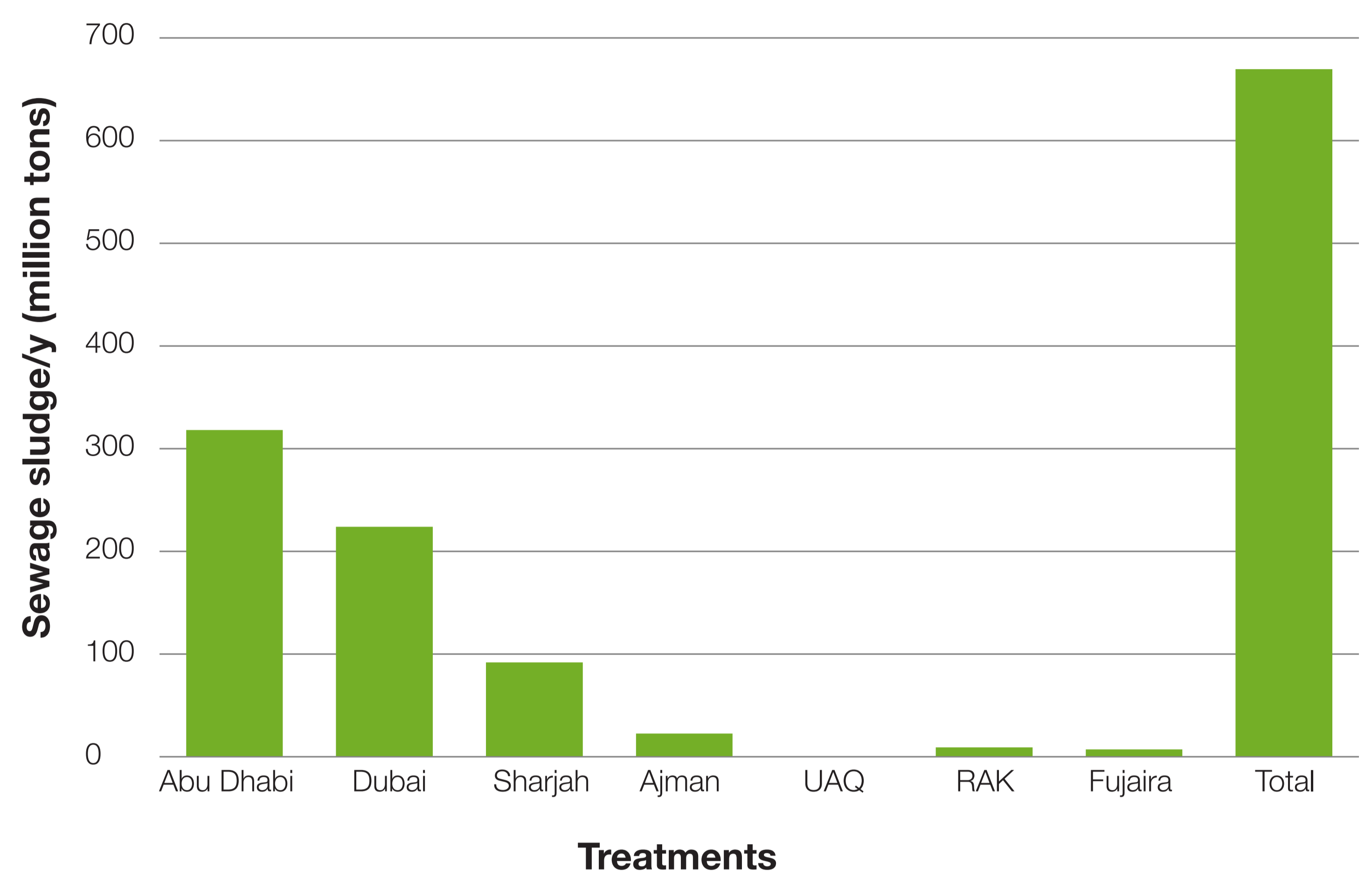
The benefits of applying biosolids to the agricultural user include improvement of soil as well as the replacement or supplementation of fertilizer nutrients. For example, sewage sludge produced at Ajman plant are sufficient to provide N for about 3200 hectares of agricultural land or the equivalent. There has been no sufficient awareness created amongst the potential customers because the farmers do not differentiate between organic manure, sludge and compost. Even the municipalities which should understand the applicability of biosolids have failed to popularize the use of it. Biosolids are fairly rich in plant available nutrients and their disposal through incineration and land filling is a mere wastage of a good nutrient source for the vegetation.

The current low level use in Ajman Emirates as elsewhere in UAE is attributed to many factors including the existing social and traditional perception of sludge in association with outlook about waste water, the lack of clear standards of quality, perception and fear of risk (heavy metals and pathogen contamination), odor, and lack of wider application practices.

However, there is a signal for a potential of more use provided better information regarding description of the quality and content of the product is given to the farmers. It may need to establish few model demonstration farms that will help in attracting and conceiving more farmers to buy and use it.

Potential market demand identified by the study includes agriculture, forestry, floriculture, composting facility, municipalities and land escaping companies. Energy production is also a possible target for the use of sewage sludge.

Estimated sewage sludge production



Estimation of potentials of biosolids supply, sales and revenue

Items	Number	Remark
Number of farmers in Ajman	500	MoEW 2012 survey
Farmers who grow fodder crops (41%)	203	MoEW 2012 survey
Farmers interviewed in second round in this study	20	
Farmers who reported use of Biosolids (20%)	100	20% of the total farmers
Who use sludge to grow forage grasses (10%)	50	
Who use dry sludge to grow forage grasses (5%)	25	
Who use composted sludge to grow forage grasses (5%)	25	
Who use composted sludge for forages & vegetables (5%)	25	
Who use sludge for vegetables, fruits and date palm (5%)	25	
<b>Use of dry sludge (tn/ha)</b>		
In production of forage grasses	20	Average farm size is around 1.2 ha
In growing vegetables, fruits and date palm	6.5	
Total potential use of dry sludge, number of farms@ use, tn	656	16% of the estimated annual production of the plant
Average price of dry sludge per kg (10 AED/25 kg bag)	0.4	Ref. Warsan Dubai
Estimated revenue from sales dry sludge (AED) (A)	262,500	
Total potential quantity of composted sludge used, tn	350	8% of the estimated annual sludge production of the plant
Average price of composted sludge <sup>1</sup> (AED/per kg)	0.32	Ref. Sharjah Compost Plant
Estimated revenue from sales composted sludge (AED) (B)	112,000	
Gross potential revenue per year (AED), A+B	374,500	

<sup>1</sup>Source: computed based on the various collected information and farmers' survey



Figure 1: Setup of the pilot scale facility fabricated at ICBA to produce biochar