

GUIDELINES FOR THE UTILISATION AND DISPOSAL OF WASTEWATER SLUDGE

Volume 2 of 5

Requirements for the agricultural use of wastewater sludge



water & forestry

Department:
Water Affairs & Forestry
REPUBLIC OF SOUTHAFRICA



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Water Research
Commission

GUIDELINE VOLUMES

These Guidelines were developed to encourage the beneficial use of wastewater sludges. Rather than trying to develop a single guideline to address all the management options, a separate Guideline Volume deals with each of the management options. This Volume deals with the management, technical and legislative aspects associated with the agricultural application of sludge as well as the sludge characterisation and monitoring requirements for sludge application to agricultural land.



Volume 1: Selection of management options



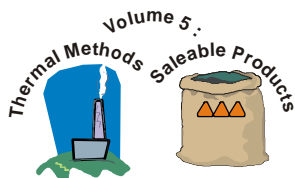
Volume 2: Requirements for the agricultural use of sludge



Volume 3: Requirements for the on-site and off-site disposal of sludge



Volume 4: Requirements for the beneficial use of sludge



Volume 5: Requirements for thermal sludge management practices and for commercial products containing sludge

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Guidelines for the Utilisation and Disposal of Wastewater Sludge

Volume 2: Requirements for the agricultural use of wastewater sludge

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FOREWORD

This Guideline Volume was specifically developed to encourage the responsible use of wastewater sludge in agricultural practices. The agricultural use of sludge is defined as the beneficial use of certain constituents in sludge to benefit either the soil condition and/or enhance crop production in a sustainable manner. The potential benefits of the nutrients (nitrogen, phosphorus and potassium) and the high organic carbon content of sludge have been well demonstrated and have led to the utilisation of sludge for agricultural practices in many countries.

The agricultural use of sludge is seen as an appropriate cost effective management option for South Africa both for the agricultural and wastewater industry. Sludge can also assist in increasing the organic content of soil. Generally, cultivated soils in South Africa are low in organic matter due to its rapid decomposition in our climate. This has contributed to a widespread deterioration of soil physical properties. The improvement of the physical properties of soil (water holding capacity, permeability etc.) as a result of an increase in organic carbon plays an important role in promoting the agricultural application of wastewater sludge in South Africa. Subsistence and small-scale farmers can particularly benefit from the agricultural use of sludge, since the farmer will benefit financially due to savings on commercial inorganic fertilizers.

As with the widespread use of inorganic fertilisers or organically rich products, such as manures, the potential negative effects on environmental resources need to be managed. For this reason, the agricultural application of sludge must be controlled effectively and monitored for the protection of human and animal health, crop quality, protection of water resources and land productivity. This Guideline Volume has been specifically developed to maximise the responsible beneficial use of sludge in agricultural practices.

The aim has been to develop this Volume in such a manner that regulatory authorities, managers, practitioners and operators responsible for sludge management can easily understand and interpret it. At the same time, in the interest of transparency, the scientific basis, assumptions made and the thought processes were also documented in a separate document which is available from the Water Research Commission.

The Sludge Guidelines will remain living publications, and will be reviewed periodically based on comments received on the current requirements and approaches. All users are urged to critically review the Guidelines in terms of its usefulness and appropriateness. It is believed that feedback will ensure continual improvement. Comments should be directed to the Senior Manager: Resource Protection and Waste, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001.



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MINISTER OF WATER AFFAIRS AND FORESTRY

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INTRODUCTION

The South African wastewater industry often views wastewater sludge as a waste product that should be managed as such. Due to the cost of the handling and disposal, sludge is increasingly being stored on site and many local authorities and service providers are not able to successfully manage the sludge in an environmentally acceptable manner.

Wastewater sludge has beneficial soil conditioning and fertilising properties. In fact, a wide array of elements contained in sludge are essential for plant growth and the organic content of sludge has led some agronomists to suggest that sludge is a more complete fertiliser than inorganic fertilisers. However, the presence of a wide variety of potentially harmful chemicals in sludge (albeit in trace amounts) with the potential for uptake by plants and animals, together with the potential presence of human pathogens mean that sludge cannot be treated like any other fertilisers.

A fundamental premise of this Volume is that sludge can be beneficially recycled to agricultural land provided that both the processing and application of sludge to land are subject to adequate management and control and provided that the sludge is applied at a rate that does not exceed the nitrogen needs of crops. In other words, rather than viewing sludge as a waste product that should be disposed of (e.g. by way of landfilling) which has its own adverse environmental effects, it is viewed as a valuable resource worth recycling to agriculture.

PURPOSE OF THIS VOLUME

The purpose of this Volume is:

- To encourage the appropriate use of sludge in agricultural practices;
- To give guidance on how to maximise the beneficial properties when applying sludge at agronomic rates;
- To create an understanding of the operational and legal requirements; and,
- To present guidelines for the monitoring of sludge for agricultural use, before application.

Agricultural use include:

- Use of stabilised sludge as a **nutrient source** and/or **soil conditioner** at an application rate designed to supply a crop's nitrogen needs, while at the same time minimising the risk of nutrient leaching. This applies to both commercial as well as to small scale and subsistence farming practices.
- To manage **compost** containing sludge that is not sold or distributed to the general public for use. Compost that is of such a high quality that it can be distributed to the general public is viewed as "a saleable product", the requirements of which are detailed in Volume 5 of the Sludge Guidelines.
- When sludge is used for municipal parks. If these parks are used by the public, additional pathogen management strategies will apply.

WHO SHOULD USE THIS VOLUME?

Volume 2 was developed to ensure the safe use of sludge on agricultural land. Any person who effectively applies the Guidelines will comply with all the environmental and health requirements. This Guideline was developed for:

- **Wastewater treatment plant operators** – to implement acceptable good practice pertaining to the beneficial use of sludge in agriculture.
- **Wastewater treatment service providers** – to implement agricultural use of sludge as a sludge management strategy.
- **Local authorities and town/city councils that own and operate wastewater treatment plants** – to design, operate and maintain a sustainable agricultural sludge application strategy to benefit the community as well as the local authority.
- **Wastewater engineers/scientists** – to develop improved treatment methods and monitoring protocols which will ensure the sustainable agricultural application of sludge.
- **Technical advisors** – to encourage the beneficial use of sludge in agricultural practice, both for sludge producers and users.
- **Legislators** – to assess compliance in cases where the Sludge Guideline Volumes have been referred to in a water use authorisation.
- **Farmers/Users** – to effectively utilise sludge in agricultural practice.
- **Educators** – to build capacity and create awareness.

OVERVIEW OF VOLUME 2: REQUIREMENTS FOR THE AGRICULTURAL USE OF WASTEWATER SLUDGE



Requirements for the agricultural use of sludge

Part 1

Background

- Approach
- Motivation

Part 2

Legal requirements for the agricultural use of sludge

Part 3

Classification of sludge intended for agricultural use

- Assign a - Microbiological class
- Stability class
- Pollutant class

Part 4

Specific restrictions and requirements for the agricultural use of different sludge classes, including crop types and buffer zones

Part 5

General restrictions and requirements for the agricultural use of sludge including sludge storage, application rates and a monitoring programme