INTRODUCTION

THIS CHAPTER WILL:

- **introduce some basic terminology**
- **provide an overview of the laws that govern the application of biosolids to farmland**
- **outline who's responsible for what, and**
- **conclude with a brief look at the issue of risk management.**

The application of municipal sewage biosolids to cropland has become a highly charged topic in some Ontario rural communities.

Some people want the practice banned outright, feeling that any level of risk is unacceptable. Others are uncertain, seeking reassurance that current regulations are sufficiently strict to keep risks to the environment and human health to a minimum.

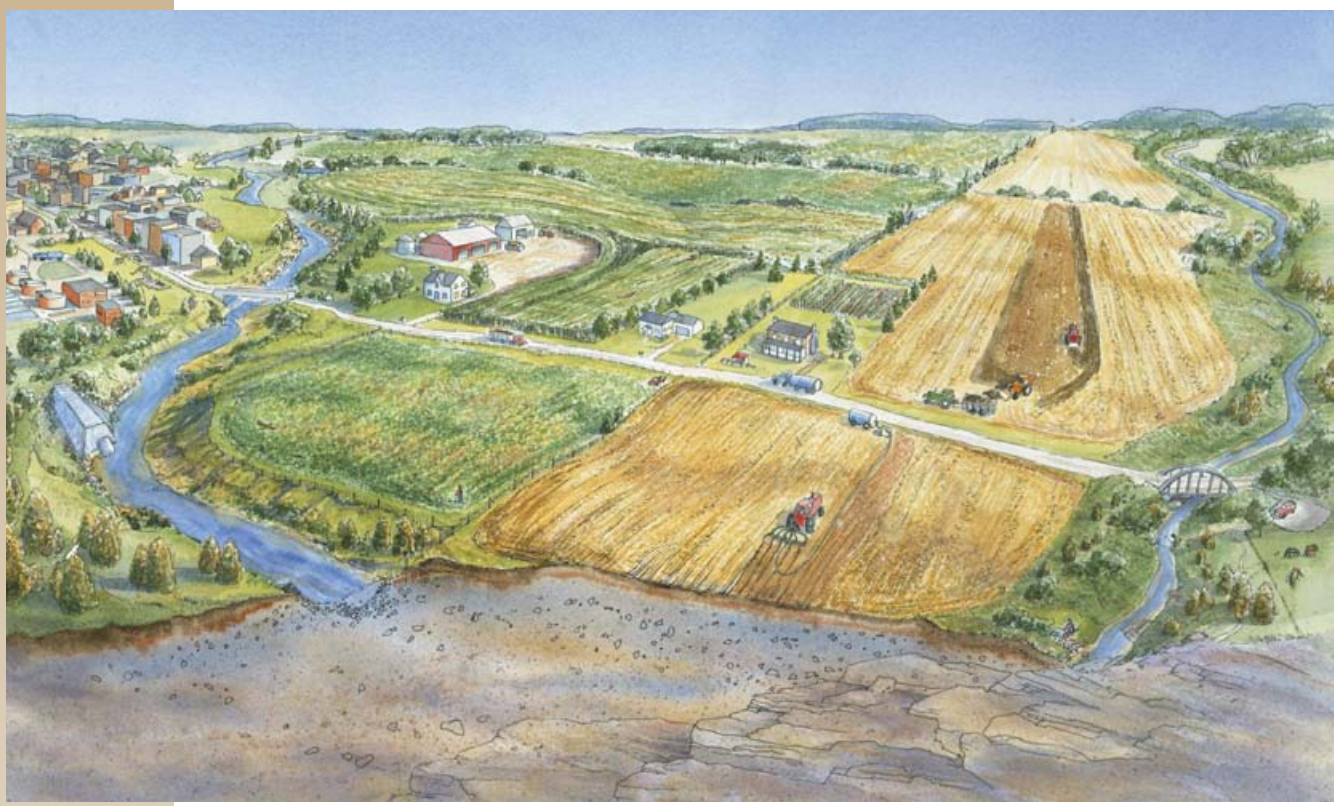
And some people are proponents, believing it's the preferred option to disposal in landfills or incineration. They see in it an opportunity to recycle safe, nutrient-rich materials to the land – closing the loop in nutrient production, consumption, and reapplication for production.

This book aims at helping everyone involved – sewage biosolids generators, haulers, farmers and their neighbours – become better informed about application to cropland. We will look at:

- benefits and risks
- what's in sewage biosolids
- sewage biosolids as sources of crop nutrients
- how sewage biosolids are treated and tested for suitability
- best management practices for storing, transporting, handling, and applying in accordance with legislation, regulations, protocols, and guidelines
- nutrient management planning for sewage biosolids
- legislative requirements for land application.

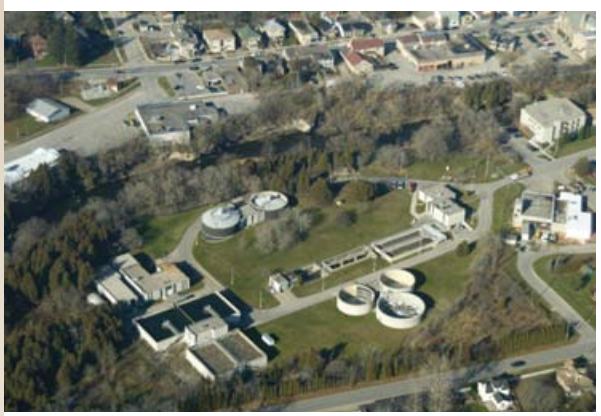
This book describes best management practices for municipal sewage biosolids. For brevity's sake, the term may be abbreviated to "sewage biosolids" or simply "biosolids."

Farmers can save fertilizer costs and produce high-yielding crops with land-applied sewage biosolids.



Land application of biosolids is one way of recycling nutrients back to cropland. Food for public consumption or grains for livestock feeds are exported from rural farmland for further processing and consumption. Once consumed, the nutrients and organic matter from treated human wastes or biosolids can improve soil quality and provide nutrients for crop and fibre production on agricultural land.

Wastewater treatment plants process and clean wastewater. Biosolids are by-products of these treatment plants.



Sewage biosolids are "stabilized" to make them more suitable for land application.

BIOSOLIDS TERMINOLOGY

Here are some definitions to help clarify what is meant by biosolids application. For a complete list of definitions, please see the Glossary on page 109.

Agricultural utilization – the use of biosolids that are acceptable for cropland application as a source of nutrients and organic material to improve soil fertility and physical properties, including tilth and water-holding capacity. This book focuses exclusively on this type of biosolids material.

Best management practice (BMP) – a proven, practical, and affordable approach to conserving soil, water, and other natural resources in rural areas.

Biosolids and ***sewage sludge*** – biosolids are treated sewage sludge. As a term, "biosolids" comes from the method of production, i.e., the biological processing of wastewater solids. Biosolids are treated and managed in accordance with regulatory standards.

Domestic septage – household waste that is a mixture of liquids and solids removed from septic tanks and holding tanks. The nutrient content of domestic septage is similar to sewage sludge and, when treated and processed, can also be land-applied as an organic nutrient source.

Sewage biosolids must be properly treated and tested to meet the criteria for land application.

To learn more about domestic septage, please see this Septic Smart publication: http://www.omafra.gov.on.ca/english/environment/facts/sep_smart.htm

Municipal sewage biosolids – nutrient-rich organic materials created as a by-product from the processing of municipal sewage in a treatment facility or wastewater treatment plant (WWTP). When treated and processed to meet provincial standards, these residuals can be recycled and applied as soil amendments and fertilizer to improve or maintain soil productivity.

NASM – non-agricultural source materials. Includes but is not limited to sewage biosolids, paper mill biosolids, food processing washwaters, and organic matter from food processing.

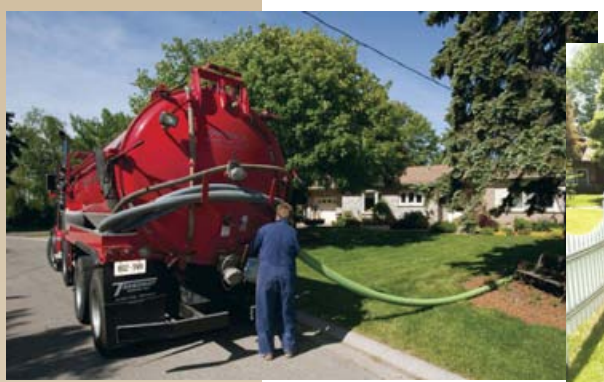
NASM plan – a nutrient management plan for non-agricultural source materials, including sewage biosolids.

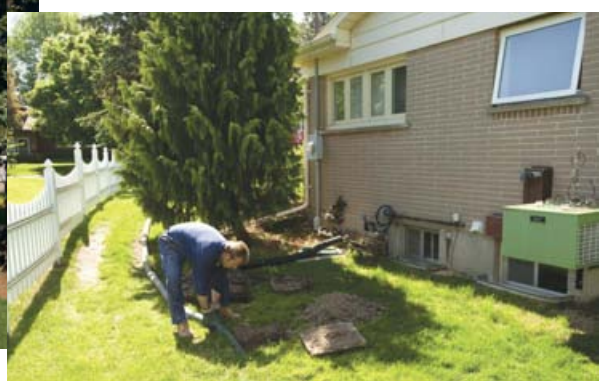
Risk management – decision-making directed towards the effective management of potential opportunities and adverse effects.

Sewage treatment plant – see *wastewater treatment plant.*

Wastewater – water that carries wastes from homes, institutions, businesses, and industries. It's a mixture of water and dissolved or suspended solids.

Wastewater treatment plant (WWTP) – a facility designed to remove contaminants from raw or untreated municipal sewage. This includes physical, chemical, and biological processes that result in two materials: treated effluent (water) and biosolids. A multi-barrier approach is used to ensure that the treated effluent (water) is of suitable quality for release into the natural environment. This process also produces biosolids of suitable quality to be returned to the environment.





Septage, or wastes from rural household septic cleanouts, may be hauled to WWTPs for treatment. It is a best management practice that septage be treated prior to land application.

LEGISLATIVE CONTROLS AND KEY PLAYERS

The management of biosolids in Ontario has two legislative acts and a network of regulations that specify roles and responsibilities.

Regulations were developed to ensure that any biosolids being applied to land do not degrade the natural environment or pose harm to human or animal health.

Regulations within the following two acts work together by establishing standards for materials composition, management and transport, siting, land application, monitoring and record-keeping, and approvals for agricultural use:

- Nutrient Management Act, 2002
- Environmental Protection Act.

The Ontario Water Resources Act and associated regulations control the operation of municipal sewage treatment plants.

On a local level, most municipalities have in place wastewater source management initiatives, including bylaws regarding municipal sewer use. These initiatives do much to control the quality of raw sewage received at sewage treatment plants.

Want more information? A whole chapter is devoted to the topic of regulatory controls for the land application of biosolids in Ontario, beginning on page 95.

KEY PLAYER	ROLES AND RESPONSIBILITIES
MUNICIPALITY (as biosolids generator) **Wastewater treatment plant operators are skilled professionals, trained to operate the plant to produce clean water and biosolids from raw municipal sewage.** 	• for the most part, municipalities generating biosolids destined for land application are responsible for producing biosolids that meet the quality criteria for land application • municipalities must provide NASM plan developers and farmers with up-to-date analytical results regarding the quality of the sewage biosolids for land application
HAULER/APPLICATOR 	• a hauler is responsible for the safe and effective transfer and application of biosolids according to regulatory requirements
FARMER 	• the farmer or receiver of the land-applied biosolids is primarily responsible for timing concerns – determining when the material is applied and adhering to the waiting periods before crop harvest or grazing • all farmers must comply with their approved NASM plans and the requirements of Ontario Regulation 267/03, the Nutrient Management Regulations
NON-AGRICULTURAL SOURCE MATERIALS (NASM) PLAN DEVELOPER	• the NASM plan developer is a trained and certified person responsible for the development of a NASM plan
PROVINCIAL GOVERNMENT Ontario	• the Ontario government is responsible for research, development, education, certification, and enforcement of a science-based regulatory framework

Few actions in agriculture are entirely risk-free. This is a fact of life. The challenge for everyone – scientists, policy-makers, and citizens – is to determine and manage a socially acceptable level of risk.

RISK MANAGEMENT AND THE MULTI-BARRIER APPROACH

Risk management can be defined as decision-making directed towards the management of potential opportunities and adverse effects.

Regarding the land application of sewage biosolids, potential adverse effects are mitigated by a series of risk management measures. This multi-barrier approach involves:

- municipal sewage bylaws to control the quality of raw sewage
- regulatory requirements governing approval of the design and monitoring of WWTPs
- criteria that specify biosolids quality, and procedures for handling, site selection, and application
- mandatory training for biosolids applicators and staff
- mandatory NASM plans for all agricultural land where biosolids are applied
- regulatory oversight, including routine inspections and materials testing
- ongoing compliance promotion and education efforts on all fronts.

This multi-barrier system of procedural controls and practices makes land application protective of the environment, but not risk-free.

BIOSOLIDS OPTIONS – LANDFILL, INCINERATE, OR APPLY TO CROPLAND?

While few of us want to think of what happens with sewage, the fact is that it has to go somewhere after treatment. Seeing that it's handled safely, properly and efficiently is in everyone's best interest.

landfill – may be the least-expensive at present, but it comes with environmental risks such as methane emissions, the loss of valuable nutrients, and use of valuable landfill capacity

incineration – destroys many contaminants in biosolids, but the process is expensive, leaves concentrated chemicals in the ash, and may add to greenhouse gas emissions

land application – recycles beneficial organic matter and utilizes valuable nutrients that otherwise go to waste (literally). Although agricultural land application is not risk-free, the risks can be minimized through proper application management.

For more information about options, see the chapter beginning on page 24.

The key to successful sewage biosolids utilization is management, which is a combination of:

- nutrient management planning
- communication
- proper application methods
- best management practices, and
- all parties being aware of their responsibilities.