

Dust and Odour Considerations for Soil Amendment Applications in the Fraser Valley

Used properly, soil amendments optimize the nutrients necessary for plant growth and/or act as a conditioning agent to improve the physical, chemical, and biological nature of the soil.

What is important to consider when applying soil amendments?

Used properly, soil amendments optimize the nutrients necessary for plant growth and/or act as a conditioning agent to improve the physical, chemical, and biological nature of the soil. However, these applications can result in dust and odour complaints from neighbours.

While the *Farm Practices Protection (Right to Farm) Act* protects normal farm practices¹ (e.g. application of fertilizer) from nuisance complaints, producers are expected to take reasonable steps to minimize potential impacts such as odour and dust.

What is dust?

Dust is composed of air-borne particles that may result from the application of soil amendments and from soil disturbances. Dust can obscure visibility (as shown in Figure 1), accumulate on surfaces and be a nuisance that affects individuals and business operations. The acceptability of dust varies with the individual, the character of the dust, and the frequency, duration, and intensity of occurrences.



Figure 1
Dust emissions from land application of wood waste

Dust may be considered an air contaminant when surface accumulation begins to interfere with the conduct of normal business or when it obscures visibility to the point of interfering with normal business or personal activities.

¹ The British Columbia Farm Industry Review Board (BCFIRB) is a tribunal that hears nuisance complaints about farm practices. BCFIRB decides whether a farm practice is a 'normal farm practice'. As part of that decision, BCFIRB will consider whether the producer has taken reasonable steps to reduce or minimize impacts on their neighbours.

What is odour?

Odour may be described as the effect of various substances on the human olfactory system. Its detectability, quality, intensity, and acceptability vary with the individual and may be affected by the duration of exposure, olfactory fatigue, acclimatization, and climatic conditions.

Odours related to agricultural soil amendment applications are predominantly from manure and decomposing organic matter. Liquid manures tend to have a stronger odour due to its lower oxygen concentration, but odours associated with solid manure may linger for a longer time. It is also reported that odours can be carried with dust and those fine particles can carry the odours a greater distance.

The 4R's of Land Application

The “4R’s” of Land Application can help minimize dust and odour complaints from neighbours while benefiting crop production.

Optimal land applications begin with planning and the 4R’s:

- Right source
- Right rate
- Right time
- Right placement

Right Source – includes evaluating the appropriateness of the type of soil amendment to be applied. This can be determined by soil, manure and plant tissue testing. Additional considerations should include soil conditions, environmental risks, product availability, and product cost.

The Right Source may include changing the type of nutrient such as using compost instead of broiler manure to reduce dust and odour emissions.

With increased adoption of bedding makers and solid-liquid separators by the dairy industry, producers are able to separate and therefore optimize nutrients from the liquid and solid portions of manure. For example, Agriculture and Agri-Food Canada research has shown a cost benefit to using separated dairy sludge, laden with phosphorus, to replace commercial fertilizer.

Right Rate – is essential to reduce the risk of over or under applying an amendment. Over applying an amendment may lead to excessive dust and odour emissions (as well as loss of nutrients).

Determining the Right Rate can also be assessed by soil, manure and plant tissue testing. The Right Rate will vary depending upon crop type, plant growth stage, soil type, weather conditions, and seasons.

Right Time – is crucial for optimizing the effectiveness of a fertilizer or soil conditioner. However, this is often limited by application method, equipment availability, and weather.

The Right time for land application includes seasonal and daily considerations. See [Recommended Methods for Land Application](#) on the next page for more information.

Right Placement – is the key to land application. Currently, the most common method of liquid and slurry manure application in the Fraser Valley is splash plate (broadcast). Use of low trajectory systems such as injection and dribble bars can reduce odours and nitrogen loss to the atmosphere.



Figure 2
Manure injection on grass field

Recommended Methods for Land Application

The following land application recommendations may help reduce dust and odour emissions:

1. **Avoid land applications in high winds** and apply when winds are blowing away from sensitive areas². Avoid times when winds are greater than 10 km/hr.
2. **Avoid spreading manure if conditions for a temperature inversion** are present. Temperature inversions trap odour and dust particles at ground level.
3. During the heavy rain season, keep solid amendments in the **aerobic** state by loosely covering the piles thereby preventing moisture from filling the air gaps. For liquid storages, surface aeration of the upper 0.5 meters has shown to reduce odours if the dissolved oxygen is maintained at or below 0.5 mg/L.
4. **Incorporate** amendments on cultivated lands as soon as possible to reduce odour and dust emissions. In the case of manure, most nitrogen in the form of ammonia is lost within the first 24 hours of land application. Immediate incorporation will maximize nitrogen retention for crop use and reduce odour generation. Over application may increase the potential of nitrous oxide emissions
5. **Time** applications to reduce nuisances to neighbours:
 - a. If your neighbour is a school or business try to avoid land applications during school and business hours.
 - b. If your neighbours are residential try to avoid land applications on evenings, weekends, and holidays.
6. **Communicate** with your neighbours. Let them know when and why you plan to land apply.
7. Apply manure only during the **active growing season** when the plant can take up the nutrients.
8. Avoid surface drift using **setbacks** from your property line, surface waters, and wells.
9. Follow the monthly **Manure Spreading Advisories and Updates** online.

² Sensitive areas are defined in the Environmental Farm Plan Reference Guide as: an area on or near a farm that may need to be protected from an unreasonable adverse affect caused by a farm activity; the sensitive area may be an area identified as wildlife habitat, habitat of a specific species recognized for its biodiversity value, human dwellings and activity areas, not target crops in the case of pesticides and nutrient application, or aquatic and riparian areas.

Additional Land Application Considerations

Additional considerations may take more time or money to implement but should be considered for the long term:

1. To reduce dust emissions from drier amendments such as dry broiler manures, increase the moisture of the manure prior to land application or use composted manure.
2. Separate solids from slurry or liquid manures to allow for improved handling (refer to **Right Placement** above).
3. Create a barrier or physical buffers such as a vegetative buffer (trees and shrubs) along property boundaries to filter or block particles released to the air.



4. Direct manure particles towards the ground using low trajectory manure application equipment as shown in Figures 2 and 3, or provide a shroud over the back of the manure spreader.
5. Develop a nutrient management plan that incorporates a sampling regime and amendment application plan. A nutrient management plan should address the 4R's.

Figure 3

Trailing hose manure application

References and More Resources – Available free online

- *Ammonia Loss from Applied Slurry Manure* Interactive Calculator on Farmwest website
- *B.C. Good Agricultural Practices* (GAP)
- B.C. Ministry of Agriculture, May 2014. *Farm Nuisance – Dust*. Order No. 870-218-62
- B.C. Ministry of Agriculture, May 2014. *Farm Nuisance – Odour*. Order No. 870-218-64
- Canada-BC Environmental Farm Plan - *Nutrient Management Guide*
- Canada-BC Environmental Farm Plan - *Reference Guide – 5th Edition*, November 2010
- Queen's Printer for British Columbia. *Farm Practices Protection (Right to Farm) Act*. RSBC 1996. Chapter 131 BC Laws

FOR FURTHER INFORMATION CONTACT

Phone: 604.556.3001
Toll Free: 1.888.221.7141

MINISTRY OF AGRICULTURE

1767 Angus Campbell Road
Abbotsford, B.C. V3G 2M