REGIONAL BIOSOLIDS STRATEGY
LOWER NORTH ISLAND

FACT SHEET 5:
LAND APPLICATION OF BIOSOLIDS

BIOSOLIDS AS A SOIL CONDITIONER

Biosolids are carbon-rich and contain high concentrations of valuable nutrients (N, P, trace elements) that can have fertiliser value and enhance soil productivity[1]. Biosolids have also been shown to improve soil structure and water holding capacity when applied appropriately.

REGULATION AND CONSENTING

The application of wastes to land including biosolids is controlled by the Resource Management Act 1991 (RMA) and regulated by Regional Councils through their Regional Plan rules[2]. These rules determine what is applied, how it is applied and where it is applied. The application of biosolids to land generally requires a resource consent from the relevant Regional Council[2,3] with conditions managing the discharge.

POTENTIAL APPLICATIONS

There are numerous land application opportunities for biosolids including:

- Agriculture and horticulture;
- Forestry;
- Municipal landscaping;
- Land rehabilitation; and
- Road corridors.

Research and surveys indicate that in some instances the application of biosolids to land which is near water bodies or that will be used to produce food crops (fruit or vegetables) is not supported by local communities or iwi[4]. Applying biosolids away from food or water sources, and to land such as forestry and grazing (or cut and carry) crops that are grown as animal feed, is more likely to be accepted.

FORESTRY

Biosolids application under forestry, both native and exotic, is well suited because:

- Forests are often established on land that is degraded, highly disturbed or with low soil fertility;
- Biosolids can increase timber production;
- There is a reduced likelihood of contaminants entering the food chain;
- There is limited direct contact with humans; and
- Perennial growth allows for year-round application.

Additionally, application as part of native forest regeneration may be viewed more positively by iwi[4].

Challenges to forest application of biosolids typically relate to accessibility, transport distance and the method of application:

- Forested land often occupies marginal land, steep slopes and relatively inaccessible areas which may increase the application costs; and
- Even distribution of biosolids may be hampered by the stems and/or canopy of the forest.

GRAZING CROPS

Biosolids contain both readily available and slow release forms of N. It is well suited to use on agricultural land, in particular non-dairy pastoral and drystock farms. Here, application could occur prior to pasture development and at re-grassing or pasture renewal. In addition, growing crops intended as supplementary feed to stock (i.e. oats or Italian Ryegrass) on biosolids amended soil has been shown to improve overall growth[5].

The biggest risk to the feasibility of this option is:

- Likely requirements for resource consent, unless a 'Grade Aa' material has been used[6]; and
- Application to dairy farms is challenging due to industry views on the use of biosolids and wastewater;
    - For some, restrictions applied to biosolids limit the grazing or feeding of material grown in biosolids amended soils to lactating and non-lactating cows.

TECHNICAL CONSIDERATIONS

Under current guidelines[6] biosolids application to land is limited to applications of 200 kg N/h per year or a one-off application of 600 kg N/h every three years.

Concentrations of nutrients in biosolids (or sludge) can depend on its source and/or prior treatment.

Analysis of 18 sludges from throughout the lower North Island highlighted the potential variation in nutrient concentrations (right).

SLUDGE TYPE	N (%)	P (%)
Oxidation pond sludge	0.3 - 2.9	0.1 - 0.9
Geobagged pond sludge	0.5 - 1.2	0.1 - 0.2
Fresh WWTP sludge	3.6 - 6	0.9 - 2.7
Composted biosolids	0.6 - 1.2	0.2 - 1.2

Other factors to consider include:

- Treatment/stabilisation – biosolids needs to meet criteria for stabilisation and contaminants according to the relevant guidelines[7] before land application can be considered;
- Monitoring – biosolids will need to be tested for metal, organic and pathogenic contaminants to confirm its relevant grading[7] and therefore suitability for use on land;
- Consultation - early engagement with potential end-users, hapū and Iwi, and incorporating the wider community's views into waste management decisions is essential when developing biosolids solutions;
- Consenting – operations for the application of biosolids to land will likely require an application for council consent that will require an assessment of environmental effects (AEE) and risk minimisation plan;
- Space requirements – large land areas will be required to accommodate biosolids application if it is going to be the sole means of 'disposal';
- Transport – significant costs are involved in transport of sludge from WWTP to application site depending on the distance, volume, and consistency of the product. Land application sites should be as close to the WWTP as feasible; and
- Mechanical equipment – for spreading or applying biosolids to assigned land.

BACKGROUND

The Regional Biosolids Strategy – Lower North Island is a collaborative project funded by the Waste Minimisation Fund. Ten lower North Island Councils have worked in partnership with Lowe Environmental Impact and research partners to develop a biosolids strategy that includes the potential collective management of sludge, focussing on beneficial use.

This project was undertaken with the support of the Ministry for the Environment waste minimisation fund, however, the Ministry does not necessarily endorse or support the content of this publication in any way.

1. Fact sheet 1 of the Regional Biosolids Strategy: What are Biosolids?
2. Fact Sheet 7 of the Regional Biosolids Strategy: Regulation and Consenting
3. Report 13 of the Regional Biosolids Strategy: Potential End-Use Options for the Lower North Island
4. Report 9 of the Regional Biosolids Strategy: Composting Trial Report
5. Report 10 of the Regional Biosolids Strategy: Field Trial Report
6. NZWWA. (2003). Guidelines for the safe application of biosolids to land in New Zealand. Ministry for the Environment (New Zealand Water and Wastes Association).