

Resource Management INFORMATION SHEET



Ministry of Agriculture, Food and Fisheries

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Please note this information sheet will remain as a **DRAFT** until the BCWMEP Manual and the "Environmental Management: Guide for Livestock Producers in BC" are completed

Nutrient Management Plans

INTRODUCTION

Nutrient Management Plans are only a small part of the development of an overall *Environmental Farm Plan*. Environmental Farm Plans include a multitude of aspects of the farm operation ranging from soil management to domestic waste management. Aspects of energy and water use efficiency and pest management may also be included in the Environmental Farm Plan. Although Nutrient Management Plans may integrate with other aspects of the Farm Environmental Plan, they may also stand alone. To stand alone they must be put in the correct context and refer to the overlapping aspects of the farm operation.

Soil, water, waste and riparian area management all include issues surrounding nutrient management. With the trend moving towards an *Environmental Self-Audit* approach of ensuring compliance with environmental regulations, it is necessary to assure a full understanding of the many aspects of the Farm Environmental Plan. The intent of this information sheet is to provide an overview of a Nutrient Management Plan.

PREPARATION OF PLAN

Due to the complexity of nutrient balancing and flow within an agricultural environment, Nutrient Management Plans should only be prepared by a Registered Professional Agrologist. Many aspects of the overall Environmental Farm Plans involve skills and expertise of other qualified registered professionals. However, nutrient management planning clearly lies in the realm of the Professional Agrologist.

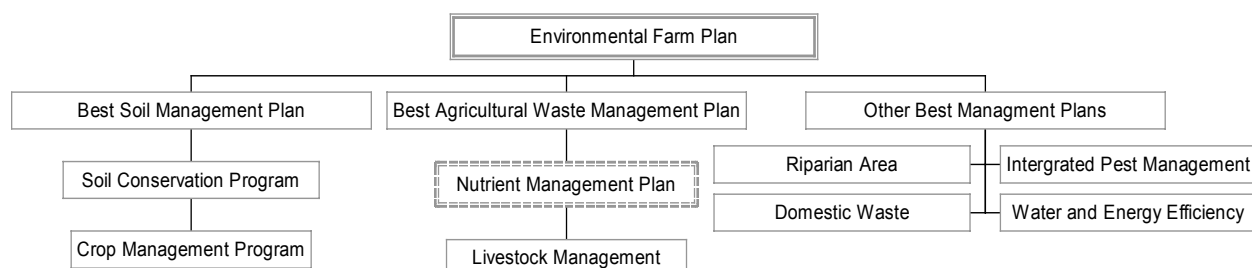


Figure 1 Typical relationship between *Nutrient Management Plan* and other components of an *Environmental Farm Plan*

OVERVIEW

The process of nutrient management planning should be an integral part of the application to land of any materials that are considered as sources of fertilizer nutrients or are used as soil conditioners. The materials used in land application may be agricultural wastes; products manufactured for a specific purpose; or organic residuals from commercial or industrial operations.

The following information is a listing of the basic components for a Nutrient Management Plan. There are nine basic components to a nutrient management plan.

- Nutrient Management
- Soil Conditioner Applications
- Overall Objectives
- Site Evaluation / Information Requirements
- Sources of Information / Regulations
- Nutrient Applications
- Monitoring
- Risk Management
- Health and Safety Issues

The above components are to be dealt with in further detail in a chapter of the *BC Agricultural Waste and Environmental Protection Manual*. This manual is currently under development by the BC Ministry of Agriculture and Food, Resource Management Branch.

COMPONENTS OF A NUTRIENT MANAGEMENT PLAN

1. NUTRIENT MANAGEMENT

Crop Requirements

- cropping alternatives (including crop, type and stage of crop development)
- cropping system (conventional or organic)
- cover cropping (soil conservation practices)
- amount and timing of nutrients required
- other balances (salts, metals, pathogens, vector attraction and organic compounds)
- applications to growing crops, application to fresh market crops
- plant uptake (yield and nutrient removal)
- groundwater (leaching)
- site characteristics (slope and aspect)
- soil characteristics (physical and chemical)
- soil management requirements (tillage and application practices)

Sources of Nutrients

- What are the characteristics and source of the product?
- cost factors; cost of nutrients, value of manure
- manure and other agricultural wastes
- fertilizers or soil conditioners
- composts or mulches
- organic residuals or by-products

Location Factors

- climate (seasonal factors), weather
 - surface water (runoff and spring melt)
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2. NUTRIENT APPLICATIONS

Determining Composition

- nutrient content and physical characteristics
- waste characteristics other than nutrients (i.e. contaminants)
- sampling methodology (from storage or during application)
- testing of nutrient source and soil at site
- interpretation of results

Application Methods

- type of equipment (uniformity of application, application efficiency, compaction)
- impact of equipment on odours, pathogens and vector attraction
- equipment calibration and maintenance
- advantages and disadvantages of different application methods

2. NUTRIENT APPLICATIONS (continued)

Availability of Nutrients

- balance of various nutrients in application in relation to crop need and soil supply
- amount and timing
- macro and micro nutrients
- nitrogen mobility / leaching
- particulate-P, soluble-P, mobility
- other factors

Estimating Losses During (and After) Application

- losses to: surface water, groundwater, air
- accumulations in the soil, consequences of accumulations

Calculating Application Rates and Timing

- objective
 - short and long term planning
 - methodology and calculations
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3. SOIL CONDITIONERS

Goals of Soil Conditioning

- soil organic matter or soil physical characteristics
- value of wastes as soil conditioner
- benefit to agriculture (soil, crop and animals)

Sources of Soil Conditioners

- types of wastes
- agricultural wastes or non-agricultural wastes
- issues and concerns (metal, toxic substances, foreign materials, pathogens and vectors)
- regulations / approvals required

Applying Soil Conditioners

- determining composition
 - laboratory analysis, interpretation of results
 - C:N ratio considerations (carbon in wastes and carbon cycle)
 - application methods and calculating application rates
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4. MONITORING

- objectives (pathways to be monitored)
- background levels and frequency of testing
- record keeping, nutrient balance sheets

Soils

- types of testing (function objectives)
- Range of physical and chemical parameters (i.e.: nutrients, salts, metals, soil moisture, organic matter, compaction)
- sampling methodologies (i.e.: report card or PSNT)
- interpretation of results
- assumptions in sampling and testing methodologies

Plants

- when and what parts of the plants should be sampled

Surface Water Monitoring

- objectives and methodologies
- interpretation of results
- surface water / groundwater interactions

Ground Water Monitoring

- objectives and methodologies
 - interpretation of results
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5. OVERALL OBJECTIVES OF PLAN

Use waste to enhance crop production while protecting the environment.

Does producer want to meet production goals?

Attempt to achieve acceptable balances in:

- nutrients
- carbon or soil organic matter
- salts
- metals
- pathogens.

Discuss these balances and pathways in relation to the need for proper application rates and timing. Discuss potential environmental impacts and pollution control principles.

Discuss riparian area management and soil conservation practices which are integral parts of planning / management.

6. RISK MANAGEMENT

Due diligence

- What constitutes due diligence for this situation?
- What record keeping required for due diligence?

Site Considerations

- attempting to minimize risk of impacts to the following: (climate, surface water, riparian areas, groundwater, soil, crop, and livestock)

Minimizing Risk / Contingency Planning

- Best Management Planning
- buffer strips /riparian area management
- opportunities for habitat enhancement
- storage capacity, runoff and containment
- well head protection

7. HEALTH AND SAFETY ISSUES

Cover aspects of human and animal health regarding metals, nutrients and pathogens.

Discuss concepts and Best Management Plans and linkages to other components of the Environmental Farm Plan.

7. SITE EVALUATION / INFORMATION REQUIRED

Describe site evaluation methodology.
For site inspections - identify locations and sources of information to be collected.

Define / describe any existing and available resources including:

- hydrology; groundwater and surface water
- setbacks and adjacent land use
- location of wells
- soils and crops
- services available (dead animal pickup, sewers)
- livestock populations (current and potential)
- type and age of livestock

9. SOURCES OF INFORMATION

The Nutrient Management Plan should include sources of information used in the development of the plan (i.e. a bibliography). This listing may

include sources from on and off the site. It should also indicate sources of information that would be useful in terms of implementing the plan

For further information

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