

POLLUTION CONTROL PLAN

1. Pollution in agricultural operations

Pollution is considered one of the major impacts of agriculture on the environment. Heavy machinery is used in agriculture with the related pollution risk. Furthermore, the use of chemical fertilisers and pesticides add to the risk of pollution. Below is an abstract from the protocols guiding the farming operation with regards to pollution risks.

2. Potential sources of pollution

- Pollution related to the use of chemicals as fertilizer
- Pollution related to the use of chemicals as pesticides
- Pollution related to the use of heavy machinery

3. Processes followed during the use of fertilizer

- 3.1. In any crop production the crop needs to be fed the correct amount of nutrients from the soil to produce optimally. The nutrients in the soil need to be balanced to provide the correct nutrients to the plant. During the 1950's - 1980's agriculture relied heavily on chemicals to provide the nutrients that the crop needs. In the early 1990's Bertie van Zyl (Edms) Bpk embarked on extensive research to establish the impact of chemicals on the soil and the result was a complete mindshift and a change in behaviour.
- 3.2. Fertilizing on the farm is done mainly by the use of compost, compost tea and EM (Effective Microbes). 20 tons of compost is applied per hectare at the beginning of the preparation of a land. The compost is spread with a compost spreader and worked into the soil while the land is prepared. The focus of the fertilizing process is not to provide the nutrients to the plant chemically but rather to promote the growth of micro-organisms in the soil by improving soil-health. The need to use chemicals is minimised through measures such as adjusting the initial pH balance of the soil.



Compost spreader in action.

- 3.3. Fertilizer is also applied via the drip-irrigation system, whereby exact quantities of EM and compost tea is distributed to plant root zones. Over-application of fertilizer therefore carries a very low risk.



Installed drip irrigation system before planting



Installed drip irrigation system at mature plants

- 3.4. When it is necessary to apply chemical fertilizer, the following procedure is followed:
- Mixing of fertilizer is done at the irrigation station located on a concrete floor.
 - Mixing is done in a dedicated plastic tank surrounded by a bund wall.
 - Soluble fertilizer is poured into the tank and water is added in exact volumes to the desired ratio.
 - This liquid fertilizer is then pumped into the irrigation system and applied through the drip lines.



Fertilizer mixing area

Fertilizer application is done according to prescription by the agronomist, using three methods to determine and monitor the fertilisation requirements of the specific crop at specific times during the growing cycle:

- Leaf analysis is done weekly to determine if elements in the leaves are at optimum levels. In extreme situations dry leaves will be sent to a laboratory for analysis.
- The LYSI-meter and/or “wetting front detector” process is used at two stages of the plant growing cycle (20cm and 40cm). The LYSI-meter extracts water from the ground and analyses it to measure the fertilizing efficiency in the soil.
- Some nutritional requirements can be visually detected.

The fertilizing program and prescription by the agronomist is based on the results of the above-mentioned tests.

- After heavy rain the tests are repeated, and the program adjusted where necessary.
- By following the above standard operating procedure, the risk of pollution due to over-fertilization or spillage is minimised. No ad-hoc applications are done.

4. Processes followed in application of insecticides and herbicides

4.1. Chemical application is done by tractor as well as backpack sprayer.

The following procedure is followed:

- Mixing of fertilizer takes place at the irrigation station located on a concrete floor.
- Mixing is done in a dedicated plastic tank.
- Chemical concentrate is poured into the tank and water is added in exact volumes to the desired ratio.

4.2. The following procedures are followed regarding the equipment.

Equipment is calibrated on a weekly basis and calibration data are captured in a standard calibration form.

Before every application it is ensured that:

- All equipment is clean, leak proof and properly working.
- All equipment is tested with clean water, prior to adding chemicals.
- All drivers wear protective clothing.
- Drivers are in possession of a properly completed work order and task description.
- All mixing tanks are inspected and must be in working order.
- Colour flags are erected according to the chemical applied.
- “No Pick” signs are erected in the lands designated to be chemically treated.

The following climate and weather requirements are adhered to:

- If rain occurs during or after application, a follow-up application is considered.
- No application is done in temperatures above 30°C
- No application is done in strong winds.



Tractor applicator at work

4.3. The application of pesticides and herbicides, (like fertilisation), is done by prescription and under supervision of an agronomist. The prescription is based on identified pests spotted by scouts in the field. No *ad-hoc* application is done. There is therefore minimum risk of pollution due to spillage or over-application.

4.4. Chemicals are stored in a purpose-built room

Chemicals are stored on shelves to ensure any leaking containers are easily identifiable. Empty cans are punctured immediately after use to ensure that chemical cans cannot be used for storing or transport of water. Used chemical cans are collected by the supplier and removed for recycling.

5. Processes followed in workshops

5.1. The highest risk of pollution in agricultural operations is associated with the use of heavy machinery. Spillage of diesel and oil can cause severe pollution to soil and water.

5.2. Servicing of vehicles

Vehicles and equipment are only serviced and repaired in the purpose-built workshop on the farm.

The following procedures are followed with the handling of oil and oil replacement:

- Oil is drained into the oil cart provided.
- Old oil is pumped from the oil cart into the container provided and stored for removal by an approved oil recycling company.
- Oil cart pumps are used to pump oil from the cart to the storage containers.
- Oil levels in the storage containers are checked before use to avoid overfill and spillage.
- Oil and diesel filters are carefully removed and emptied into the oil cart.
- Filters are punctured at the bottom and placed on a strainer for two days.
- Empty filter cartridges are cleaned and stored for removal by an approved oil recycling company.
- In case of spillage the diesel or oil must be covered with sand, which must be stored for removal by an approved oil recycling company.
- Oil carts are cleaned after use and stored securely.

All of the above protocols are strictly adhered to and monitored by Koedoepan Boerdery (Pty) Ltd (on behalf of Bertie van Zyl (Edms) Bpk, a GLOBALG.A.P-accredited producer, who retains records of all actions taken in the use of chemicals.
