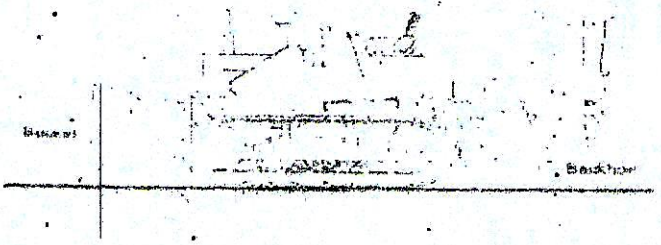
of tractive force, high reach of the bucket arms and hydraulic force. It should be used in the same way as bulldozer. *An excavator* can also be used for smaller trees and can be useful for cutting around roots. You can also use it for lifting bundles of cleared wood.



5.6 Surface soil removal

1. Surface soil has the highest concentration of roots and decaying organic materials (see Section 1.4, *Soil, 6*). This soil is unstable as a construction material and cannot be used for the foundations of any dike or structure. Therefore the surface soil should be removed from the areas where:

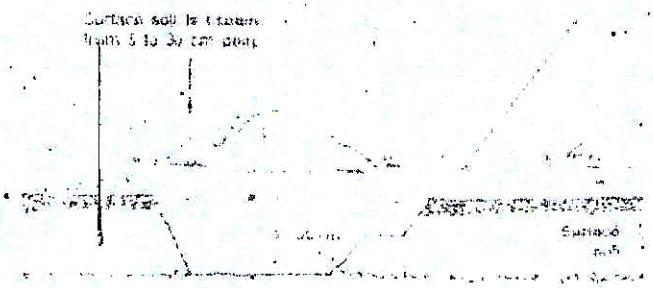
- dikes and structures will be built;
- soil will be taken as a dike construction material.

Example:

- If you build a *barrage pond*, remove the surface soil from the area where the dike (and the outlet structure, if any) will be built.
- If you build a *diversion pond* by mixed excavation/embankment, remove the surface soil from the whole area of the pond, dikes and structures included.

2. Soil may also be required outside the site to *supply topsoil* for newly constructed areas such as dikes.

3. *The depth of the surface soil* varies from region to region. It may be totally absent or more than 1m thick. Usually the surface soil is from *5 to 30 cm deep*. Once your site has been cleared, find out how thick the surface soil is. On this basis plan the construction method for your dikes and the removal and storage of the surface soil.

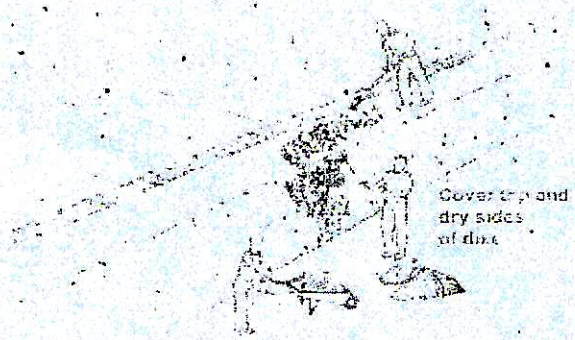


Example:

- The surface soil thickness averages a few centimetres only: you do not have to remove it, but you will have to plough the area well where the dikes will be built.
- The thickness of the surface soil averages 20 cm over a site of 20 metres square (400 m^2): you will have to remove, transport and store 20 m x 20 m x 0.20 m = 80 m^3 of soil.

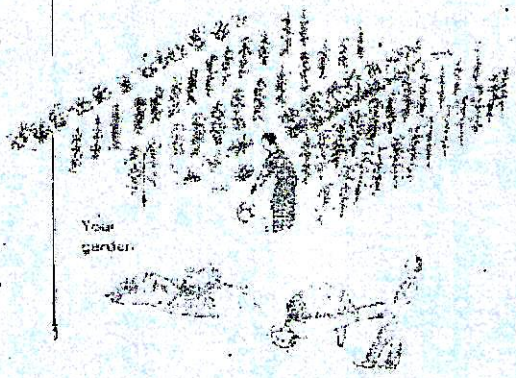
4. *Stake out* clearly the areas of the site from where the surface soil should be removed, as was done earlier before the clearing started (see Section 5.2).

5. *Excavate* to the desired depth and *transport* the surface soil away from the construction site (see Chapter 4).



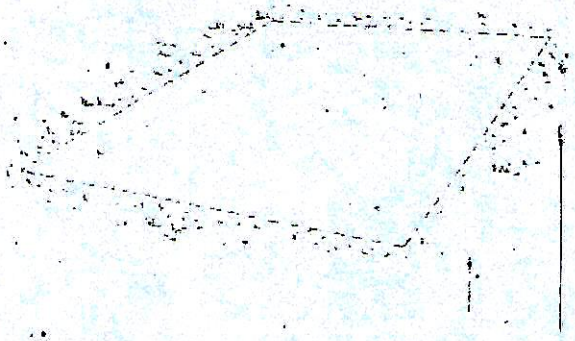
- preparing compost piles:

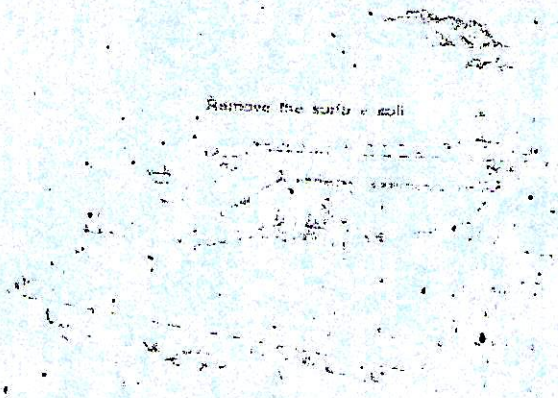
- improving your garden and producing valuable crops.



Note: larger sites may present considerable variation in surface soil depth. It is useful to measure this and plan the excavation and movement of the soil accordingly.

Stake out site as a guide for soil suface removal



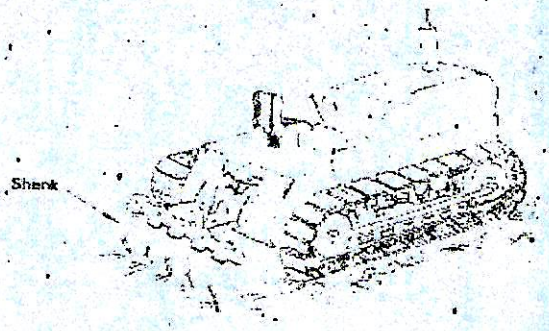


6. To be able to dig out this surface soil without too much effort, it might be necessary to *loosen it by ploughing*. In exceptional cases, you may have *to rip the soil* with a tractor first, before starting excavation. Use as many shanks as possible, at low speed and maximum soil penetration, to reach best efficiency. For small areas, the soil may be loosened using a pick.

Loosen the soil
Using a plough

Using a pick

Using a tractor



7. *Store this surface soil* in a suitable location, as close as possible to the site. You will *use this fertile organic soil later* for several purposes such as:

- covering the top and dry side of the dikes with a thin layer of rich soil to grow a protective grass cover (see Section 6.9);
- putting it back into the pond to increase its fertility;