

This Action Sheet describes how to build ferrocement water tanks. Take advice from an engineer or other experienced person if necessary, and be aware of safety issues when using cement.

Ferrocement consists of a cement-rich mortar reinforced with layers of wire mesh, sometimes with additional plain wire reinforcement for added strength. Tanks made of ferrocement are used in many countries for the collection and storage of water for drinking, washing, for animal use and irrigation. Ferrocement tanks have several advantages over tanks made of concrete or brick:

- They are usually cheaper to build and require less skilled labour.
- They are able to withstand shock better, as ferrocement is more flexible.
- Smaller ferrocement tanks are portable.

Ferrocement tanks vary in capacity, size, and shape. They are built by hand-trowelling layers of cement mortar onto a wire frame which is either free-standing or held in place by temporary or permanent structures known as 'formwork'.

Ferrocement is only needed for tanks of capacities greater than 1000 litres. Below this size, cement mortar alone is strong enough to withstand the applied loads.

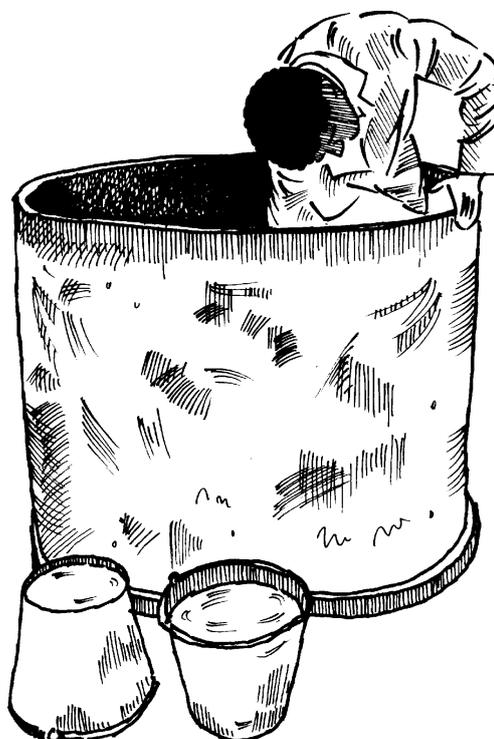
Tanks used for storing drinking-water must always be covered to avoid contamination and so maintain drinking-water quality.

Fittings are usually built into the ferrocement during construction. These include:

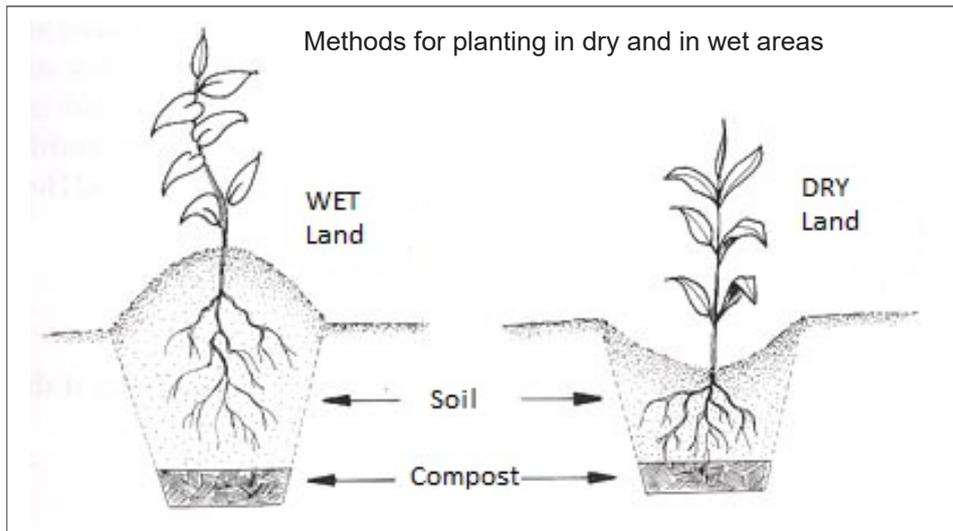
- one or more taps for water collection;
- a drainage tap (or wash-out) at the bottom of the tank, to be used when cleaning;
- an inlet pipe; and
- an overflow pipe. This must be screened to prevent insect entry.

A tank may be sited above ground or below ground, or it may be partially sunk (provided its base is situated well above groundwater level).

Plastering the inside of a ferrocement tank

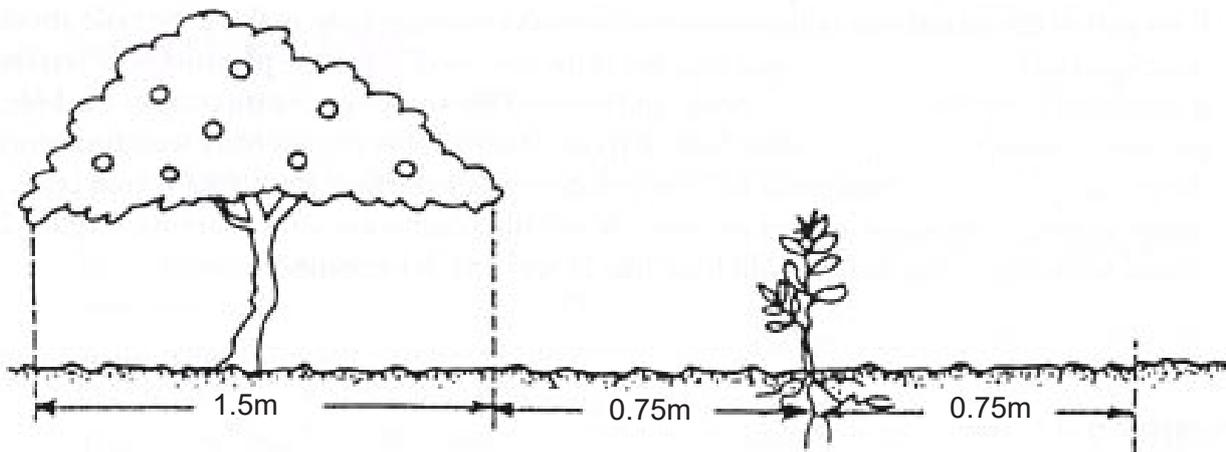






**Spacing.** Trees should be spaced to avoid competition for water and nutrients and to avoid too much shade. The spacing between trees should allow the trees to develop fully and to create as little competition among plants as possible. For example, as illustrated in Figure 3, a citrus tree's branches spread 1.5 m from one side to the other, so this kind of citrus tree should be planted with at least 1.5 m of spacing. Many fruit-trees develop feeder roots close to the soil's surface, which compete with other crops. So, if crops will be planted underneath them, trees should be planted farther apart.

Correct spacing varies from tree to tree. Plants with a small canopy (e.g. papaya) need about 2 to 4 m of space between them, while those with a big canopy (e.g. certain varieties of mango) need up to 10 m. Before the fruit- or nut-trees reach their full size, other food crops can be planted between them.



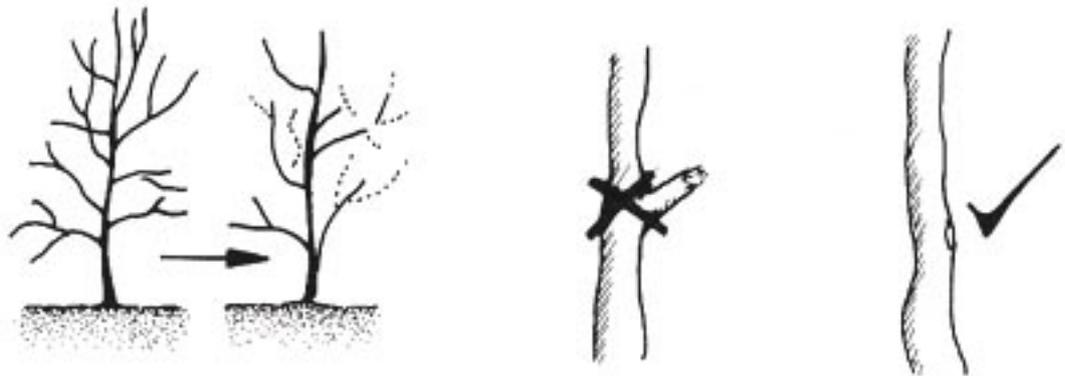
### **Pest and disease control**

Fruit-trees are best prepared to fight pests and diseases when they are planted in conditions that suit them. These conditions include optimum sunlight or shade, shelter, drainage and soil type. Many problems can be avoided if good hygiene is practised: plant only healthy trees, remove and compost fallen or diseased fruit, prune dead branches and do not bring soil from around infected plants into the garden. For more information, read Action Sheet 33: Natural Pest and Disease Control.

## Tree Husbandry

Like other plants and animals, fruit-trees will grow and produce better if they receive proper care.

**Pruning.** Some trees, such as citrus and mango, benefit from tree shaping. At planting, select the strongest upright branch of the seedling to become the future trunk of the tree. As the tree grows, carefully prune branches that are too close or rubbing together. This allows air and light to circulate through the tree, reduces diseases and can improve fruiting. Prune weak branches and those that let fruit hang too close to the ground where animals or soil diseases can attack them. Remove dead branches, where pests may be living. The cut surfaces can be covered with wood ash to seal the damaged tissues.



**Feeding.** Trees benefit from the application of compost or fertilizer, particularly at planting. Generally, 2 kg of good compost or a small handful of NPK fertilizer should be applied at planting, and then again every four months. Apply compost or fertilizer before (not during) tree flowering and again when the tree's fruit is half-mature. Put organic matter or mulch under a tree to provide nutrients, reduce weed competition and retain soil moisture.

**Watering.** Young fruit-trees are sensitive to drought and need daily watering during the dry season for the first year or two. Older trees are more resistant and may not need supplementary watering. Fruit-trees such as papaya benefit from daily watering throughout their lives. Not all trees, however, need supplementary water.

**Some suggested trees: fruits, nuts and spices**

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### **Acknowledgements**

This Action Sheet is an edited version of FAO Home Garden Technology Leaflet 14. <http://www.fao.org/docrep/003/x3996e/x3996e38.htm>

### **More information**

FAO: [www.fao.org](http://www.fao.org)

Food and Trees for Africa: [www.trees.org.za](http://www.trees.org.za)

Practical Action Technical Briefs on Food Processing have lots of ideas about ways to prepare fruit and nuts for preservation or sale: <https://answers.practicalaction.org/our-resources>

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