Mango growing booklet













Funded by European Union

© 2020 World Agrofrestry (ICRAF)

This booklet has been prepared by the Tree Productivity and Diversity Theme of the World Agroforestry Centre (ICRAF), Nairobi Kenya with inputs from Erick Ngethe, Valentine Gitonga, Agnes Gachuiri, Sammy Carsan, Katja Kehlenbeck and Stepha McMullin. This manual was developed through the Food Trees project, funded by EC/IFAD.

This version has been reproduced through the Reversing Land Degradation by Scaling up Evergreen Agriculture (Regreening Africa) project funded by the European Union.

Disclaimer:

The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union.

Citation:

Erick Ngethe, Valentine Gitonga, Agnes Gachuiri, Sammy Carsan, Katja Kehlenbeck and Stepha McMullin (2020) *Mango growing booklet.* World Agroforestry ICRAF, Nairobi, Kenya. 12pp

ISBN: 978-9966-108-32-6







Introduction

Trees in general, have many functions in a farming system. They contribute directly to food requirements of households, communities and livestock through provision of fruits, vegetables, starch and fodder. Environmentally, trees contribute to a sustainable and increased food production, particularly for vulnerable ecosystems, by improving the soils and microclimates of the surrounding. More importantly to farmers and rural communities, trees are a source of fuel wood, which in many areas is the only available form of energy, in addition to providing locally available materials for construction.

Fruit trees however, have a more direct utility to people for nutrition and food, in that they provide fruits which are rich in vitamins, proteins, essential oils and energy, and thereby play an important role in the nutrition of children, women and men in both rural communities and urban centres. For instance, mango fruit is a rich source of vitamins A, C and B6, which are important nutrients, mainly enhancing good vision and a strong immune system for healthy functioning bodies.

However, it has been noted that farmers have limited knowledge in tree cultivation, particularly how to plant fruit trees. Majority of these farmers lack basic skills in fruit tree planting including; proper timing, technical aspects and management techniques. It is important to note that establishing healthy and productive fruit trees requires planning and preparation.



Planting a grafted mango seedling

Mango trees (*Mangifera indica L.*) are grown in many African countries. Mangoes contribute to family diets, and also serves as serving as a cash crop. In Kenya, both local and naturalized exotic species are cultivated for their sweet and aromatic fruits, which are eaten fresh or processed into juice, jam, fruit leather, chutneys or dried fruits. In areas of mango production, there has been a marked increase in the demand for high quality mango fruits for both the domestic and export markets.

This booklet is a guide for farmers, extension agents and tree nursery operators, detailing the process of planting a grafted mango tree and its management on-farm from planting to harvesting of fruits. It presents a step-by-step guide on how to plant and take care of a grafted mango tree.

Things to consider before planting a grafted mango seedling include the following;

- i. Adequate space to plant the seedling(s), preferably far from buildings and other installations such as power lines, water pipes or telephone posts,
- ii. That the soil conditions, fertility and topography of the area selected is suitable for the mango variety to be planted, and
- iii. Adequate sunlight exposure for the mango seedling planted.

Assemble all required materials

Assemble all the necessary materials and equipment; grafted mango seedling(s) manure and/or fertilizer, watering can with water, spade and a hoe (*jembe*).



Farmers are advised to source quality grafted mango seedling(s) from a reputable nursery.

STEP 2 Selection of seedlings for planting



It is important to identify and select seedlings that are healthy and big enough for planting as they have a higher chance of survival. Quality planting material (grafted) is important for good production/high yields. Selected seedlings should not show signs of pests and diseases.



STEP 3

Transportation of seedlings for planting



Different means of transporting seedlings are used, depending on the distance from the nursery to the identified planting site. During transportation of seedlings, be careful not to pile them up on each other as this can cause damage to the young trees. It is recommended that the seedlings are transported upright in boxes, plastic crates or bags as this will reduce possibility of their damage.

Water the selected seedling before transporting them from the nursery to the planting site. Watering is done to protect the seedling from drying up during transportation.





An ideal climate for mango trees ranges from the humid tropical to the semi-arid sub-tropical, wherever a dry period exists of at least 3 to 4 months, sufficient light to induce flowering.

Spacing between mango trees varies depending on the variety and growing environment (dry and wet zone). In a dry zone the recommended spacing is 10 m x 10 m, because the growth is less, in Wet and rich soils the preferred spacing is 12 m x 12 m, because of abundant vegetative growth.

Planting holes should be dug before the onset of a rainy season, where possible, for water to collect in it to enhance the survival rate of the seedling planted. The holes should be dug to a depth of 1 metre, width of 1 metre and length of 1 metre $(1m \times 1m \times 1m)$.

The spacing between these holes should take into consideration the mango tree canopy as well as soil fertility of the area.



5 Planting the seedling

If ready to plant, re-fill the planting holes with a ¼ of the top soil from around the hole or with the soils removed when preparing the hole(s).

Where necessary, mix this soil with recommended amounts of farm yard manure or tree fertilizers thoroughly at the ratio of 3:1 respectively.







Remove the polythene bag or polythene tube by tearing on the side or below while holding the seedling upright. However, if the seedling was raised in a tin or any other container, bang it from the top slightly.





Then remove the seedling from the tube/container with its soil by holding it at the base of the stem. Ensure that the root systems are not disturbed while doing this. Place the seedling in the hole. Half fill the hole with top soil and press it gently towards the root. Fill the hole with water and allow it to drain before completely filling it up with soil. Ensure this is done without removing the soils around the roots and/or bending the roots.



Place the soils back in the hole all around the seedling ensuring the roots are covered properly



Make a basin around the base of tree by gently pressing down the soil around the seedling. The basin will help hold the water after watering. Ensure that the seedling remains upright just as it was in the polythene tube in the nursery.

Apply a mulch layer under young trees. Mulch provides organic matter (a valuable source of tree nutrients and food for beneficial soil micro-organisms), reduces moisture loss and competition from weeds.





Management of fruit tree after planting

Irrigation

Watering should be done immediately after planting in the field to foster proper establishment.

If possible, you can water the mango tree at intervals of 8-12 days from when it starts to produce flowers to maturity so as to attain higher yields. Note that watering is not recommended 2-3 months before flowering as it will encourage increased branching and leaves development.

Protection

Where the fruit tree is planted in an open field, particularly where animals are also grazed, it is advisable to protect the tree against destruction by livestock, especially goats, by building a fence of sticks/net around it.

Manure and fertilizer application

After about 3-6 months, start application of nitrogenous fertilizers (in case of fruit trees e.g. mango, pawpaw, oranges). Apply nitrogenous fertilizers in varied intervals to avoid leaching out (downward movement of useful mineral or nutrients in water). Alternatively, properly prepared farm yard manure or compost, kitchen ash (left from cooking) and mulching can be used in place of fertilizers.

Pruning and training

The height and form of the fruit tree needs to be controlled. This is meant to guide the tree and facilitate its harvesting during the later stages. It is advisable that you carry out pruning in the first year to guide the tree into the desired shape, and when tree is about 1 m from the ground, cap the seedling (by limiting the upward growth of the tree) to encourage side branches. Carry out pruning later for proper tree maintenance (should be carried out after fruit harvest). Control the height to about 3.5 m and all branches at knee level (about 0.5 m) should be pruned. Remove all dead branches to allow sunlight through the canopy to the ground.

Flowering and fruit formation

Grafted fruit trees usually start to flower within two years from planting. However, fruit formation should be discouraged at this stage as it can affect growth of the fruit tree. For grafted mangoes, it is advisable that fruit formation is allowed from the fourth year onwards.

Pests and diseases

Fruit fly is the most common pest for mangoes, usually causing a lot of damage and high losses of fruits. The use of fruit fly traps is a popular method of controlling the pest. Other pests include gall midges and scales insects. Powdery mildew and anthracnose are the most common mango diseases mainly affecting the flowers, tender leaves and leading to development of black lesions on mango fruits. Powdery mildew can be controlled by spraying Sulphur or Bayleton, while anthracnose can be controlled using copper fungicides.

Maturity and harvesting

It takes between 90–160 days after flowering for the mangoes to reach maturity, depending on the variety. Good harvesting practices are necessary. Mangos should not be removed from the tree by beating with a stick and dropping to the ground. They should be picked by hand, and if possible, best to harvest the mangoes with a stalk (part connecting the fruit to the branch, about 2–3 cm long) still attached to the fruit. This reduces the latex which could cover the fruit if incorrectly harvested. Fruits are generally picked when they begin to change their outer colour, for example, from deep green to light green in some cultivars. Pack the fruits in a single layer with stalks facing downwards in a box or crate for transportation to the market.

Good postharvest handling should involve storage in boxes/crates rather than sacks to avoid bruising.





Funded by European Union



World Agroforestry (ICRAF)

United Nations Avenue, Gigiri PO Box 30677–00100, Nairobi, Kenya Phone: + (254) 20 7224000, Fax: +(254) 20 722 4001 Via USA phone (1-650) 833-6645 Via USA fax (1-650) 833-6646 Email: worldagroforestry@cgiar.org Website: www.worldagroforestry.org



Giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH





RESEARCH PROGRAM ON Forests, Trees and Agroforestry

