

Fruit Tree Portfolios for Improved Diets and Nutrition in Machakos County, Kenya

How to use the diversity of different fruit tree species available in Machakos county to provide better nutrition for smallholder farming families





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Contributions on content from Erick Ngethe, Agnes Gachui, Parveen Anjarwalla, Brendah Wekesa and Meda Rono

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World Agroforestry Centre,
United Nations Avenue, Gigiri,
P.O Box 30677-00100 Nairobi, Kenya
Phone: + (254) 20 7224000, Fax: + (254) 20 7224001
Via USA phone: (1-650) 833-6645, Fax: (1-650) 833-6646
Email: worldagroforestry@cgiar.org
www.worldagroforestry.org

The contribution of fruits to health and well-being

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients.

Fruits deliver important nutrients for healthy and strong bodies such as Vitamins A, C and B6:

Vitamin A is for healthy eyes and good vision.

Vitamin C provides general good health and reduces illness such as colds.

Vitamin B6 is good for pregnant women and young children for healthy development.

10 fruit tree species on a farm can provide year-round healthy fruits rich in vitamin C and pro-vitamin A in Machakos County

English name	Species name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Vit C	Vit A
Pawpaw	<i>Carica papaya</i>													++	+++
Mango	<i>Mangifera indica</i>													+	++
Waterberry	<i>Syzygium spp.</i>													+	(+)
Custard Apple	<i>Annona reticulata</i>													+	
Guava	<i>Psidium guajava</i>													+++	++
Lemon	<i>Citrus limon</i>													+	
Orange	<i>Citrus sinensis</i>													+	
Chocolate berry	<i>Vitex payos</i>														+++
Passion fruit	<i>Passiflora edulis</i>														+++
Desert date	<i>Balanites aegyptiaca</i>													(+)	

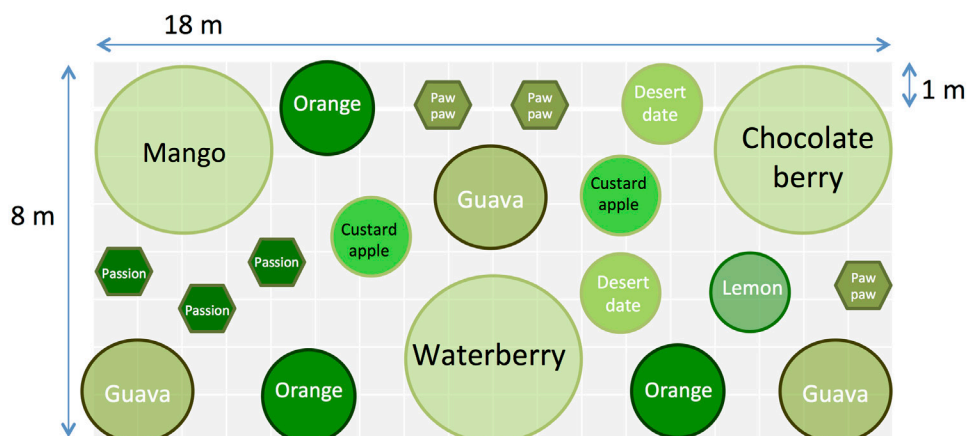
Vitamin C and pro-vitamin A contents: +++ very high; ++ high; + good; (+) intermediate

Purple bars = harvest times for that specific species

Fruit tree species and number of trees per species to be planted on each farm as a fruit tree portfolio in Machakos County

Species name	Swahili name	Kamba name	Type	Tree Numbers
Mango	Mwembe	Muembe	Grafted	1
Waterberry	Mzambarau	Mzambarau, Kivuena	Seedling	1
Chocolate berry	Mfufu	Kimuu	Seedling	1
Custard Apple	Mtomoko	Kitomoko	Seedling	2
Guava	Mpera	Kivela	Cuttings	3
Lemon	Mulimau	Kitimu	Grafted	1
Orange	Mchungwa	Musungwa	Grafted	3
Desert date	Mjunju	Kilului	Seedling	2
Pawpaw	Mpapai	Mapapai	Seedling	3
Passion	Mukundi	Makundi	Grafted	3
				20

The 20 trees of the 10 species can be planted along the farm borders, around the house or in an orchard of 8 x 18 m size:



Pawpaw

(*Carica papaya*)
Mpapai (Swahili)



Pawpaw is a tree-like herb with an unbranched stem and a small crown at the end of the stem, growing to a height of up to 10 m. It originates from Tropical America, but is widely cultivated in Kenya and can grow in low and medium altitudes of different climates. Even though fairly resistant to drought, pawpaw requires a constant water supply. Pawpaw is easily grown from seeds. For commercial production, quality seeds of improved varieties should be used. The large sweet fruits can be eaten fresh or used to make fruit salads, or processed into juice, jam, jelly, sweets and dried fruits. In Machakos area, pawpaw fruits are ready for harvest almost year-round, but mainly from October to June.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Pawpaw is rich in vitamins C and A.

Vitamin C strengthens the immune system and provides for good health.

Vitamin A is important for good vision and a healthy immune system.

Passion fruit

(*Passiflora edulis*)

Mukundi (Swahili)



Passion fruit is a perennial, shallow-rooted climber which can grow several metres in height. The species is native of southern America. The yellow passion fruit is suitable for cultivation in lowlands, while the purple type is good for higher altitudes. Passion fruit can be grown from seed, but grafted plants are recommended for commercial cultivation. The fruit can be eaten fresh or processed into juice and jam and is on high demand both in domestic and export markets. In Machakos area, passion fruits are ready for harvest mainly in July and November.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Passion fruit is rich in vitamin C, vitamin A, iron and fibre.

Vitamin C strengthens the immune system and provides for good health.

Vitamin A is important for good vision and a healthy immune system.

Iron increases the quality of blood.

Fibre is an important part of a healthy diet. A diet high in fibre has many health benefits and can improve the digestive system.

Orange

(*Citrus sinensis*)

Mchungwa (Swahili)



Orange is a small, spiny and shallow-rooted tree or shrub with a round, dense crown, growing to a height of about 6 m. It originates from Asia and grows in intermediate and lower altitudes with a semi-arid climate. In higher altitudes orange trees often suffer from the greening disease. Orange trees should be budded or grafted to obtain high quality fruits. Several improved varieties are available. The sweet, juicy fruits can be eaten fresh or processed into juice, jelly or marmalade. In Machakos area, orange fruits are ready for harvest mainly from May to July.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Orange is rich in vitamin C.

Vitamin C strengthens the immune system and provides for good health.

Mango

(Mangifera indica)
Mwembe (Swahili)



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Mango is a medium to large-sized tree with a big, dense crown, growing to a height of about 15 m. The species originates from Asia, but is naturalised in Kenya. Mango grows well in a range of climate zones from semi-arid lowlands, to humid midlands. The local varieties can be raised from seeds, but for commercial cultivation, grafted seedlings of improved varieties should be grown. The sweet and aromatic fruits are delicious when eaten fresh, but can also be processed into juice, jam, fruit leather, chutneys and dried fruits. There is a still increasing demand for high quality mango fruits from domestic and export markets. In Machakos area, mango fruits are ready for harvest from December to March.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Mango is rich in vitamins A, C and B6.

Vitamin A is important for good vision and a healthy immune system.

Vitamin C strengthens the immune system and provides for good health.

Vitamin B6 is good for the immune system and for pregnant women and young children for healthy development.

Lemon

(*Citrus limon*)

Mulimau (Swahili)



Lemon is a small, spiny tree or shrub with a round, medium dense crown, growing to a height of about 6 m. It originates from Asia and grows best in intermediate altitudes with a semi-arid climate. It can be grown from seed, but high quality trees are only obtained through budding and grafting. The sour fruits are usually not eaten directly, but used as an ingredient for refreshing drinks, fruit salads, ice-cream, jams and juice. In Machakos area, lemon fruits are ready for harvest mainly in May, June and July.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Lemon is rich in vitamin C.

Vitamin C strengthens the immune system and provides for good health.

Guava

(*Psidium guajava*)

Mpera (Swahili)



Guava is a small tree or shrub with an open crown growing to a height of up to 8 m. It originates from Southern America, but is naturalised in Kenya. Guava grows well in many different climate zones, ranging from semi-arid lowlands to humid midlands, where it can even become a weed as the seeds are distributed by birds. For commercial production, guava trees of improved varieties are not grown from seeds, but from cuttings and graftings. Guava fruits can be eaten fresh, but they are also suitable for processing into jam, juice, wine and fruit leather. Improved guava has a high market potential, particularly for juice processing. In Machakos area, guava fruits are ready for harvest from March to June.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Guava is rich in vitamins C, A and B6.

Vitamin C strengthens the immune system and provides for good health.

Vitamin A is important for good vision and a healthy immune system.

Vitamin B6 is good for the immune system and for pregnant women and young children for healthy development.

Desert date

(Balanites aegyptiaca)
Mjunju (Swahili)



Desert date is a spiny shrub or small tree with hanging branches and a small open crown, growing to a height of about 10 m. This species is indigenous in Kenya and has a wide ecological distribution but grows best in arid or semi-arid lowlands and midlands. Desert date trees can be grown from seeds. The fleshy pulp of both unripe and ripe fruit can be eaten fresh or dried. The fruit pulp has a sweet-bitter taste. In other African countries, juice and syrup is produced on commercial scale from the fruits, young leaves are cooked as vegetable and highly valuable oil is pressed from the seeds. In Machakos area, desert date fruits are ready for harvest mainly in August and September.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Desert date is rich in iron, vitamin C, potassium and calcium.

Iron increases the quality of blood.

Vitamin C strengthens the immune system and provides for good health.

Potassium is necessary for a healthy body and supports the functions of the heart, kidneys, and other organs.

Calcium helps to build strong bones and teeth and supports the muscles systems in the body.

Custard apple

(*Annona reticulata* and *A. squamosa*)

Mtomoko (Swahili)



Custard apple is a small tree with a short stem and an open crown, growing to a height of up to 7 m. It is native to Southern America, but has naturalised in many tropical countries and grows well in semi-arid lowlands and lower midlands. Custard apple is usually grown from seeds, but grafting is also possible. Fruits are picked slightly unripe and stored until they are soft. They are mostly eaten fresh. In Machakos area, custard apple fruits are ready for harvest in March and April.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Custard apple is rich in vitamin C, vitamin B6 and potassium.

Vitamin C strengthens the immune system and provides for good health.

Vitamin B6 is good for the immune system and for pregnant women and young children for healthy development.

Potassium is necessary for a healthy body and supports the functions of the heart, kidneys, and other organs.

Chocolate berry

(*Vitex payos*)
Mfufu (Swahili)



Chocolate berry is a small tree with a low, rounded crown, growing to a height of up to 8 m. Chocolate berry is indigenous in Kenya and grows in semi-arid areas of the lowlands and the midlands. Chocolate berry is grown from seeds, but the seeds are not easy to germinate. The black fruits are sweet and mostly eaten fresh, but they can be processed into juice and jam. In Machakos area, fruits are ready for harvest in May, June and July.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Chocolate berry is rich in vitamin A and potassium.

Vitamin A is important for good vision and a healthy immune system.

Potassium is necessary for a healthy body and supports the functions of the heart, kidneys, and other organs.

Waterberry

(*Syzygium cuminii*)
Mzambarau (Swahili)



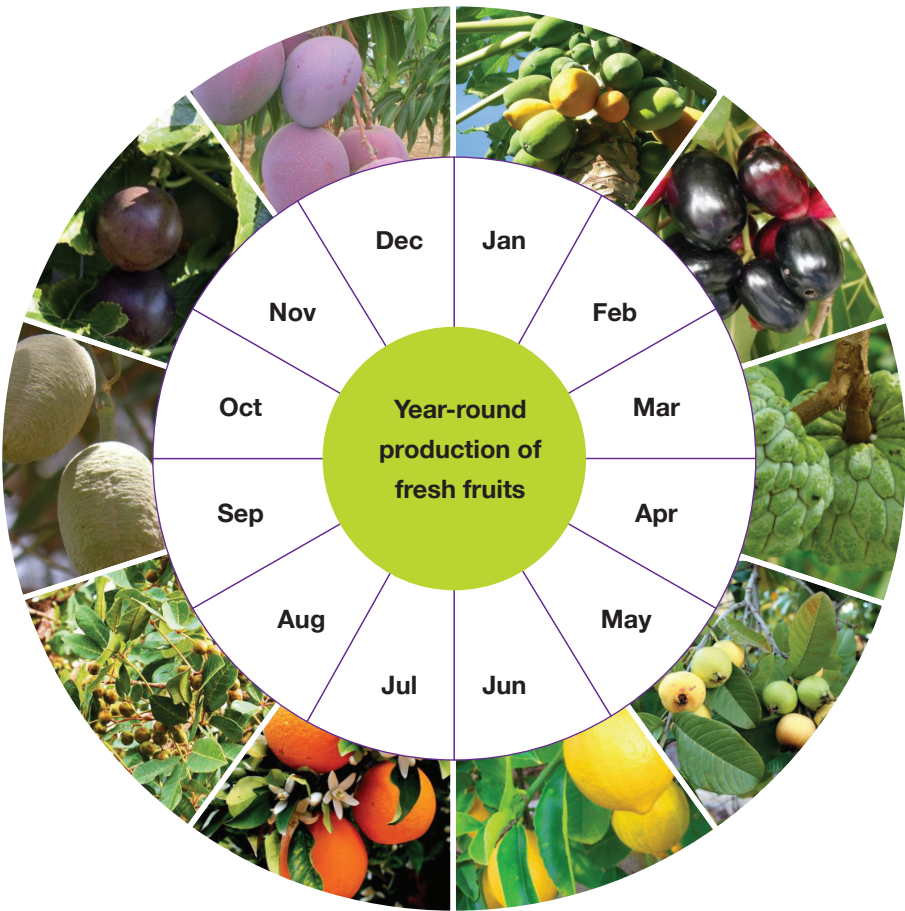
Waterberry is a medium to large-sized tree with dense foliage, growing to a height of up to 30 m. There are several species of waterberry in Kenya, some of them are indigenous. Waterberry grows well in the lowlands and midlands and can withstand flooding and droughts. It is a fast-growing tree, which can easily be established from seeds. The fruits are sweetish-sour in taste and are mainly eaten fresh, but they are also suitable for juice and jam making. In Machakos area, waterberry fruits are ready for harvest in March.

Nutrients are the nutritious components in foods that the body needs to grow strong and healthy. A diverse and balanced diet contains a range of nutrients, all of which play an important part in keeping our bodies healthy. Waterberry is rich in vitamin A and iron.

Vitamin A is important for good vision and a healthy immune system.

Iron increases the quality of blood.

Year-round production of fresh fruits in Machakos County





The World Agroforestry Centre is a
member of the CGIAR Consortium

World Agroforestry Centre, United Nations Avenue, Gigiri,
P.O Box 30677-00100 Nairobi, Kenya

Phone: + (254) 20 7224000, Fax: + (254) 20 7224001

Via USA phone: (1-650) 833-6645, Fax: (1-650) 833-6646

Email: worldagroforestry@cgiar.org

www.worldagroforestry.org