

# ADAPTABILITY OF MANGO VARIETIES IN SRI LANKA AND THEIR POTENTIALITY IN COMMERCIAL FRUIT CULTURE

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## Introduction:

Mango (Mangifera indica) is grown in various parts of Sri Lanka, being adapted to a wide range of climatic conditions and soils. However the soil should not be water logged or infertile. Mango can tolerate very high temperatures. However, rainfall is the most limiting factor that affects flowering, fruit set and maturation.

The varieties commonly seen growing in various areas (introduced as well as indigenous) are linked with different ecological factors; hence some varieties are adapted to certain agro-ecological regions than the others.

Most introduced varieties are adapted to the Dry Zone, where they give higher yields, where as the indigenous varieties are found mostly in the wet zone. Intermediate zone is not identified for commercial fruit culture due to the limited number of varieties grown, and it is more suitable for expansion of indigenous varieties in small scale or as a Home garden crop.

Compared to other fruit crops mango is an hardy plant and continues to bear fruits for over 30-40 years, with low cost of maintenance and less attention.

However, mango varieties have their advantages as well as disadvantages in commercial fruit culture in relation to canning or as a whole fruit for the market, which determine their potentiality.

## Varietal adaptability:

Due to a wide range of ecological regions in the country, mango varieties differ in adaptability to different zones. Also, the bearing habit of one variety in two different regions in the same environment could change according to variations in temperature and moisture.

Most commonly grown mango varieties in the Dry Zone are: Karatha Kolomban, Ambalavi, Neelum, Chembattan, Pandi, Seelun, Willard, Dilpasand and Salem. Varieties common to the wet zone are : Vellai Kolomban, Peterpasand, Parrot, Betti, Alponso, Dampara, Fibre mango, Honey mango and Wild mango. Pol-amba and underground are common in the Intermediate zone. The Dry Zone varieties are also suitable for the drier parts of the Intermediate zone too.

Some varieties are particularly distinct in different areas. For example, Parrot mango in Kandy; Rupee (Pol) mango in Kurunegala and Kuliya-pitiya; Betti-amba in Matara; Dampara in the interior parts of Colombo; Fibre mango in the entire wet zone; Karatha kolomban and Willard in the Dry Zone; Vellai kolomban in the wet zone; and most of the indigenous varieties are seen in the wet zone.

Dry zone and the drier part of the intermediate zone are considered as the best areas for commercial fruit culture, owing to its climate and varieties available. Wet zone varieties can therefore be utilized to supplement the local market. However, each variety has its own advantages as well as disadvantages.

#### **Advantages and disadvantages of some Mango varieties:**

The aroma, flavour and tastes of the fruits of different varieties are unique. Fruits are with varying skin and flesh colours. It is utilized as a fresh fruit or processed product. Poly embryonic forms are self compatible in grafts. Uniformity in growth may be achieved by budding or grafting. Needs less attention and care; also less pests and diseases. Possess a long life span and higher yield per hectare.

However, mango do not give quick returns. All varieties show alternate bearing. Seasonal in production, hence prices are high in the off seasons. Some varieties are not available in large quantities for processing. Fruits deteriorate fast, causing problems in transport and marketing. Plants are susceptible to water logging. Rainfall is limiting for flowering, fruit set and fruit ripening. Some varieties are fibrous or with less firm flesh which are not suitable for canning.

Some varieties are with a higher sugar to acid ratio, becoming too sour; non-uniform fruit shapes are the disadvantages in relation to canning.

The Dry Zone varieties cannot be pushed into the wet zone, owing to the rainfall which lowers the fruit set. However, all the wet zone varieties are adapted to the Dry Zone conditions.

The Dry Zone varieties are ideal for processing in the form of cuttings (cubes), discs or slices and remain firm in the thick syrup. Wet Zone varieties which are more fibrous and juicy are suitable for juice extraction; for soft drinks; or flavouring ice-cream, also utilized in Jam, pickles and chutneys. Mango kernel can be fed directly to cattle or swine, since it is rich in protein, fats and carbohydrates. When good varieties are utilized for processing the indigenous varieties cannot be ignored. They can be supplemented for the local market. Parrot mango is a good example.

Varieties like Peterpassand, Karatha Kolamban, Vellai Kolomban, fibre and Betti-amba are poly embryonic. Since poly embryonic varieties are self compatible in grafts, expansion of cultivation using such varieties is more appropriate. Fibre and sour mango are ideal for root stocks, as they are freely available and relatively cheap. Also they bear heavily, less susceptible to pests and diseases. Being poly embryonic, they are commonly used as root stocks. A hybrid variety like Willard is ideal as a home garden crop, and popular due to fruit size and peel colour. It is not a quality fruit for processing, but a potential variety for export as a whole fruit.

#### **Potential for processing:**

the proportion of male and female flowers in mango determine the ability of fruiting under different ecological conditions. If the rainfall coincides with flowering, flower shed occur, or the flowers and young fruits will succumb to Anthracnose disease. Also rainfall effects flowering, fruit set and maturity. This explain why most of the introduced varieties are located in the Dry Zone, and Dry Zone being considered ideal for commercial mango culture. Most new introductions and hybrids cannot be pushed into the wet zone, since rainfall imposes limitations.

Tendency of alternative bearing is another disadvantage in commercial fruit culture, which can be overcome to some extent by cultural and management practices.

However, there are problems with transport and marketing, owing to quick deterioration of the fruit. Also does not give quick returns like pineapple or passion fruit. Fruits of certain varieties are not suitable for processing due to high sugar acid ratio, high fibre content, low flesh content, small size and varying shapes. Thus growers should be encouraged to cultivate more suitable varieties, required for processing. Varieties could be priced accordingly as an incentive to the grower. With the present subsidy scheme in operation and quality planting materials production in Government Farms and registered private nurseries, the situation would improve gradually.

It should be borne in mind that the time of flowering of manago in different parts of the country is determined by the local weather prevailing. However, the flower initiation, time of flower opening and duration are genetical. District wise information is available about the varieties grown, the varieties that are popular in each region, time of flowering of popular varieties, peak harvest period, and their market prices. Such information therefore can be utilized very effectively in mango processing, so that such processing units will not idle during the so called 'off seasons' of mango in relation to a region. Collection and transport of suitable varieties from regions could be effectively done. Hence seasonal bearing and 'off season' bearing of manago will not be problems in commercial fruit culture.

- Key to Varieties

K.K.	- Karatha Kollomban	P.P.	- Peter Passand
V.K.	- Vellai Kollomban	L.O.	- Local
W	- Willard	S.	- Salem
W.A.	- Wal-amba	K.	- Kalakaddy
G.A.	- Gira-amba	N.	- Neelum
B.A.	- Betti-amba	D.	- Dampara
K.A.	- Kohu-amba	C.	- Chembattan
P.A.	- Petti-amba	A.	- Ambalavi
Y.A.	- Yapan-amba	P.	- Pandi
R.A.	- Rata-amba	M.	- Malgova.

TABLE I. Some districtwise information available on Mango and potential areas for processing units.

District	Approximate Extent (Ac)	Varieties grown	Flowering season	Bearing season	Harvesting season	Varieties in bulk at Peak harvesting	Order of consumer preference	Price for fruit (or) per Kg (Rs)	Remarks
Colombo	200	V.K. D B.A	Jan/Feb	Mar/Apr	May/June	V.K D B.A	1. V.K. 2. D 3. B.A.	Rs. 1.50/Kg	Trees scattered
Gampaha	595	V.K. K.K., W P.A. K.A.	Dec/Jan (March)	Jan/Apr -N.A-	Apr/May (Jun/July)	M.K K.K P.A. K.A	1. V.K. 2. K.K. 3. K.A. 4. P.A.	Rs. 1.00/Fr Rs. 3.00/Kg	Trees scattered
Kalutara	Home Gardens	V.K;D;W P.P;K.K. K.A.: Local	Dec/Feb	Jan/Mar	Apr/Jun.	K.A. D	1. V.K 2. D 3. K.A.	10-4- cts Fr.	Not economically feasible on large scale.
Ratnapura	Scattered	K.K; W: P.P.	March	April	May/Jun	K.K.	1. K.K.	Rs. 2.50/Kg	Trees scattered
Kegalle	228	V.K; K.K. w;K.A; G.A. Local	* N.A.	*N.A.	*N.A.	Local KA: V.K. K.K.	* N.A.	20 cts/Fr to Rs. 2.00/Fr	Trees scattered Good quality mother trees available.
Kandy	*N.A.								

District	Approximate Extent (Ac)	Varieties grown	Flowering season	Beating season	Harvesting season	Varieties in bulk at Peak harvesting	Orders of consumer preference	Price for fruit (or) per Kg (Rs)	Remarks
Nuwara-Eliya	Few trees scattered	K.A.; G.A.; K.K.; Papol Amba	Jan/Feb.	Feb/Mar/April	May/June	* N.A.	1. Papol Amba 2. G.A.	Rs.1.60- Rs.1.50/Kg	Needs better transport & marketing for mangoes from other districts.
Kurunegala	2130	K.K.; W.; K.A.; W.A.	Feb/Mar	Mar/Apr	Apr/May	K.K.; W K.A.; W.A.	1. K.K. 2. W	40-70 cts/ Fr.	Dry Zone part of this area is most ideal for expansion of cultivation
Galle	550	V.K.; K.K.; P.P. W.; K.A.; D R.A.; G.; W.A.; B.A.	Jan/Feb	Feb/Mar	Apr/May	R.A.; P.P V.K.; K.A; W.A.; K.K.; D	1. K.K. 2. V.K. 3. D.D. 4. P.P. 5. R.A. 6. G.A. 7. W	60 cts/Fr Rs.3.00/Kg	Wasteage due to uneven maturity, improper marketing facilities.
Matara	1252	V.K.; W.P.A.; G.A.; K.A.; Y.A.	Feb/March	Mar./Apr	Apr/May/June	V.K K.A. Y.A	1. V.K. 2. K.K. 3. Y.A 4. W 5. P.A.	15 cts to 60 cts/Fr	Trees scattered but a potential area.

District	approximate extent (Ac)	Varieties grown	Flowering season	Bearing season	Harvesting season	Varieties in bulk at peak harvesting	Order of consumer preference	Price for fruit (or) Remarks per Kg (Rs)
Hambantota	*N.A.							
Moneragala	292	K.K:W V.K K.A	Feb/Mar July/Aug	Mar/Apr Sept/Oct	May/Jun Nov/Dec	* N.A.	1. K.K. 2. V.K. 3. B.A.	25 cts to A potential Rs.1.00/Fr area
Amparai	520	W.K.K. V.K;K.A G.A; B.A. P.A:C; Local	Sept/Oct Feb/Mar	Nov/Dec Apr/May	Jan/Feb Jun/July	W.K.K: V.K	1. V.K 2. K.K. 3. W 4. Ambalevi	75 cts- Rs.2.00/Fr due to lack Rs.1/50 of marketing Rs.8/00/Kg facilities. Highly seasonal in different areas of this districts.
Trincomalee	*N.A.	W:K.K; A:V.K: C:Local	Feb/Mar	Apr/May	May/Jun.	K.K:W:A	1. K.K. 2. W 3. A 4. C 5. V.K	Rs.3.00 Soils Rs.5.00/Kg suitable. Good potential under the subsidy scheme.
Mullaitivu	400	K.K:W:C V.K:A Local	March	April	May/Jun	K.K.	1. K.K	75 cts - Longer Rs.1.00/Fr period of production.

District	Approximate extent (ac)	Varieties grown	Flowering season	Bearing season	Harvesting season	Varieties in bulk at Peak harvesting	Order of consumer preference	Price per fruit (or) per Kg. (Rs)	Remarks
Vauniya	625	K.K:V.K: W:A:C:P:	Feb/Mar	Mar/Apr	Jun/Jly	K.K:V.K: W:A:	1. K.K. 2. V.K 3. W 4. A	Rs.1.50/Kg	Main growing areas within the district is known. Good potential.
Anuredhapura	Scattered all over 2000	K.K:V.K W.A. W	Jul/Aug (Mar/Apr)	Sept/Oct Apr/May	Dec/Jan May/June	K.K; V.K; W	1. K.K 2. V.K. 3. W	20 cts- 50 cts/Fr	Produce purchased by the marketing dept. Potential area
Puttalam	2000	V.K:K.K. B.A;W.A	March	May	May/June	V.K:K.K W.A:B.A	1. K.K. 2. V.K 3. B.A. 4. W.A.	10 cts 50 cts/Fr	Potential area under irrigation
Jaffna	2100	K.K:K:W A:C:P:N:M S;K Local	Feb/Mar Sept.	Jun/Jul Sept/Oct.	July/Aug Dec/Jan. Feb.	K.K;V.K	1 K.K. 2. A. 3. W. 4. C	50 cts.to Rs.1.50/Fr	Varying soil types. Variable bearing. Preference highly variable Large price differences according to variable.
Others	*N.A.								

\* N.A. - Accurate figures and information not available.