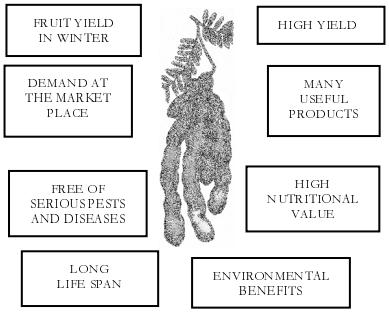
Fruits for the Future
Tamarind

International Centre for Underutilized Crops. Factsheet No. 1. December 1999

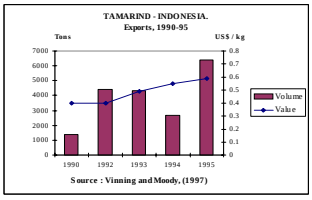

What is tamarind? - *Tamarindus indica* L. is a tropical fruit tree which grows in dry/monsoonal climates. It belongs to the family Leguminosae (Fabaceae). The fruits are usually between 5 and 14 cm in length and approximately 2 cm wide. The ripe fruit is filled with a sticky pulp which can be used both in industry and domestically in a variety of different ways. The tree averages 20-25 m in height and 1 m in diameter, it has a wide spreading crown and a short, stout trunk. It is slow growing, but long lived, with an average life span of 80-200 years. *Tamarindus* is a monotypic genus (having only one species) the closet relative is thought to be *Heterostemon* which is native to the upper Amazon region.

Where does tamarind grow? - today, tamarind grows widely in most tropical/subtropical regions of the world. It is thought to have originated in tropical East Africa, from where it was carried by seafaring Arabian traders to Asia and Southeast Asia. From here it is thought to have made the trip over the Atlantic to the American continent where it is grown widely in parts of Central and South America. Tamarind is well adapted to semi-arid tropical conditions, it also grows well in many humid tropical areas with seasonally high rainfall. It grows in well drained, slightly acidic soils and although it cannot withstand stagnant inundation, it can tolerate a wide range of physical site characteristics. Regardless of total annual rainfall, tamarind produces more fruit when subjected to a fairly long annual dry period. The tree has a deep and extensive root system, which allows it to withstand violent typhoons and cyclones. Young trees are susceptible to frost but the mature trees can withstand temperatures of -3°C without serious injury. Tamarind is grown commercially in plantations and homestead gardens for its produce, and along avenues as an ornamental in towns and cities.



Why should you grow tamarind? - the tamarind tree can produce an annual fruit yield in the range of 150-500 kg/tree, it is easy and cheap to cultivate and free of any serious pests and diseases. It is generally left to grow until it dies naturally, as the timber does not fetch as good a price as the fruit in the market place. Tamarind is therefore a sustainable resource with positive environmental benefits. The tree provides perennial cover thus protecting the soil and aiding in the storage and recycling of plant nutrients and organic matter.

Tamarind has many uses and is available when other food supplies are low during the winter and spring. It is most well known for its fruits which have a low water content and one of the highest levels of protein and carbohydrate of any fruit. The pulp is high in potassium, phosphorus and calcium, it also contains iron and a good source of the vitamins thiamin and niacin. The leaves contain vitamin C and beta carotene and the seed protein has a highly favourable amino acid content. Tamarind could therefore contribute significantly to the nutrition of low income rural households, especially children.



Economics of tamarind - tamarind is an economically important species. There are 2 main varieties, sweet and sour, though the genetic diversity in Asia and Africa is high with varying fruit and flower colours and sugar/acid ratio in the fruits. The sweet tamarind is produced mainly in Thailand where it is grown on a commercial scale and is exported both in the fresh and processed form. Approximately 140,000 tons of tamarind is produced annually in Thailand. India is also a major producer of tamarind, where it is

collected and marketed mainly by the rural communities. Both sweet and sour types are grown in India, though the sour type is by far the more commercial variety and total tamarind production is thought to exceed 300,000 tons annually. India exports tamarind products to Pakistan, Arab countries, Europe and North America. Other Asian countries also produce and export tamarind, but on a much smaller scale. In the Americas, Costa Rica has become quite a large producer of tamarind with production of 220 tons annually, other American countries such as Mexico (37 tons) and Puerto Rico (23 tons), produce much smaller quantities. Export is mainly to North America and Europe. Most of the producing countries do not grow tamarind on a commercial scale and fruits are collected from trees that grow in the wild and in home gardens. Tamarind trade has expanded over the last decade and is continuing to do so.

How do you grow tamarind? - tamarind can be grown from seed and vegetative propagation. It is easily and usually grown from seed, however there is often variation in the offspring due to cross pollination. Seeds usually germinate within a week and can retain their viability for several months provided they are kept dry. Seeds should be planted approximately 1 cm deep in containers of sandy/loam soil. Fruits should be selected from trees with good production and quality, and the seeds should be extracted and cleaned in water. When planted out, young trees require adequate soil moisture to become well established, but mature trees can withstand drought quite well. The fruits mature in late spring to early summer and may persist on the tree for several months. Ripe fruits, however, are readily attacked by beetles and fungi in humid climates, they should therefore be harvested and stored under refrigeration. The trees will bear fruit in 6-8 years.

Due to the unreliable nature of the offspring from seed propagation, tamarind may also be propagated by stem cuttings, this method is relatively cheap and easy. Soft wood stem cuttings must be used and plant growth hormones are required for rooting to take place. Veneer grafting, shield budding and air layering can also be used successfully to propagate desirable selections, these trees will usually bear fruit within 3-4 years. Grafting methods however tend to be time consuming and expensive.

What are the uses of tamarind? - tamarind is best known for its fruits. The sticky pulp is often eaten fresh but has many other culinary uses for example in pickles, jams, candy, juice and drinks. The pulp can also be used, when mixed with salt, to polish brass, copper and silver, it can be used as a fixative with turmeric and annatto dyes and also serves to coagulate rubber. Extracts from the fruit pulp have shown some molluscicidal activity and has been reported to have potent fungicidal and bactericidal properties. Extracts from the plant also have an inhibitory effect on plant viruses. The leaves and foliage of tamarind can be used as forage for cattle and the timber, though very hard, can be used to make furniture and tools. Tamarind fruit and leaves are reputed to have medicinal properties and have been used in the past for complaints such as intestinal ailments and skin infections. The American pharmaceutical industry processes 100 tons of tamarind pulp annually and it is a common ingredient in cardiac and blood sugar reducing medicines. Tamarind seed kernel powder (TKP) is a major industrial product, which is used in the sizing of textile, paper and jute. A substance known as "jellose" can be also be extracted from the seed, this is a polysaccharide with gel forming characteristics, it has both food and industrial applications. The seed and its extracts can be used in the food processing industry, as an adhesive in the plywood industry and in the tanning industry due to the high tannin content in the seed testa.

Further Reading

Coronel, R. E. (1991) *Tamarindus indica* L. In Plant Resources of South East Asia, Wageningen; Pudoc. No. 2. Edible Fruits and Nuts. Eds. E.W.M. Verheij and R.E. Coronel, PROSEA Foundation, Bogor, Indonesia: 298 - 301.

Gunasena, H. P. M. & Hughes, A. (2000) Tamarind. International Centre for Underutilized Crops, Southampton, UK

Gunasena, H. P. M. (2000) Tamarind Extension Manual. International Centre for Underutilized Crops, Southampton, UK

Relwani, L. L. (1993) Tamarind: A multipurpose tree for diverse environments. The Bharathia Agricultural and Industrial Foundation Journal, 13(2): 2.

Vinning, G. & Moody, T. (1997) A market compendium of tropical fruits. Rural Industries Research and Development Corporation. Canberra, Australia: 258 - 266.

Prepared and Published by the **International Centre for Underutilized Crops**, Institute of Irrigation and Development Studies, University of Southampton, Southampton, SO17 1BJ, UK. Tel: +44 (0)2380 594229 Fax: +44 (0)2380 677519 Email: A.Hughes@soton.ac.uk Website: http://www.soton.ac.uk/~icuc

This publication is an output from a research project funded by the United Kingdom Department of International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID [R7187 Forestry Research Programme].