Fruit growing in the tropics

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The previous editions of this Agrodok, published in 1992 and 1999, gave a general introduction into fruit growing in the tropics and described 8 major crops. Working on this revision, the general introduction quickly filled the entire Agrodok! And if the major fruit crops are to be dealt with anew, each crop will no doubt require an Agrodok of its own. In fact it may be better to publish regional crop manuals, rather than trying to cram information for various parts of the tropics into a single booklet.

The aim of this revised text is to foster your interest in and understanding of fruit growing. Traditional knowledge has been combined with insights gained through research work. No recipes are given for growing specific fruit crops. The contents are directed at home gardeners, growers who depend for (part of) their income on the sale of fruit, extension workers and others who support gardeners and growers.

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1 Introduction

1.1 No flowers, no fruit

So you are interested in growing fruit! Perhaps you already grow fruit in a home garden or in an orchard, or you intend to do so. This Agrodok is written to make you feel at home amidst the different fruits crops you see around you. More than 60 fruits are mentioned in the text. The Index at the end lists the botanical names and the pages on which you can find more information about these fruits. There is also an Appendix with particulars about the flowers (in connection with pollination), the fruit, the seed and the common methods of propagation.

No flowers, no fruits! Scanty flowering is the main reason for disappointing crops in the tropics. Hence the flowering habit of a fruit crop is extremely important. Flowering habit is linked with tree habit, as explained in Chapter 3. A few very common fruit crops – pineapple, banana, papaya, (also palms) – have the growth habit of a single large shoot. These fruits as a rule flower and fruit well if they grow well. So they respond to the common measures to stimulate growth – watering, manuring, crop protection – that every farmer knows about. But the large majority of the fruit crops branch freely issuing hundreds or thousands of shoots. Each of these trees branches in its own typical way. These freely branching trees get the most attention in this Agrodok, because they are the problem crops that often flower poorly.

The main reason for scanty flowering is simple: the tree ‘forgets’ to form floral buds because it is too busy making new shoots. In fact most branched fruit crops require a period of stress – in the form of a cold or dry season – to put a stop to shoot growth in favour of laying down floral buds. And if the natural stress is inadequate – as is the case in large parts of the tropics for many fruit crops in most years, you will need to check shoot growth yourself. In such tree crops, therefore, measures to limit shoot growth and measures to stimulate growth should be alternated according to the seasons. Thus the grower
of these fruits needs special skills and has to apply them at the right time. The aim is to achieve a better *BALANCE* between vegetative growth and reproductive growth (the course of events from the initiation of floral buds to ripening of the fruit). This is the subject of Chapter 6.

Pruning, discussed in Chapter 5, is one of the skills employed in branching trees. But in the tropics the results of pruning are all too often negative. The main reason is that pruning leads to compensatory regrowth, which sets back the formation of floral buds. Thus pruning is important mainly when trees flower and fruit abundantly, so that shoot growth needs to be stimulated rather than flowering.

Without flowers no fruit. But also: without pollination no fruit set! There are exceptions to this rule, but flowers generally need to be pollinated, preferably by cross-pollination, to set fruit. Fruit crops differ greatly in the types of flowers they bear and in the way pollination and fruit set is effected. This important subject is dealt with in Chapter 7.

### 1.2 Importance of trees and fruits

**Big trees and small trees**

Trees are the natural vegetation in large parts of the tropics, in particular, in humid regions. The importance of trees stems partly from their large size and perennial character. Trees shape the landscape and frame buildings; they cast their shade over man and beast. They protect the soil against the hot sun, heavy rain and strong winds, especially during seasons when there are no annual crops in the fields. The roots explore deep soil layers, recycling water and nutrients that cannot be reached by the roots of field crops. In these ways, trees ameliorate their immediate environment.

There is increasing evidence that trees protect and exploit the environment more effectively than annuals. Evergreen trees have the advantage over seasonal crop plants in that the canopy of leaves is present throughout the year. Agrodok 16: Agroforestry, explains the role
of trees in more detail, both in the environment and in the farming sys-

As a fruit grower you harvest fruit, not leaves and wood. Unfortu-
nately, the so-called ‘harvest index’ – that is the share of fruit in the
total amount of organic matter produced – is often quite low, espe-
cially for most freely branching fruit trees. The tomatoes, eggplants,
cucurbits, etc. of the vegetable grower may not exploit the environ-
ment nearly as well as the tree fruits, but they yield many more tons of
fruit per ha than most trees. Perhaps you should grow vegetables...

People think it natural that trees grow to a large size, but in fact trees
grow big because poor flowering and fruiting leave enough energy for
ever more shoots to grow. As a fruit grower your aim should be to
produce fruit with a minimum of wood! If you could make a tree bear
a full crop – in relation to its size – each year, starting within a few
years from planting, it would never grow big. Imagine a mature
mango tree the size of a coffee bush: think of the ease of pruning, crop
protection, selective harvesting... For the fruit grower SMALL IS
BEAUTIFUL. This is the conclusion of Chapter 2, in which the differ-
ten cropping systems for fruit are compared.

Cloning is the first step towards control over tree size, as explained in
Chapter 4: Propagation. In Chapter 9, Harvesting, it is argued that
large tree size and top quality fruit do not go together: harvesting each
fruit when it is at its best is impossible and avoiding blemishes is dif-
ficult.

Who eats fruit and why?
In Africa fruit is often considered as ‘food for the birds’ (Swa-
hili:”chakula cha ndege”’) and it is left to children to compete with the
birds; a man – it is said – should drink beer. In Central and South
America, people are usually more fruitminded. Asians generally have
a great appreciation of fruits.
The regard for fruit appears to be related to the propagation methods. Until recently fruit trees in Africa were commonly raised from seed; hence there were no named varieties or cultivars (banana being an important exception). Asia, on the other hand, is the area of origin of several important cloning methods, enabling growers to propagate superior varieties. Appreciation of the distinct taste of each variety developed through the ages. Home gardens flourish, people are familiar with home preservation and cooking methods, and aware of the health benefits traditionally attributed to each fruit. But for all that most people in Asia must make do with far less fruit than they would like to eat.

1.3 Reasons NOT to grow fruit

This booklet is meant to put across new ideas to gardeners, growers and extension workers. The intention, of course, is to encourage you to grow fruit. Nevertheless it is only fair to briefly list reasons not to grow fruit as well, even though you have probably thought of these reasons yourself.

No doubt you took into account that it takes years before you can harvest the first crop. And when the trees come into bearing they may fail to flower, or to set fruit, or that the fruit may drop prematurely. But, supposing the trees are doing fine: have you considered the risk of fire scorching your trees? And what about pilferage, birds, bats and rats eating the fruit, not to say anything about losses due to other pests and diseases?

The fruit grower faces a lot of uncertainty in producing a crop and, if there is a good crop to be picked, there is still the uncertainty of the market. There is truth in the saying that producing a fruit crop is the lesser half of the problem, post-harvest handling and marketing representing the larger half...

Hopefully you have given proper thought to all these risks, problems and possible setbacks, because this Agrodok cannot do it for you! For
one thing, the contents are limited to fruit production. Some aspects, such as out-of-season production, are related to marketing, but marketing as such is not dealt with. Local markets and customary arrangements with middlemen vary so much and the market situation changes so rapidly when the production of a new fruit increases, that marketing advice should be based on local conditions.

In Chapter 8 the principles of controlling pests and diseases are discussed with some examples. Finally, if you have considered all the above objections and still are about to plant fruit trees, you will find recommendations in Chapter 10: Layout and establishment of the orchard.