1. INTRODUCTION

WHAT IS APICULTURE?

Apis is Latin for bee, and apiculture is the science and practice of bee keeping. The words 'apiculture' and 'beekeeping' tend to be applied loosely and used synonymously: in some parts of the world, significant volumes of honey are today still obtained by plundering wild colonies of bees – this 'honey hunting' cannot be properly described as 'beekeeping'. Honey hunting still remains an important part of many rural livelihoods and falls within the remit of apiculture, and this book. In some parts of the world apiculture forms part of the work of hunter-gatherers, while elsewhere apiculture is practised by highly industrialised agriculturalists in the world's richest nations.

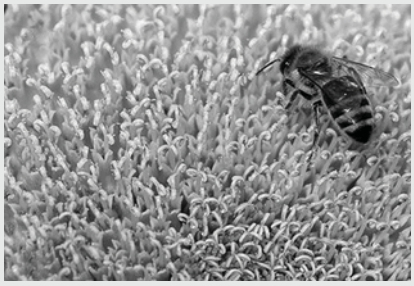
The product that most people first associate with bees is honey, although beekeeping generates much more than just honey. The maintenance of biodiversity and pollination of crops are the most valuable services provided by bees. Honey is just one of several different products that can be harvested: others are beeswax, pollen and propolis, royal jelly and venom, and the use of bees in apitherapy, which is medicine using bee products. It is still possible to harvest high quality, excellent products from bees using simple equipment and techniques, building on the traditions held in almost every society.

BOX 1
Services rendered by bees

The maintenance of biodiversity by the pollination of flowering plants
The pollination of crops
Apitherapy – medicine using bees' products

Products harvested from bees

Honey
Beeswax
Pollen
Propolis
Royal jelly and venom



This book aims to provide the information that people working in rural areas of developing countries need to maximise the benefit they can gain from bees. There is no standard text on apicultural methods that is useful for every situation. This is because there is no standard, globally applicable apicultural method. Today, there is still great diversity of apicultural practices throughout the world, although most industrialised countries use standard styles of frame hives for keeping European races of honeybee. The resources available, and the reasons why people want apiculture, vary tremendously from place to place. Apiculture is diverse, varying greatly in the way it is practised from one region to another: in Africa, the Middle East and Asia, bees are often kept inside the walls of people's homes (and are often not noticed by visitors); while in India, over 50 percent of honey is still harvested from wild-nesting bees. People practise apiculture not only in different ways, but also for different reasons: some farmers want to have bees to ensure that crops such as fruit, oil seeds and coffee are pollinated adequately; others keep bees to harvest honey and wax; some farmers keep stingless bees for their honey, which is especially valued for medicinal properties. Recently there was a report from Laikipia Plateau in Kenya of bees being used as a 'living fence' to keep elephants away from smallholdings (Vollrath and Douglas-Hamilton, 2002).

Honey hunting and beekeeping, i.e. keeping bees inside man-made hives and harvesting honey from them, has been practised by humans for at least 4500 years - so human societies have long been aware of the worthwhile benefits to be gained from bees. These benefits include the pollination of plants, harvests of honey and beeswax, as well as a number of other useful products.

Today, apiculture plays a valuable part in rural livelihoods worldwide, and this book aims to provide an insight into the many ways in which bees and beekeeping contribute to these livelihoods, and how to strengthen this contribution. While the rationale for the sustainable use of tree resources is widely appreciated, by contrast the sustainable use of bee resources is poorly promoted and appreciated. Rural people in every developing country are keeping bees or harvesting from them in one way or another. This book aims to help ensure that these people gain the most from these activities.

AREAS FOR APICULTURE

Bees and beekeeping contribute to peoples' livelihoods in almost every country on earth. Honey, and the other products obtained from bees have long been known by every society: perhaps it is only Inuit societies that have evolved without the possibility – in arctic conditions – to exploit bees for sweet honey and other products. The bees being exploited vary between regions, and beekeepers operate under varying conditions and with widely differing resources available to them. This great diversity in bees, and in beekeeping practices, explains why there is little beekeeping literature that is widely applicable. For example, the beekeeping practised in temperate climate Europe is very different from the beekeeping of tropical Africa – even though the honeybee is of the same species – *Apis mellifera* – and looks similar: in fact, their biology and behaviour differ significantly.

RESOURCES NEEDED

Some of the many variables that must be considered for apiculture are:

TABLE 1
Resources needed for apiculture

Natural resources	
Bees	The different species of bees exploited in apiculture are described in Chapter 2.
Plant resources	Types of forage good for apiculture are described in Chapter 7. The value of bees in pollination is described in Chapter 8.
Other natural resources	Chapters 3 and 7 discuss environmental reason for promoting apiculture.
Human resources	
Existing apicultural skills	Honey hunting and beekeeping methods are described in Chapter 5 and 6.
The value placed on different types of bee products	For example, some societies value honey from one type of bee more than honey from another: this is discussed in Chapter 9. Beeswax is described in Chapter 10, and other products in Chapter 11.
Apitherapy	Some societies place great importance on apitherapy: see Chapter 12.
Knowledge of the manufacture and use of secondary products	Different societies value different bee products and goods made from them: see Chapter 13.
Skills in packaging and marketing	Described in Chapters 9, 10, 11, 13 and 14.
Social resources	
Assistance available from families, friends, networks	This can determine the type of beekeeping feasible, see Chapter 4.
Membership of groups	Honey hunters and beekeepers benefit greatly by being organised into groups for marketing: this is described in Chapter 14.
Access to a wider society, market information, research findings	Global changes in the honeybee disease situation and changes in world trade can now affect beekeepers everywhere, who need access to up to date information. Chapters 9 and 15.
Physical resources	
Tools, equipment, buildings	Chapter 5 discuss the merits and relative costs of different equipment types, and the physical infrastructure need for beekeeping.
Transport, roads	These factors can determine market access: Chapter 14.
Financial resources	
Finance to purchase equipment, and access to credit to enable groups to buy honey from beekeepers	Chapter 5 describes equipment options and Chapter 14 discusses the need for credit for marketing purposes. Chapter 16 outlines potential sources of support.

BEEKEEPING AND FORESTRY

Forests provide excellent resources for bees and beekeeping, and bees are a vital part of forest ecosystems. Indigenous bee species are natural forest resources, and beekeeping enables their exploitation by humans for valuable products, without necessarily damaging the honeybee populations, or extracting anything except the products, honey and beeswax. This is also the case where exotic honeybee species have been introduced, for example in the tropical forests of South America, now home to large populations of African honeybees.

People living in or near tropical forests and woodlands are amongst the poorest in the world, often depending on shifting cultivation for their food, and local wood as their fuel source. These people will be the first to feel the consequences of deforestation: soil and water degradation, low agricultural productivity, wood fuel shortage and flooding. To conserve forests, local people must be assured of sources of food and income that are sustainable without being environmentally damaging. Beekeeping fits this category so perfectly: using locally available, renewable resources, forest beekeeping is an environmentally sound activity, yet one that enables forest – dwelling people to harvest products that can be of world quality.

In working to retain natural environments, it is widely understood that habitats cannot be protected without the interest and involvement of local people. Beekeeping offers a good way for people to create income from natural resources without damaging them. In fact, beekeeping contributes to the maintenance of biodiversity by pollination. When beekeepers are supported and have access to good markets for their products, they are motivated to support local conservation efforts.

Bees and trees are interdependent, and have been perfecting their relationship for over 50 million years. Bees are a fantastic world resource: they are essential for sustaining our environment because they pollinate flowering plants. Bees also sustain our agriculture by pollinating crops and thereby increasing yields of seeds and fruits, and they provide us with honey, beeswax and other products – valuable sources of food and income.

Trees do not just need bees for their own reproduction, but for the whole system within which the trees exist. The more species of fruit and seed generating within a system, the greater its biodiversity and the greater its life-carrying and life-enhancing capacity.

ASSETS CREATED BY APICULTURE

While products from bees such as honey and beeswax are well known, the main service provided by bees – pollination – remains poorly appreciated and underestimated in most countries. In the USA, scientists have attempted to measure the value of increased yield and quality of crops achieved by honeybee pollination: during the year 2000 in the USA, this was estimated at US$14.6 billion (Morse and Calderone, 2000). In June 2002, data was published about the beneficial effect of honeybees for coffee pollination: in Panama, coffee bean production is increased by 50 percent (Roubik, 2002). Yet we do not have data proving the benefit of honeybees for the pollination of many tropical crops, and it is impossible to put financial value on the effect of honeybee pollination of indigenous plants, and this important contribution to the maintenance of biodiversity. Other assets created by apiculture such as honey and beeswax are far more tangible, but their value must be far less than the wealth created as a result of optimal pollination of plants.

BOX 2

Ten excellent reasons for beekeeping

1 Pollination

Bees pollinate flowering plants and thereby maintain the ecosystem.

Bees pollinate cultivated crops.

2 Honey

People everywhere know and like honey, a valuable food and income source.

3 Beeswax and other products

Beeswax, propolis, pollen and royal jelly. These products have many uses, and can be used to create income.

4 Few resources are needed

Beekeeping is feasible even for people with minimal resources.

Bees are obtained from the wild.

Equipment can be made locally.

Bees do not need the beekeeper to feed them.

5 Land ownership not essential

Hives can be placed anywhere convenient, and so beekeeping does not use up valuable land.

Bees collect nectar and pollen wherever they can find it, so wild, cultivated and wasteland areas all have value for beekeeping.

6 Nectar and pollen are otherwise not harvested

Nectar and pollen are not used by other livestock: only bees harvest these resources, so there is no competition with other crops.

Without bees these valuable resources could not be harvested.

7 Different sectors and trades benefit from a strong beekeeping industry

Other local traders benefit by making hives and equipment, and from using and selling the products.

8 Beekeeping encourages ecological awareness

Beekeepers have a financial reason to conserve the environment: ensuring that flowers are available and bees are protected.

9 Everybody can be a beekeeper

Bees can be kept by people of all ages.

Bees do not need daily care and beekeeping can be done when other work allows.

10 Beekeeping is benign

Beekeeping generates income without destroying habitat.

Encouraging beekeeping encourages the maintenance of biodiversity.