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**"Competition for Resources in a Changing World:
New Drive for Rural Development"**

Overview of Traditional Beekeeping in Sudan

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Introduction

Agriculture is the most important sector in the Sudanese economy, in terms of its contribution to Gross Domestic Product (GDP). It accounted for 40% of GDP in 2006 (16). Main agricultural crops are cotton, peanuts, sorghum, barley, sesame, wheat and gum Arabic produced from *Acacia senegal* trees.

Moreover, traditional beekeeping as a type of land use activity offers a great potential for socio-economic development of residents and thus, plays regionally an important role in Sudan. There are thousands of beekeepers in Sudan (13). Beekeeping can provide valuable food and medicine for local resident. Moreover, honey and beeswax are important cash crops offered on local markets. Thus, beekeeping gives local people an economic incentive for the protection of natural habitats such as forests and therefore it is an ideal activity in any forest conservation program.

Beekeeping is a family activity which has a plenty of advantages compared to other types of agriculture: it needs a relatively small investment and depends on little land without specific demands on the quality of the land. It is a flexible activity for both sexes of any age. Beekeeping can be carried out as a productive secondary activity with low-level technology, or as a primary undertaking with more complicated techniques. In addition beekeeping does not compete for resources with other types of agriculture - the nectar and pollen of plants are a true bonus (5).

Distribution of honey bees

Worldwide, there are perhaps 20,000 species of bees, of which 500 are social bees mostly in the family Apidae. In sub-saharan Africa, there are over 3,000 species of bees, many being endemic. Most important among the African Apidae are the stinging (*Apis*) and stingless honey bees (*Trigona*). Within the genus *Apis*, *A. mellifera* is the most useful species, and is therefore known best by scientific studies on several aspects (4). The honey bee, *Apis mellifera* L., occurs naturally in Europe, the Middle East and Africa, which is the largest area where *Apis mellifera* original lived. This diverse range of habitats has required adaptation to a variety of ecological and climatic conditions and historical separation has caused the evolution of over 24 named sub-species. On the basis of morphology, these subspecies have been grouped into four distinct evolutionary branches, namely the African, the western and northern European, the southeastern European, as well as the Middle Eastern. Molecular analyses have broadly supported this

classification. Some of the most commonly referred African races of honeybees (*Apis mellifera*) which have been identified, including aspects of their behaviour are *Apis mellifera intermissa*, *Apis mellifera lamarckii* (Egyptian bees found in North East Africa primarily in Egypt and the Sudan along the Nile Valley), *Apis mellifera scutellata*, *Apis mellifera adansonii*, *Apis mellifera monticola* and *Apis mellifera capensis* (6). The borderlines between the different races are not well known (2).

The distribution of honey bees in Sudan depends on environmental conditions. Northern Sudan is desert, and indigenous honeybees do not exist north of Khartoum. In South, rainfall increases, and so does vegetation through savannah until finally the lush rain-forest near Sudan southern boundaries. Along the two Niles in Sudan honeybees (*Apis mellifera*) occur rarely north of Ed Dueim and Wad Medani. At Kosti, they are compelled to utilise densely foliaged mango trees and build combs on horizontal branches.

The little bee (*Apis florea*) of the Middle East was first recorded in Sudan in 1987 in Khartoum, where it utilises thick shady trees and shrubs for building its small single multiuse comb. Although placid, it is not very adaptable to apicultural practices. The honey is not easy to harvest without detaching the entire comb and thereby destroying the swarm, so it is of limited commercial significance.

The native Khartoum bee was more aggressive than the Carniolan race, Blue Nile bees and hybrid colonies. Migration, swarming and supersedure of the native honeybees was quite noticeable (13).

Relevance of honey bees for mankind and ecosystems

Apis mellifera is the source for honey, beeswax, and a variety of other health and nutritional products. Honeybee and its products such as honey, pollen, royal jelly, propolis, beeswax, bee bread and venom offer outstanding therapeutic potential for many debilitating human diseases including cancer, tuberculosis, mental illness, HIV/AIDS, Parkinson's disease, hypertension and other cardiovascular disorders. No wonder apitherapy is a fast emerging science to alleviate human sufferings through medical applications of bee products for disease prevention and cure. Worldwide, the efficacy of bee products against many diseases and ill-health conditions has been scientifically validated. In effect, honeybees improve the health and nutritional status of man as well as ensuring global economic growth because health is wealth and a concrete input into economic development. As important as these products are, their value pales in comparison to the value of honey bees as crop pollinators (3).These tiny noble insects are also indicators of world biodiversity and environmental quality. For instance, as pollinators, honeybees help to perpetuate plant species and other genetic resources, which are vital components of biodiversity (7).

Beekeeping Practices

The tradition of beekeeping in Africa dates back almost 5000 years when beehives were first used for producing honey in ancient Egypt. During the course of time it has spread from Egypt to the Middle East, throughout the Mediterranean and south into tropical Africa (1).

In tropical Africa, beekeeping practices vary only slightly across the continent, based on good knowledge of botany and ecology, that makes beekeeping possible under very complex circumstances. In the region as a whole, local honeybee races exploit scattered resources by moving from area to area. This means that some hives remain empty for parts of the year

especially under adverse weather conditions. African races of honeybees also have a high rate of swarm production (15).

A beehive is any container provided for honey bees to nest in. The idea is to encourage the bees to build their nest in such a way that it is easy for the beekeeper to manage and exploit them (13). Emin pasha gives an early description of the use of bark hives when coming across them among the Dinka of east Sudan in 1888. Traditional hives are made from whatever materials available locally: e.g. logs, bark, clay, grass, or cane. Traditional beekeeping includes clay pots, cylindrical log hives, bark hives , grasses woven into mats and rolled up, leaves of the doum palm "tangels". In Sudan a beehive was designed for usage by natives of the Southern parts of the country, by developing the so called Khartoum and Omdurman hives (13). Modern low-technology hives like Kenya tops bar hives, Omdurman clay hives, Gufa basket hives and modern hives are used in Sudan (15), while in Uganda beehives are traditionally constructed from timber, bamboo boruss palms or woven from forest climbers (9). Moreover, in Zambia beehives are made by stripping bark off a living tree. The cylindrical hives are about 120 cm long and about 30 cm in diameter. The joint along the length of the hive is secured with seasoned hardwood pegs. The ends are then closed either by circular plaited grass doors made of fine thatching grass, or by another piece of bark. The hives are then left to dry for two months before being hung in trees (8).

Promotion of Beekeeping in Sudan

One NGO was active in the Kosti area between 1986 - 88 with a beekeeping project, imparting knowledge to several Sudanese beekeepers about improving their beehives. The Beekeeping Development Unit (BDU), and the Baraka Agricultural College-Kenya was recently linked up with the New Sudan Honey Producers Association (NSHPA) in Maridi, South Sudan for the supply of top quality wild forest honey. NSHPA was formed in 1999 and has many honey producers registered as members. It aims to facilitate economic development by promoting small business and supports community groups to implement sustainable economic rehabilitation projects. NSHPA was established due to the enormous beekeeping potential of the lush rainforest in Western Equatoria. The Association is helping local people to generate income and has established several honey collection centers to facilitate bulking of honey for marketing. All members are trained on proper harvesting and handling of honey. Honey buckets are provided by the association to hold the newly harvested white sealed honey combs. No further processing of the honey is carried out until it reaches the BDU at Molo Kenya where the honey is packed for sale. This honey will soon be certified as totally organic, as no chemical fertilizers or pesticide sprays are used in the Maridi beekeeping area (12).

On the other hand a project for refugees of Southern Sudan was conducted in an area with good vegetation. They encouraged to plant trees. A beekeeping project was conducted in Kubbum, the main centre of honey production in West Sudan, in 1986. Traditional beekeeping has long been practised here, where *Acacia* and other melliferous trees are found. With the increase of desertification it is evident that hives must be prepared so that available timber can be used economically. To promote education of beekeeping, 1600 farmers were trained with the aim to construct low-technology beehives. A number of projects were conducted in North and South Sudan.

Finally, modern apiary was established as a subject at the Faculty of Agriculture at the University of Khartoum, where the Sudan National Council for Research and the "Near East Foundation", jointly co-sponsored the training and research programs (13). These 3 institutions

formed the "National Beekeeping Project" (NBP). In 1987, a group of apiculturists and agriculturists formed the “Sudan - Bee and Agriculture Voluntary Association". In 1987, a project was started in Kosti area for the small-scale farmers and honey hunters of the White Nile Agricultural Schemes. Most of people have accepted the project (14).

Threats of honey bees

There are many threats for honeybees. Population growth and destruction of natural forests, which deliver food and shelter for bees, are the most important. Mostly, the natural vegetation cover is burnt to make rice fields. Spraying with pesticides can be dangerous for man and bees. In many developmental projects the use of insecticides has been recommended without warning about the risk for the pollinating insects (2). In Sudan spray programs along the Nile for tree locusts or desert locusts within a range of 2 - 3 km from apiaries have to be based on the use of insecticides that are relatively non-toxic to bees. In most of the gum belt though, bees are either not present or are too infrequent to require special precautions.

Beekeeping in Sudan has not been practised on a highly developed level with conservation and optimum yields in the view. Most of the honey is gathered from wild swarms located in hollow trees, using traditional destructive methods. Thus, bees are threatened by the mode of collecting honey in the wild. It is frequently combined with the use of fire, smoke, non-target chemicals and felling of trees. Thus, the colony is killed to harvest honey and wax. Under the traditional system of collecting honey from wild colonies, fire was set to the tree containing the honeycomb to drive out the bees before harvesting was done (10). If fire has been used to kill the bees, it lasts long before another bee colony settles at the same place. If a bee colony is killed by insecticide to harvest the honey and the wax, both products might be poisonous to the consumer (2). If the combs containing honey and brood (larval and pupal stages) are taken left bees are doomed due to the loss of honey stores and brood. Honey hunters usually regret having to kill the colony, but they know no other way to obtain honey or wax. Wild bee colonies are common in many regions of the world. Harvesting of honey from wild bee colonies has been practiced in West Africa for many years. The gathering of honey from these colonies is an occasional activity for many local farmers. This often occurs when trees containing bee colonies are felled during the clearing of forest and bush for planting crops (5).

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