Integration and Validation of Sericulture and Apiculture Technologies in the NENA Region for the Rural Poor

Proceedings

of the
IDB/IFAD International Workshop on
Promotion of Income Generating Activities in the NENA Region
Based on Sericulture and Apiculture Technologies

9–10 July 2006, Cairo, Egypt

Sponsored by:
International Fund for Agricultural Development (IFAD), Rome, Italy
Islamic Development Bank (IDB), Jeddah, Saudi Arabia
icipe – African Insect Science for Food and Health, Nairobi, Kenya

Editors: S. K. Raina and E. N. Kioko

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Maps and Illustrations by Sospeter Makau and Irene Ogendo

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We are grateful to the International Fund for Agricultural Development (IFAD), for the timely financial support for Phase III of the project to enable *icipe* organise this workshop for co-financing by IDB and OPEC Fund for NENA region member states to organise and conduct validation trials and develop marketing outlets for smallholders in sericulture and apiculture enterprises. The professional and moral support offered by Prof. Christian Borgemeister, Director General, *icipe*, is gratefully acknowledged. We are indebted to Dr Shantanu Mathur and Dr Vineet Raswant of the technical advisory division, IFAD, for their technical and moral support. We are grateful to Dr Tarek El Reedy, Director Country Operations Department III (IDB) for giving us the opportunity to organise this workshop to complete the full project proposal for possible co-financing. We are indebted to Mr Abderrafia Abdelmouttalib of IDB for his excellent guidance during the workshop. We thank Dr Abbas Kesseba and Dr Mahmoud Abdel Wahed Rafea, the Director General ARC, Plant Protection Department, Ministry of Agriculture, Cairo, Egypt for making all arrangements for the success of this workshop. Last but not least our appreciation goes to the CIP project team and IFAD stakeholders, particularly, Rose Onyango for making this workshop a great success in Cairo.

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PREFACE

Rapid changes in the international development environment are forcing development and implementing agencies to move with the times and to face new challenges. The continuing decline in government-finance and aid flows is a serious challenge to multilateral development institutions such as the Food and Agriculture Organization of the United Nations (FAO) and the *icipe* – African Insect Science for Food and Health, as they are expected to do more with less money. Donors place more emphasis on achieving concrete and perceptible results. As they move gradually, and sometimes haltingly towards more democratic systems, governments in the developing countries are coming under greater pressure to help the poor. This is happening, however, at a time of severe budget constraints and a general shrinking of the public sector, resulting in reduced direct government services in rural areas, such as extension services and rural infrastructure. The worldwide move towards privatisation, market-driven economic outcomes and price liberalisation is also contributing to the changing context in which official development aid must operate. As well, there is an increased emphasis of the link between poverty and environmental degradation. Extreme poverty invariably diminishes the resources available for all and the commitment to combating soil erosion and loss in soil fertility, ultimately degrading the environment and its biodiversity.

With these changes in mind, development agencies are refocusing their policy on rural development. In view of the need to redefine the nature of poverty and how to combat it effectively and stepping up resource mobilisation efforts to reduce poverty, including closer cooperation with the private sector, *icipe* has been in the forefront in showing the way and galvanising energies to alleviate rural poverty and hunger in Africa, including in the NENA region and the Far East, and to rejuvenate, through their participation, the capacities of its clientele, the poor. Together with its networking partners, *icipe* is ensuring the design and implementation of innovative, cost-effective and replicable programmes as income generation options, such as apiculture and sericulture, which have sustainable impact. Through these programmes and many other ongoing programmes, *icipe* can respond to the expectations of the rural poor of Africa.

Since 1999, the last four international workshops on implementation of apiculture and sericulture technologies in Africa, in which more than 30 African countries have participated, have clearly revealed that among the most common problems in implementation of sericulture and apiculture technologies are unclear goals, lack of training to the trainers, lack of infrastructure, lack of managerial autonomy and accountability, and financial difficulties. The potential for improving performance in infrastructure provision and investment in sericulture and apiculture by *icipe* is substantial, as is the quantity of resources devoted to it. Both the need and the broad direction for reform require additional investment. This investment in itself will not avoid inefficiencies, improve maintenance or increase user satisfaction.

Achieving these improvements will require three broad actions:

(i) Involvement of users and other stakeholders in planning, and providing and monitoring apiculture and sericulture infrastructure services.
(ii) Applying commercial principles to sericulture and apiculture infrastructure operations that are ownership driven.
(iii) Encouraging competition from appropriately regulated private sector provider.

The main bottlenecks in the advancement of these actions in sericulture (silk production) and modernisation of apiculture (honey and hive products) in NENA countries are the lack of training infrastructure and the training base. In silk production, it is the lack of appropriate know-how on wild or mulberry silkworms and their egg production, lack of silk cocoons processing (post-harvest) facilities, and training. In the honey and hive products areas, apart from honey and wax, there is fragmented theoretical knowledge on other beehive products such as propolis, royal jelly, bee venom and pollen. These shortcomings are compounded by the lack of silk and honey marketplaces, limited market-outlets and weak market linkages.

It is within this context that *icipe* and IFAD have been requested by IDB to organise this workshop to provide a valuable opportunity for representatives of NENA region governments, NGOs and the private sector, to interact and share experiences to gain skills on the management of commercial insects. The workshop will also design an infrastructure template for the integration of sericulture- and apiculture-based farming systems with regional development operations in Africa. It will also encourage private investment so that the positive impacts on community livelihoods are ensured, commercial profits are maximised and biodiversity and conservation benefits are maintained. It is such challenges that must be addressed in this workshop, among participants from the beneficiary countries and experts from *icipe*, IFAD and IDB. We hope to develop long-term policies, and a full project document for submission to the IDB for possible co-finance, which will ensure sound management of sericulture and apiculture micro-enterprises in the beneficiary countries of the NENA region to meet local peoples' needs, support the economies and promote biodiversity conservation in the region.

Suresh K. Raina
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ACRONYMS AND ABBREVIATIONS

ARC:	Agricultural Research Centre
CIP:	Commercial Insects Programme
CASS:	Community Assistance Strategy Study
CBO:	Community Based Organisation
CSO:	Community Social Organisation
DFO:	District Forest Officer
FA:	Forest Association
FAO:	Food and Agriculture Organization of the United Nations
FD:	Forest Department
GEF:	Global Environment Facility
IDB:	Islamic Development Bank
IDP:	Internally Displaced Persons
IFAD:	International Fund for Agricultural Development
IPM:	Integrated Pest Management
KTB:	Kenya Top Bar (hive)
LDMC:	Least Developed Member Country (of NENA)
M&E:	Monitoring and Evaluation
MIS:	Management Information Systems
NAADS:	National Agricultural Advisory Services
NARIMS:	National Agricultural Research Information Management System
NARS:	National Agricultural Research System
NEF:	North Eastern Frontier
NENA:	Near East and North Africa Region
NGO:	Non-Governmental Organisation
NMK:	National Museums of Kenya
OPEC:	Organisation of Petroleum Exporting Countries
OFID:	OPEC Fund for International Development
PEAP:	Poverty Eradication Action Plan
PFM-ICD:	Participatory Forest Management-Integrated Conservation Development

PMA: Plan for Modernisation of Agriculture

PRSP: Poverty Reduction Strategy Paper

SARDNet: Sericulture, Apiculture Research and Development Network in Africa

SDR: Special Drawing Rights (created by the IMF)

SM: Silkmoth

SME: Small and Medium Scale Enterprises

INTRODUCTION

The Arab world is rich in natural vegetation (nectar sources). Floral and plant diversity abounds in the plains, valleys, forests and mountains. Different *Acacia*, *Commiphora* and *Ziziphus* trees and shrubs are found in Yemen and the Sudan, *Camphor* trees and *Cinchona* in Kuwait, citrus and cotton in Egypt, and Nabk trees in the Tohama and Aseer valleys. Natural resource conservation has long been an important element in many policies and management plans in the Arab countries. There have been achievements in ecosystem restorations but these are far from sufficient in terms of the magnitude of the problem. A key constraint is the poverty and inadequate or even the absence of the local people's involvement in natural resource management. Populations living around these important natural resources in the rural areas seldom have an input in shaping conservation plans and are not encouraged to participate in their implementation, except as hired labourers. Improving natural resource management requires a strategic mix of planned law enforcement and local capacity building that includes community participation based on incentives. These incentives should be based on the diversification of local livelihood options. All of this needs to operate within a supportive and enabling environment at local, district and central levels requiring an investment into policy support and institutional strengthening and awareness raising so as to allow informed decision-making for alleviating poverty.

Rural poverty can be reduced by investment in rural infrastructure and the rural poor have to be enabled to take control of their own destiny. The Sudan, Egypt and Yemen have environmentally conscious government policies that have overhauled their ecologies, with improved management capacity. Both the policy and regulatory frameworks stress the need for collaborative ecosystem management and support for the poor through economic restructuring and introduction of income generating activities such as modern apiculture and sericulture.

The last decade has seen a decline in the capacity for management of ecosystem conservation. However, the political will is now renewed to rebuild capacity, embracing community–government–private sector partnership. Thus, IFAD has financially supported *icipe* to provide a mechanism for improved management of systems that can contribute towards increased income generating opportunities to benefit the rural poor and enhance and strengthen their linkages to production and marketing systems for both local and export outlets. The *icipe* has implemented apiculture and sericulture activities as choices for the communities living around the threatened forests in East Africa and generated incentives for their livelihoods. The *icipe*'s Commercial Insects Programme project has successfully shown a great impact on rural poverty in that region.

The communities across Africa, particularly in the NENA region and the Far East, have been demanding assistance to develop apiculture and sericulture based industries and the related markets, but so far, we have not even scratched the surface due to lack of funding.

In response to *icipe*/IFAD submission of a project concept for funding to the NENA countries, particularly for Yemen, the Sudan and Egypt, IFAD received a

request from Dr Tarek El Reedy, Director, Country Operation Department III of the Islamic Development Bank, Jeddah, Saudi Arabia in March 2006 to organise a workshop in one of the beneficiary countries to come up with a concrete project proposal for possible co-financing.

In this context, IFAD has requested *icipe* to take the lead in organising a workshop and liaise with IDB on finalising the project proposal with the representatives of the beneficiary countries and expert consultants from Africa. The *icipe* organised this workshop in July 2006 at the Plant Protection Research Institute at Cairo, Egypt, which was attended by the representative of the IDB, sericulture and apiculture experts from *icipe*, IFAD project coordinator, and participants from the beneficiary countries. The workshop has paved the way for finalising the project document, which was submitted to the IDB in early 2007 for possible co-finance, so as to be able to launch income-generating projects based on sericulture and apiculture in selected member countries.

The objectives of the workshop were to:

- Provide a forum for setting the collaborative links for improved management systems to contribute towards increased income generating opportunities for the rural poor communities in the Near East and North Africa (NENA) region.
- Measure the strengths and weaknesses of beneficiary countries for enhancing the formation of forward and backward linkages to production and marketing systems for apiculture and sericulture products.
- Discuss the project proposal and the budget submitted by *icipe*/IFAD and develop mechanisms to integrate and validate the technology packages appropriate to various NENA countries.

Based on the above objectives, the workshop was divided into three sessions:

- Session one was chaired by Dr A. Kesseba for the official opening by Prof. Dr Fawzi Naim Mahrouse, former President, Agricultural Research Centre for providing the guidance for setting the collaborative links for improved management systems.
- Session two was chaired by Prof. S. K. Raina, for beneficiary countries' presentations to fulfill the second objective of the workshop.
- Session three was chaired by Mr Abderrafia Abdelmouttalib of IDB for discussing the concept paper and countries' budget for developing a full project proposal.

This workshop has allowed a critical reflection of conservation and income generation strategies and led to recommendations for future research, development and implementation for sericulture and apiculture enterprises in the NENA region. The full project document was presented to IDB in January 2007 and with the approval of OPEC Fund (Appendix D) as co-financer for the same project, a revised budget was submitted to IDB in March 2007.

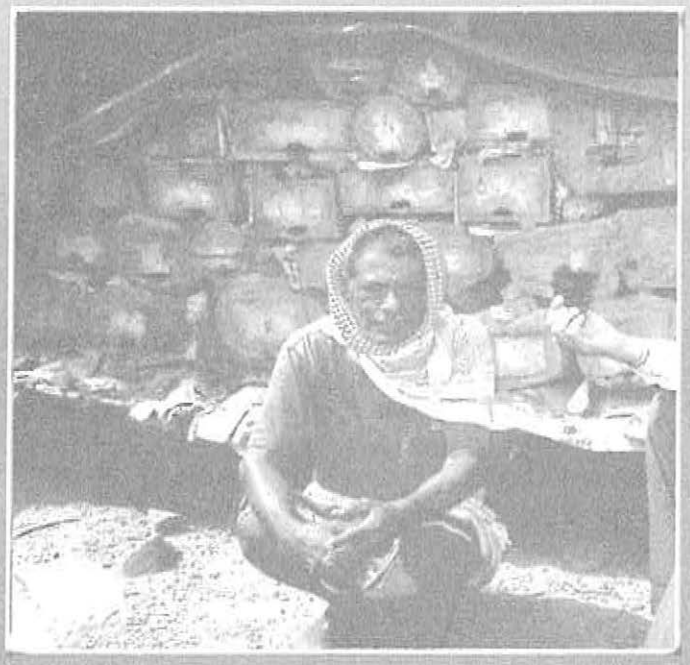
S. K. Raina

SESSION ONE

Official Opening

Chair: Dr A. Kesseba

- Keynote Address by Dr Fawzi Naim Mahrouse, Former President ARC "Setting the Collaborative Links for Improved Management Systems in the NENA Region for the Rural Poor".
- Challenges to Social Development in the Near East and North Africa (NENA) Region—A. Kesseba
- Role of the Commercial Insects Programme—S. K. Raina
- Mandate of the Islamic Development Bank and Project Preparation Guidelines—A. Abdelmouttalib



KEYNOTE ADDRESS

Setting the Collaborative Links for Improved Management Systems in the NENA Region for the Rural Poor

Dr Fawzi Naim Mahrouse
Former President, Agricultural Research Centre (ARC), Egypt

Distinguished Delegates,

It gives me a great pleasure to welcome all of you to this important workshop on behalf of H.E. Mr Amin Abaza, the Minister for Agriculture and Land Reform, who unfortunately, was not able to participate due to other urgent commitments. He stressed, however, the importance he attaches to this regional project that addresses key strategic issues for rural development in the region being, rural income, employment generation particularly for women, and food security. The region is blessed with the fact that sericulture and apiculture were recorded historically in the region since over 6000 years BC as shown on the ancient temples of the pharaohs.

The productivity and the technologies used by the farmers are still below the levels of productivity achieved elsewhere. Therefore, this project is expected to play a key role in bridging the productivity gap and improving the processing technologies.

We are grateful to the Islamic Development Bank, IFAD and *icipe* for co-sponsoring this meeting in Cairo and providing a platform for interactions with the scientists from the Sudan and Yemen. The Agricultural Research Centre of this Ministry, in recognition of the importance of these cultures, has since many years established the Apiculture Research Institute and the Sericulture Research Institute as vehicles for promoting new technologies in this field. Similarly, apiculture and sericulture research infrastructures also exisit within the faculties of agriculture at the 16 universities operating in Egypt. This explains the size of scientific capacity that exists in this country to collaborate with. Similar infrastructure also exists in the Sudan and Yemen. We therefore are keen to get this project started as quickly as possible to be able to mobilise this scientific power within the project framework to realise its objectives and establish the basis for extending the project in future to other countries in the region who share the same environment.

We understand that IFAD has already approved the grant to fund this project, and that IDB will follow suit and that OPEC Fund will also join them to fund this important activity. We hope that in the future other donors will also join to enable the project to extend its coverage to other countries in the region that are in dire need for such support to enhance farmers' productivity and upgrade the processing technologies that can increase the value added products and scale up their production.

Once more, let me express my gratitude for Dr Suresh Riana and his *icipe* team for their restless efforts to promote these technologies for the benefit of the rural populations in our countries. As the Chair of ARC, I can pledge my institution's full support to this project and we look forward to the recommendations that will emerge from your deliberations. Please accept our best wishes for a successful meeting and a pleasant stay in Egypt.

CHALLENGES TO SOCIAL DEVELOPMENT IN THE NEAR EAST AND NORTH AFRICA (NENA) REGION

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Introduction

The NENA region (Figure 1) is characterised by:

- High number of people living below the poverty line
- High number of people who are socially disadvantaged
- 58% of the population is below 25 years
- Agriculture employs 30% of the total labour force
- Only 22% of the land area is suitable for agriculture
- Agriculture GDP does not exceed 14%
- Acute shortage of food and animal feed
- High rate of urbanisation due to the constant flow of the rural population to the urban centres
- The region has the highest levels of unemployment in the world (Figure 2).

Figure 1. Near East and North Africa (NENA) Countries

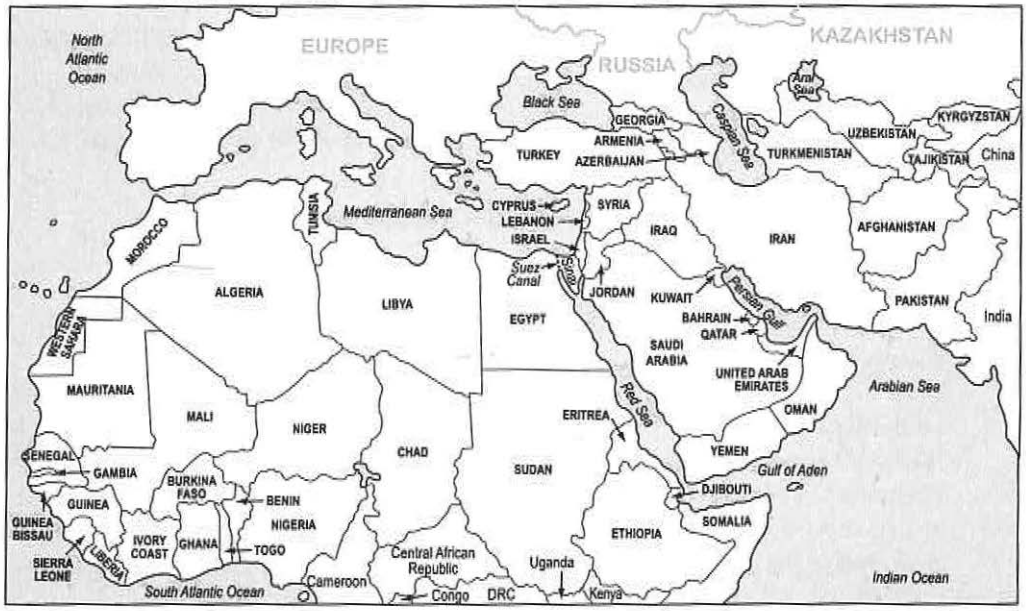
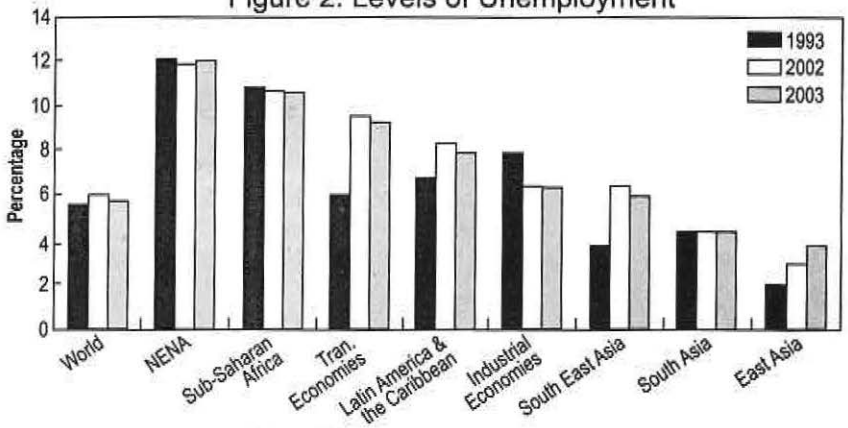


Figure 2. Levels of Unemployment



SOURCE: World Employment Report 2004–2005: Employment Productivity and Poverty Reduction, ILO Dec. 2004

In the NENA region, the main challenges to social development are environmentally related. Other challenges are complex and affect mostly the youth, women and other vulnerable groups. The remaining challenges have been caused by civil and regional conflicts as well as by rapid urbanisation.

Main Challenges

1. **Fragile Ecosystems:**
   - Prevalence of poverty;
   - High population growth;
   - Rural to urban migration;
   - Fresh water scarcity;
   - Land degradation;
   - High rate of illiteracy, especially in the rural areas.

2. **Loss of Agro-biodiversity:**
   - Global warming risks;
   - Weak research infrastructure;
   - Inadequate investment in research;
   - Weak information technology infrastructure and capacity;
   - Poor governance practices;
   - Low level of participation.

Challenges to Inclusiveness

1. **Youth:**
   - Have limited access to quality public education;
   - Very high unemployment rates;
   - Lack of political voice and power;
   - With the exception of a few countries, youth experience a sharper generational cultural divide due to the pace of modernisation, urbanisation, increased literacy and communications.

2. **Women:**
   - Still have high illiteracy rates;
   - Have the lowest labour force participation rates in the world;
   - Lack political participation and voice;
   - Face explicit and implicit social discrimination;
   - Need law enforcement against physical violence.

3. **Other Vulnerable Groups are:**
   - People with disabilities;
   - Children at risk;
   - People with HIV / AIDS;
   - Refugees;
   - Internally displaced groups;
   - Some ethnic minorities and marginalised groups face continued risks of exclusion from governments' development plans.

Challenges to Cohesion

1. **Civil and Regional Conflict:**
   - Up-rooted people from their homes;
   - Social networks created groups of refugees and internally displaced persons (IDP).
2. **Rapid Urbanisation:**
   - Has broken the traditional social bonds of collective action;
   - Has led to unplanned urban development without any social protective institutions;
   - Has left a rural society with a high dependency ratio of elderly, women and very young, that can no longer economically sustain itself, nor maintain social solidarity.

Apiculture/Sericulture for Small and Micro Enterprise Development in the NENA Region, Principally for the Rural Unemployed Youth and Women

What We Need

Capacity Building
- Provide rearing and processing skills.

Transfer of Technology
- Access to financing through social funds and agricultural credit banks for SME establishment.

Associations
- To group these SME producers to enable improved processing techniques, quality control and market access.

Market Networks
- Build a network of associations across the region supported by National Agricultural Research Information Management System (NARIMS) regional project to enhance market and export opportunities, knowledge and information exchange.

Partnership Building

- The challenges in the region are so complex that it requires the joint efforts of all actors in the region including the clients, the regional banks and civil society.
- IFAD is seeking the collaboration of IDB, OPEC Fund and others for the implementation of this important project by the NARS in partnership with *icipe* to help the countries reduce their unemployment rates and increase the incomes of the rural communities.

What We Can Do Together

- Select countries that have expressed interest in promoting commercial insects production to assist in establishing an enabling framework through transfer of improved technologies and capacity building and institutional arrangements;
- Develop a portfolio of specific projects that focus on the key employment generation activities for youth and women, based on careful analysis of the scale, location and severity of the problems and the costs, and opportunities for success;
- Share knowledge and information with clients and CSO and enhance their ability to undertake similar development activities that respond to social change.
- Link with FAO/NARIMS to facilitate the links between partners and support the flow of information and knowledge from the project to the wider community of potential beneficiaries.

ROLE OF THE COMMERCIAL INSECTS PROGRAMME

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Introduction

icipe – African Insect Science for Food and Health was established in April 1970 as a centre of excellence for research in insect science and its application.

It is an intergovernmental organisation and its Charter was signed by 11 countries worldwide. It has 280 staff members that include 35 scientists, 20 visiting scientists and postdoctoral fellows (PDFs), and 30–35 MSc and PhD students in residence at any one time.

The centre is governed by a 14-member international governing council. The centre's mandate includes the protection of biodiversity in Africa and its sustainable utilisation for the development of local communities and small-scale farmers, particularly women groups. The centre seeks to fulfill this mandate by developing technologies to provide additional food sources and increase rural income in Africa. It acts as a nucleus of research that addresses basic problems in the conservation of beneficial insects and their judicial utilisation. Training at *icipe* addresses three major areas: professional scientific training at post-doctoral and post-graduate levels; short-term courses in useful insects and harmful pests management for beekeepers, silk farmers, NARS agriculturists, insect scientists, and technicians; and short training courses for farmer trainers.

The *icipe* has pioneered the development of successful community enterprises around commercial insects farming in East Africa with pilot trials at sites in Kenya (Mwingi, Othoro, Kakamega, Tana River and Taita-Taveta), in Uganda (Hoima and Bushenyi), in Madagascar and in four North African countries (Libya, Tunisia, Algeria and Morocco). The project will be implemented by *icipe* through continuing the ongoing collaboration with the Sudan, Egypt and Yemen forestry departments, ministries of agriculture, IFAD, and Viking Limited and Biop (from the private sector).

The *icipe* Commercial Insects Programme received a prestigious World Bank Finalist Innovation Award in 2002 for the pioneering work on marketplace development through use of commercial insects in rural development and forest area conservation. The *icipe* has established six operational honey and silk marketplaces in East Africa and four quality control laboratories in North Africa through community and government participation, giving communities ownership to control their own businesses and conserve the forests in collaboration with the local governments.

The Pilot Project

The overall objective of the NENA region Pilot Project (in the Sudan, Egypt and Yemen), is to reduce poverty through improved food security and income levels of farmers, especially rural women by promoting more effective use of forest resources and biodiversity through introducing income generating activities using honeybees and silkmoths. The project will also improve management practices for better crop yield through pollination services and will provide honey and silk marketplaces and marketing linkages for the products. This will contribute to the governments' poverty reduction and environmental conservation strategies. The project's immediate objective is to enhance equitable use of forest resources with particular focus on commercial insects' use for income generation and ecosystem conservation. The project covers the protected forests and poverty-stricken semi-arid zones with spiny woodlands of the Sudan, Egypt and Yemen. In these areas, the IDB/IFAD/OPEC grant will support the ongoing IFAD loan projects and assist them in training, marketplace development and capacity building.

The project uses a two-pronged approach to poverty reduction and ecosystem restoration. The first is by addressing the causes and impacts of ecosystem degradation. The second is by minimising the anthropogenic threat by introducing, through capacity building, alternative sources of income through the development of silkmoth and honeybees technologies using minimal forest resources, and by improving agricultural produce through pollination services. To make protection more sustainable in the long term, the local populations are actively involved in the design and implementation of conservation strategies. This participation in planning and management will not necessarily cover the short-term losses incurred. This project aims to achieve protection through utilisation of natural resources and also to achieve protection through exclusion.

While the restrictions on utilisation are of limited duration and are confined to a few forms of utilisation, the ban on utilisation extends to the entire protected area. Both types of approaches require training the local community by NARS and *icipe* to bring changes in behaviour on resource use. Village level organisations ensure that the by-laws and rules are followed and at the same time act as a stimulus for change within the social system. Capacity development is targeted within all the core outputs (1–4) at all levels (community, district, central, forestry). The project will provide local people with needed expertise in community forestry inputs, as well as support initiatives in sericulture and apiculture. The project assists new districts, with little past institutional support and provides support to the partnership process. There is a need for better market information services among local communities living in the rural areas. This project provides that information in a village friendly manner.

The IDB/OPEC and IFAD-financed and *icipe*/NARS implemented activities in the commercial insects areas are focused on improving the income of the poor and their livelihoods, while Governments/NARS and *icipe* will provide in kind support, i. e. capacity building through on-site training on ecosystem

management activities in forest areas within the Sudan, Egypt and Yemen. The marketing aspect is undertaken by private groups. The total project cost is US$ 4575 million.

Objective

The main objective is successful mainstreaming of ecosystem conservation through adoption of collaborative management using income-generating activities through sericulture and apiculture as incentives for communities by adopting the IFAD funded case study in East Africa.

Overall Goal

The national ecosystem is protected and strengthened through improved income-generating incentives in collaborative forest management with poor communities.

Project Outcomes

- The forward and backward linkages between primary and secondary production and marketing systems in apiculture and sericulture ventures are strengthened.
- Methodologies and capacities to improve the livelihoods of poor communities that are based on commercial use of insect resources linked to various habitats are developed and scaled-up.
- Poor communities are empowered to generate substantial income and achieve a fair distribution of the benefits through the sale of products.

Impact Indicators in the Sudan, Yemen and Egypt

1. On Technologies:
   (a) Abundance ratings of wild silkmoth and pollinator bees are stable or increased.
   (b) A total of 6000 ha of ecosystem, particularly forest and woodland, across the three countries will be under improved multi-stakeholder management.
   (c) Habitat monitoring in buffer zones in the final year shows no loss of any ecosystem forest area.
   (d) Three hundred (300) ha of new mulberry plantations for fuelwood, fodder and sericulture activities.
   (e) Six thousand (6000) Langstroth hives distributed, with honey and hive products increased by 20% in each country.
   (f) Two thousand (2000) beekeepers/silk farmers trained in modern beekeeping and sericulture technologies in each country.
   (g) Income of 6000 households increased by 20% at the end of the project.

(h) Silk production brings foreign exchange into the country and creates self-employment in the rural sector.
(i) Silk and honey marketplaces and market linkages developed in each country and community ownership established.

2. On Pressures:
   (a) No new demands made by communities for excisions in target forests.
   (b) Forest departments' reports of illegal activity (cutting, harvesting) in buffer zones reduced by 40% by the final year.
   (c) No threat for the honey or silk markets.

3. On Response Measures:
   (a) Silk and modern beekeeping forest associations formed in all target villages.
   (b) Income generation groups are formed and increase in number, capacity and turnover.

Project Regions

The project will focus on the following regions in the three countries (see also Figure 1):

- In the Sudan, the project will support Southern and Northern Kordofan forest zones in collaboration with IFAD loan project.
- In Yemen, the project will support Al-Dhala forest regions and the community supporting the activities being carried out by IFAD loan project. The University of Aden will be collaborating in terms of development of a honey quality control laboratory for the region.
- In Egypt, the project will support the ongoing activities of unemployed youth in West Naubaria collaborating with rural development project. In addition, the project will support the mangrove vegetation environment project in the Red Sea area. The silk quality control laboratory will be established in the Agricultural Research Centre, Sericulture Research Department in Giza, Egypt.

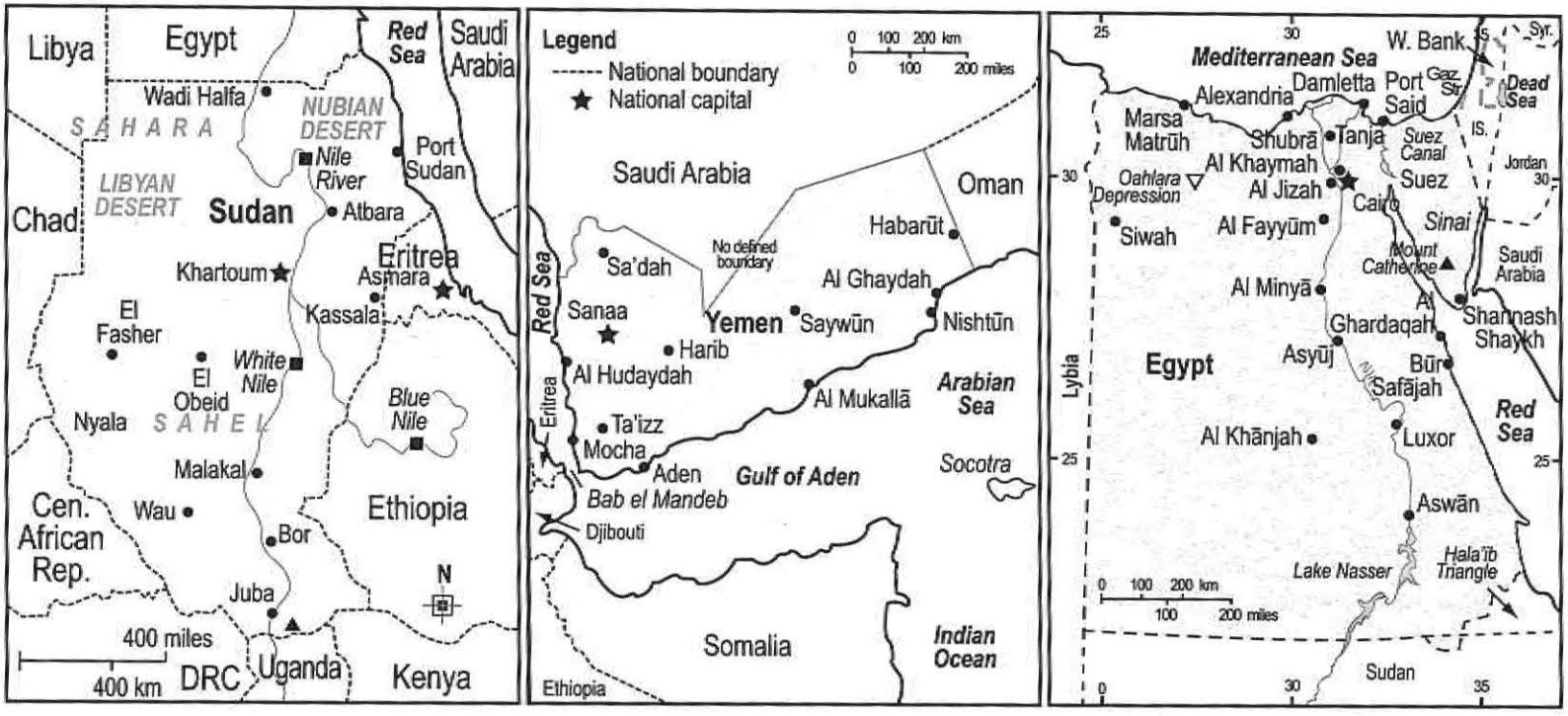
Project Components

The project will be implemented through five components, each with a distinct output.

Output 1.
An ecosystem management framework in place that facilitates community participation in rural areas enterprise in all project sites.

Output 2.
Rural communities, through registered associations, are actively engaged in ecosystem conservation through new plantations, management and enterprise.

Figure 1. Project Countries



Output 3.

The capacity of communities and institutions to manage and utilise both wild and mulberry silkmoth and honeybee biodiversity for income generation is increased.

Output 4.

Improved methodologies and insect resources are available at sites to allow efficient resource use for improved livelihoods and ecosystem conservation practices.

Key activities are implemented by *icipe* and partners: bee apiaries, quality control laboratories for silk and hive products, queen rearing, wild and mulberry silk moth farming systems and post-harvest and packaging for the markets.

Marketplaces and market linkages established and operational with community ownership.

Output 5.

Effective project administration, monitoring and coordination to enable timely and efficient implementation of project activities.

Key Activities

The project will involve the local poor community (Figure 2) and adopt a value chain approach (Figure 3) in the development of the honey and silk micro enterprises in the NENA region project countries.

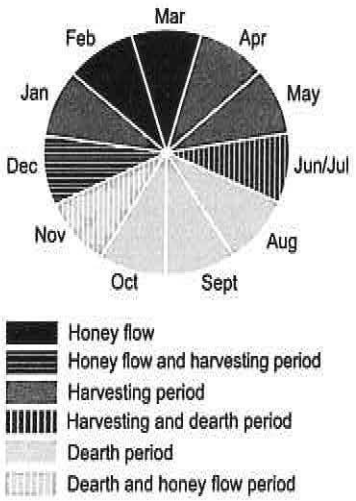
Figure 2. A Local Woman Beekeeper with Traditional Hives in Yemen

Figure 3. Value Chain Approach: African Silk and Honey Micro-Enterprises Development

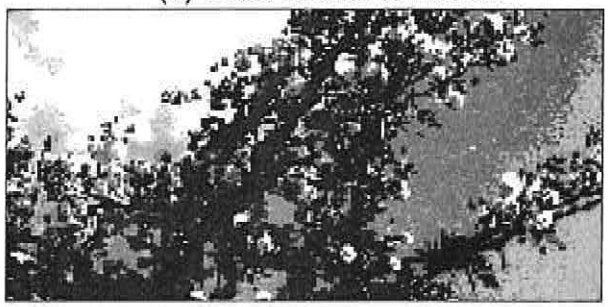
The project will make use of the apiculture and sericulture modules developed in Phase I and II of the IFAD project in East Africa at *icipe*, Nairobi, Kenya (Figures 4–8).

Figure 4. Apiculture Modules

(a) Floral Calendar

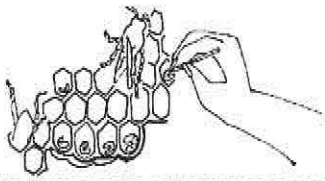


(b) Good Source of Nectar

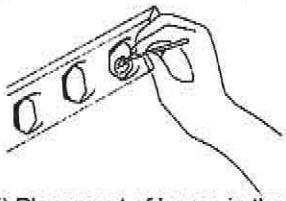


(c) Modern Langstroth Hives

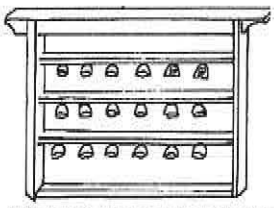
(d) Queen Breeding



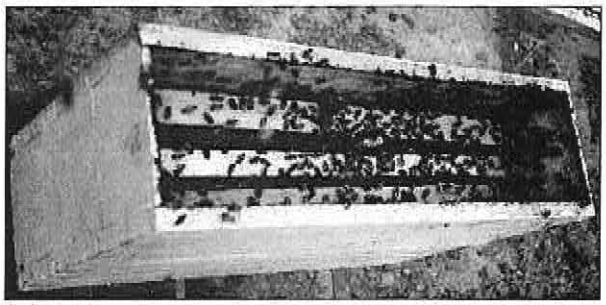
(i) Brood cells with young larvae



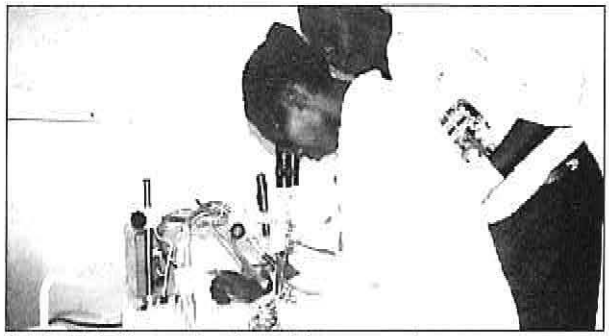
(ii) Placement of larvae in the cup



(iii) Wax cups arranged in a rectangular frame



(iv) Nucleus box



(v) Artificial insemination of the queen bee

Quality Control of Honey

Before analysis honey samples are:

- Strained using a stainless steel sieve with a mesh diameter of 0.5 mm. This removes coarse material and debris.
- Homogenised by stirring thoroughly.

Table 1. Characteristics of High Quality Table Honey

Moisture content	≤ 21%
Electrical conductivity[2]	≤ 0.7 mS/cm
Acidity[1,2]	≤ 40 meq/kg (50 meq/kg)
Hydroxymethylfurfural (HMF) content	≤ 40 mg/kg
Diastase content	≥ 8 Schade units
Fructose + glucose content	≥ 60%
Sucrose content	# ≤ 5%
Ash content	# ≤ 0.6–1%
Insoluble matter[1,2]	≤ 0.1 g/100g
Invertase[2]	≥ 50 units/kg
Proline[3]	≥ 180 mg/kg

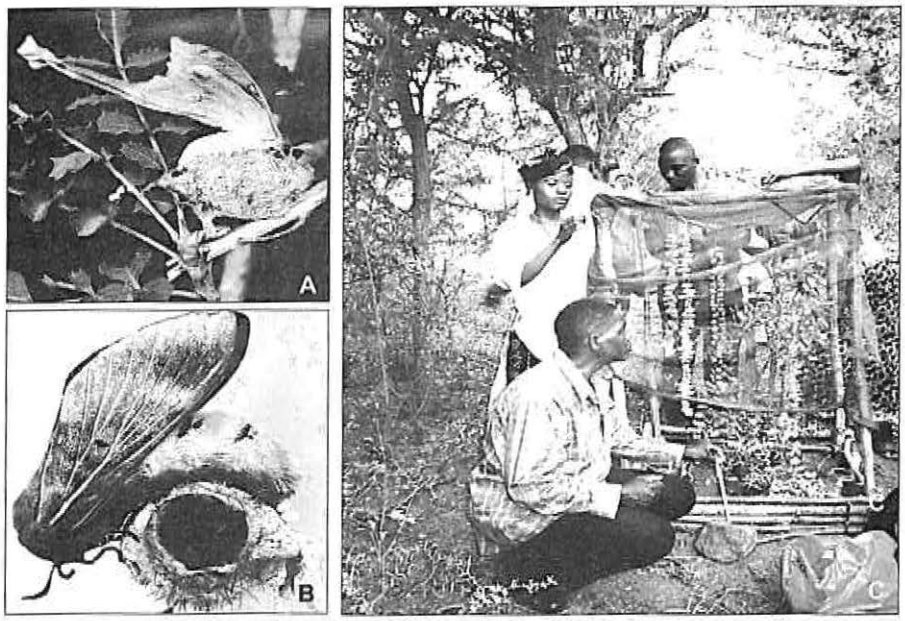
[1]European Honey Directive 74/409/EC.
[2]Proposals by the European Honey Commission of Apimodia for future EU and Codex Alimentarius Standards.
[3]In Germany.

Organic Certification of Honey and Hive-Based Products (Royal Jelly, Propolis, Wax and Pollen) from Natural Forests

- Organic honey and royal jelly are the products of an organic apiculture system employing management practices that seek to nurture ecosystems, which achieve sustainable productivity.
- Certification is the procedure by which officially recognised certification bodies provide written assurance that honey or honey production systems conform to the requirements by auditing of the quality assurance systems and examination of finished products.

Figure 5. Sericulture Modules

A–C: Wild Silkmoth Farming and Forest Conservation



Argema mimosae (A), *Gonometa postica* (B), *G. postica* cocoons for silkmoth egg production (grainage) (C)

Marketing of Honey- and Silk-Based Products

The project will provide a marketing information system of honey and silk-based products by adopting five marketing research components:

- Market research
- Product research
- Pricing research
- Distribution research
- Promotion research.

Market Busting Strategies

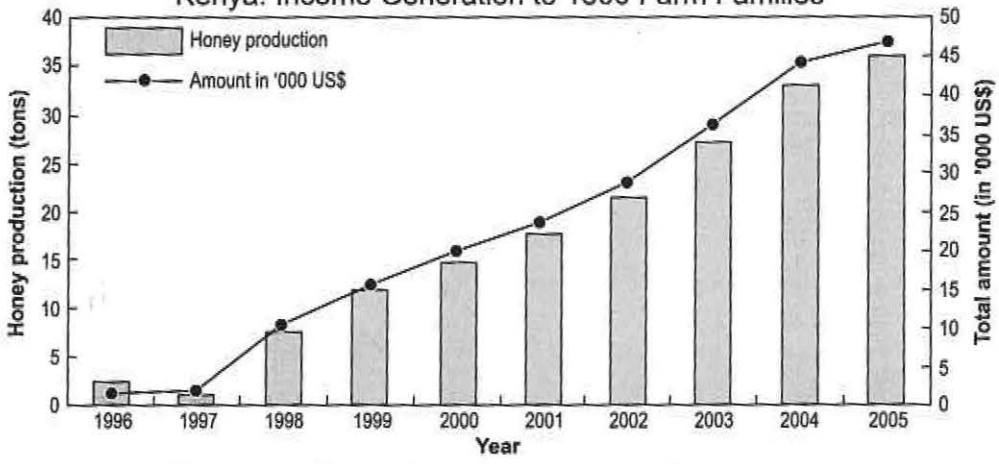
Market busting strategies are actions taken by the silk / honey firm to help deliver markedly superior products.

You create market busters to:

- Transform the customers' experience
- Transform your offerings
- Redefine profit drivers
- Exploit industry shifts
- Enter new markets.

Impact of Honey Marketplaces on Community Income

Figure 6. Impact Assessment of Honey Production in Mwingi, Kenya: Income Generation to 1800 Farm Families



The rate in 1996 was US$ 0.58 per kg (middleman marketing). The rate in 1997 onwards after icipe involvement was US$ 1.33–1.5

Figure 7. Mwingi Honey Marketplace, Kenya

Table 2. Economics: Honey-Based Products

Types of hive	Number of hives	Honey harvested (kg/hive)	Middleman purchases (US$/kg)	After marketplace establishment farmers receive (US$/kg)	Total sale of honey per hive through middlemen (US$)	Community empowered to sell honey to trader (US$)
Traditional	1	**7**	0.38	1.03	2.69	7.18
Langstroth	1	**20**	0.38	1.41	7.69	28.21

Impact of Silk Marketplaces on Community Income

Figure 8. Bushenyi Silk Marketplace, Uganda

Table 3. Economics: Silk-Based Products

Particulars	Amount (in US$)
Cocoon production from 1 hectare (2.5 acres) of mulberry plantation in 5 rearing cycles of 200 DFLs each, giving 480 kg of green cocoons in a year. The cost of 1 kg is US$ 3.5	1680
Value added by silk cocoon processing in the marketplace	
Reeling: From 480 kg of fresh silk cocoons, 80 kg of raw silk is obtained at US$ 25 per kg	2000
Twisting and bleaching: From 80 kg of raw silk, 78 kg of bleached silk yarn is obtained at US$ 28 per kg	2184
Looming: Power/handloom, 660 metres of silk cloth (14 kg of silk yarn makes 120 metres of silk cloth, hence 78 kg makes 660 metres) at US$ 10 per metre of plain cloth	6600
Value addition by printing and dyeing the silk cloth at US$ 11	7260
264 Garments/shirts from plain cloth (each consuming 2.5 metres) at US$ 32	8445
264 Garments/shirts from tie and dye cloth (each consuming 2.5 metres) at US$ 37	9768

Ownership of Marketplaces

- Marketplaces for silk and honey-based products can succeed only if local communities understand the value of biodiversity and sustainably manage bio-regions to meet their needs.
- Communities are empowered to maintain their own business activities reducing the role of middlemen.

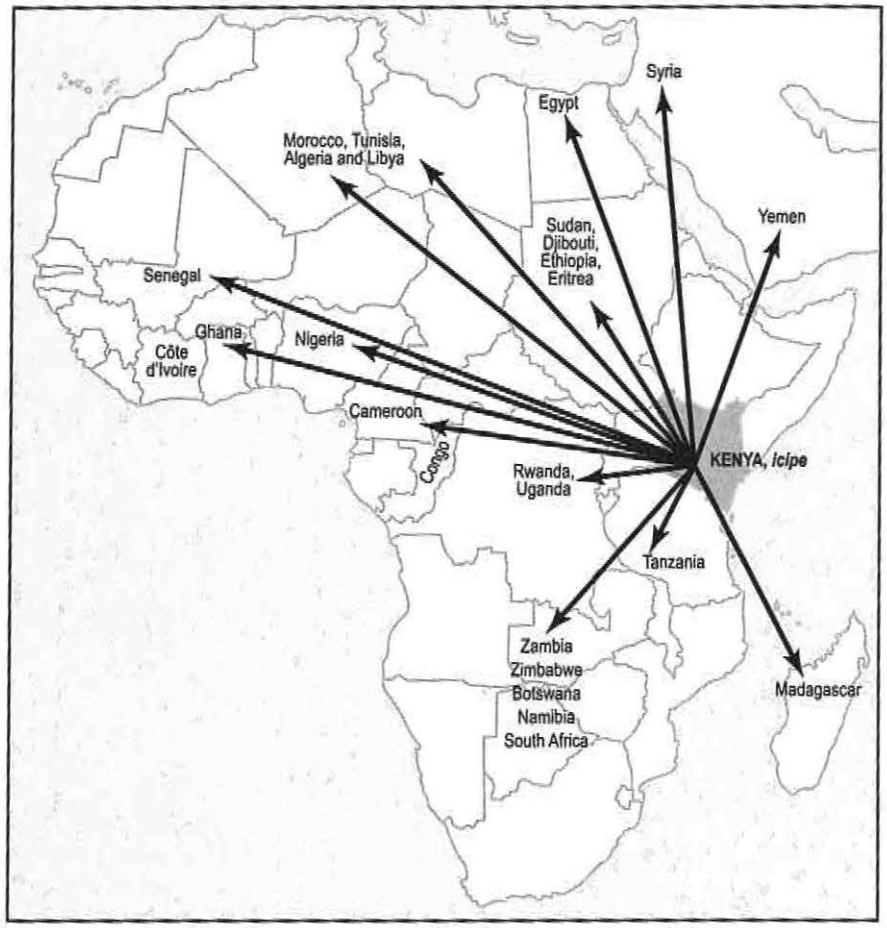
Replicability and Leverage

- Low-technology approaches with social and market support to economically viable activities.
- The problem in East Africa is supply rather than demand. Quality honey markets already exist but it is difficult for small farmers to access them. This is what the project will overcome.
- Value adding and capacity building provide important mechanisms and leverage marketplace development.

Sericulture and Apiculture Training

Sericulture and apiculture training was provided to NARS and NGOs of SARDNet countries in the course of four international workshops held from 1999–2006. A few countries have become members for future training through IDB/OPEC projects.

Figure 9. Sericulture, Apiculture Research and Development Network in Africa (SARDNet Africa)



MANDATE OF THE ISLAMIC DEVELOPMENT BANK AND PROJECT PREPARATION GUIDELINES

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Introduction

The Islamic Development Bank (IDB) is primarily engaged in promoting socio-economic development of its member countries. The overall framework for the Bank's involvement in a member country is the Country Assistance Strategy Study (CASS). CASS establishes the Bank's assistance strategy, including the level and composition of assistance to be provided based on country priorities in the respective member country and the Medium-Term Strategic Agenda of the Bank. CASS will be instrumental in identifying and designing projects that fit into and support a coherent development strategy, and which reflect a harmonious marriage of the priorities of member countries and the IDB.

One of the main objectives of the IDB is to finance productive projects. Such projects are carefully selected and prepared, thoroughly appraised, closely supervised and systematically evaluated. Every Bank-assisted project must be technically, economically and financially sound and it must contribute substantially to the development objectives of the respective member country.

Each project passes through a cycle that, with some variations, is common to all projects. The Bank's project cycle, which is similar to other institutions, covers the life of a typical project from identification of needs and priorities until the final completion of work and evaluation of results. This process of project identification, preparation, appraisal/negotiation, implementation and follow-up and evaluation constitutes the project cycle. The Bank's role in the project cycle is performed largely by its operations and projects departments.

IDB Cycles of Project Financing

Identification

Identification is the first phase of the project cycle. Identification proceeds against the background of a country's development plan and the Bank's priorities articulated in its Medium-Term Strategic Agenda. Identification of a project can come from several sources, including the government and IDB missions, and from contacts with other development financial institutions, UN agencies or private sponsors. Projects identified through other sources should have official government endorsement. For a project to be formally identified as

priority project and included in the Bank's three-year rolling work programme, it must have the provisional support of both the government and the Bank to ensure that its objectives are shared by both. It must also meet a *prima facie* test of feasibility—that technical and institutional solutions are likely to be found at costs commensurate with expected benefits.

Once identified, a project is incorporated into a rolling three-year work programme for that country that forms the basis for the Bank's future operations in that country. Country rolling work programmes are used for programming and budgeting the Bank's operations and for assuring that the resources are available to support each successive phase of the project cycle.

Preparation

An extensive preparation period of close collaboration between the Bank and the beneficiary / executing agency begins once a project has been incorporated into the rolling three-year work programme. A 'Project Document' is prepared for each project, describing its objectives, identifying the principal issues and establishing the timetable for its further processing.

Preparation of a project feasibility study transforms the project idea into a detailed proposal that covers the full range of technical, economic, financial, social, institutional and environmental aspects. The goal is to come up with the best method to achieve the project's objectives, by comparing alternatives on the basis of their relative costs and benefits.

Formal responsibility for project preparation rests with the beneficiary. The Bank plays an active role in ensuring a timely flow of well-prepared projects including making sure that the beneficiary has the capacity and resources to prepare the project and understands the Bank's requirements and standards. For example, the Bank takes responsibility for updating and filling gaps in projects that are inadequately prepared.

The Bank can extend financial and technical assistance for project preparation in a number of ways. It can provide technical assistance for preparation of a feasibility study, detailed design and tender documents, and project supervision. In providing this help, the Bank ensures that the concerned government and the beneficiary are fully committed to the project and deeply involved in its preparation.

Appraisal/Negotiation

After the beneficiary completes the project preparation phase, the Bank reviews the proposal and undertakes a full-scale project appraisal. Appraisal covers comprehensive review of the technical, economic, financial and institutional aspects of the project proposal and lays the foundation for implementing the project and evaluating it when completed.

An appraisal mission examines such matters as components to be financed by IDB, terms and conditions of IDB financing, project procurement action plans, project implementation plans and disbursement profiles. It also reviews

the legal aspects of the project including the draft project financing agreement and conditions of effectiveness, and concludes an understanding on these issues with the Government and the executing agencies. The appraisal mission and the beneficiary endeavour to agree on the measures necessary to assure the success of the project.

The draft project financing agreement is negotiated and at the end of the appraisal mission work, a Memorandum of Understanding (MOU) reflecting the discussions and understanding reached by the appraisal mission and the beneficiary, is signed.

Appraisal of a project is solely the Bank's responsibility and is conducted by the Bank staff, supplemented by outside consultants if required. Appraisal activities cover the review and assessment of the following major aspects of a project:

Technical. The Bank has to ensure that projects are soundly designed, appropriately engineered, and follow accepted industry/sector standards. The appraisal mission looks into technical alternatives provided, solutions proposed and the results expected.

Technical appraisal is concerned with questions of physical scale, layout, and location of facilities. It looks into the technology to be used, including types of equipment or processes and their appropriateness to local conditions, the approach to be followed for the provision of services, how realistic the implementation schedules are and the likelihood of achieving expected levels of output.

Institutional. The mission from the bank verifies whether the entity is properly organised and its management is adequate to perform the job and whether the executing agency needs capacity building support. This is essential to avoid problems that often arise during project implementation and operation.

Economic. The project is studied thoroughly in its various sectoral settings. The investment programme for the sector, the strengths and weaknesses of public and private sectoral institutions, and key government policies are all examined.

The project is subjected to a detailed cost–benefit analysis of alternative project designs, the result of which are usually expressed as economic rates of return, and those that contribute most to the development objectives of the country may be selected. 'Shadow' prices are used routinely when true economic values of costs are not reflected in market prices as a result of various distortions, such as trade restrictions, taxes or subsidies. The distribution of the benefits of a project and its fiscal impact are considered carefully. Since the estimates of future costs and benefits are subject to substantial margins of error, a sensitivity analysis is always made of the return on the project to variations in some of the key assumptions. Moreover, macro-economic benefits such as value addition, effect on employment, generation of foreign exchange etc., are also considered.

Financial. Financial appraisal has several purposes. One is to ensure that there are sufficient funds to cover the costs of implementing the project. Normally, the Bank does not finance the total project costs. A typical project financing comprises foreign exchange costs and the Bank expects the beneficiary or the government

to meet some or all of the local costs. In addition, co-financers may join to co-finance a project. Thus, at project appraisal stage, IDB ensures a financing plan that will make funds available to implement the project on schedule.

The financial appraisal is also concerned with financial viability. This includes an assessment of the enterprise's ability to meet all its financial obligations, including repayments to the Bank and capability to generate enough funds from internal resources to earn a reasonable rate of return on its assets and make a satisfactory contribution to its future capital requirements, etc. The enterprise's finances are closely reviewed through projections of the balance sheet, income statement and cash flow. Additional safeguards of financial integrity may include establishing suitable debt-to-equity ratios or placing a limit on additional long-term financing.

The financial review often highlights the need to adjust the level and structure of prices charged by the enterprise. It is also concerned with recovering investment and operating costs from project beneficiaries.

Social Assessment. Social assessment provides a benchmark on potential beneficiaries and the extent to which project benefits and costs will be distributed among them. Adverse effects are quantified and appropriate remedial actions put in place to alleviate them.

Another aspect of social appraisal is to have a better understanding of the local organisational arrangements (socio-cultural issues) so that these are incorporated in the design of the project for its successful implementation.

Environmental Impact. Environmental assessment has become an important tool in project design and selection due to the inseparable relationship between socio-economic development and environment. The decision to carry out such an assessment depends upon the nature and scale of the project and is done at the early stages of project preparation so that the final design incorporates the key environmental aspects.

Presentation to the Board

The appraisal mission prepares a Staff Appraisal Report (SAR) and Report and Recommendation of the President (RRP) that sets forth its findings and recommends the level terms and conditions of IDB financing. This report is carefully prepared to reflect the agreements reached and reviewed and cleared according to IDB's processes and procedures before submission of the project to the Board of Executive Directors for final approval.

Upon obtaining the concurrence of the beneficiary on the terms and conditions of IDB financing, the project is presented to the Board of Executive Directors for approval. On approval by the Board, decision is intimated to the beneficiary. Subsequently, the project agreement is finalised, signed and declared effective. This marks the end of the processing phase of the project cycle and the beginning of the implementation phase. The staff appraisal report is provided to the beneficiary and the project-executing agency.

Implementation and Follow-up

The next stage in the life of a project is its actual implementation over the period of construction and subsequent operation. Implementation of the project is the responsibility of the beneficiary. The Bank's role is to follow-up the implementation and procurement processes. Follow-up is primarily concerned with that period in the project's life when physical components are being constructed, equipment purchased and installed, and new institutions, programmes, and policies are put in place.

The main purpose of follow-up is to help ensure that a project achieves its development objectives and, in particular, to work with the beneficiary in identifying and dealing with problems that arise during implementation. Follow-up, therefore, is primarily an exercise in collective problem solving. Follow-up takes place in a variety of ways. During appraisal, agreement will have been reached on a schedule of progress reports to be submitted by the beneficiary. Based on this, the beneficiary provides progress reports periodically covering the physical execution of the project.

The progress reports are reviewed at the Bank. Problems that surface are dealt with through correspondence or in the course of project follow-up missions undertaken by the Bank staff. The frequency of these missions is tailored to suit the complexity of the project, the status of its implementation, and the number and nature of problems encountered.

An important element of project follow-up concerns procurement of goods and services financed under the project agreement. Procurement is carried out in accordance with IDB guidelines, incorporated in the project agreement that are designed to ensure that the requisite goods and services are procured in the most efficient and economical manner.

Upon physical completion of the project, the beneficiary submits a Project Completion Report (PCR) to the Bank. Subsequently, the concerned Operations and Projects Department prepares the Bank's Project Completion Report.

Evaluation

Upon completion, all Bank-assisted projects are subjected to post-evaluation. To ensure its independence and objectivity, this review is carried out by the Operations Evaluation Office (OEO), which is entirely separate from the Bank's operations departments and reports directly to the President.

OEO prepares an independent evaluation report on each project within 2–5 years of its completion. This report assesses the impact of the project and compares actual results with what had been expected at the time of project appraisal. Valuable lessons are learned over time from the successes and failures. Results and recommendations drawn from these reports are fed back into the design and implementation of future policies and financing operations.

IDB Modes of Project Financing

The Islamic Development Bank (IDB) utilises various Sharia-compliant modes of financing to support development projects in its member countries. Through these modes, the IDB finances a variety of projects in the agricultural, industrial, agro-industrial and infrastructure sectors. The Bank also finances small and medium-scale enterprises (SMEs) and micro-finance schemes. These modes fall under two main categories, namely concessional and ordinary. The concessional modes are loan financing and technical assistance. The ordinary modes comprise leasing, installment sale, Istisna'a and lines of financing. Additional modes include equity participation and profit sharing. In general, all member countries benefit from IDB's financing.

For operational purposes, the Bank has classified its member countries into two groups, with the view to tailoring its financing more 'equitably'. The first group defines countries by their stage of development, essentially comprising the least developed member countries (LDMCs) and the Non-LDMCs. This classification is used to allocate the concessional resources in the Bank's 'Annual Operations Plans'. The primary benefactors of concessional financing are the LDMCs (usually 80 percent of the total annual allocation), while the non-LDMCs benefit mostly from ordinary financing. There are 25 member countries classified by the Bank as LDMCs. These are Afghanistan, Bangladesh, Benin, Burkina Faso, Chad, Comoros, Djibouti, Gambia, Guinea, Guinea-Bissau, Maldives, Mali, Mauritania, Mozambique, Niger, Senegal, Sierra Leone, Somalia, the Sudan, Togo, Uganda and Yemen. In addition, Kyrgyzstan and Tajikistan—categorised as landlocked developing countries by the United Nations—are classified as least developed by the IDB. Moreover, Palestine is also classified as such by the IDB as a special case, making it the 25th.

The second set of classification adopted by the Bank defines its member countries into three income groups, on the basis of the criteria applied by the United Nations and the World Bank. The three groups of countries are low-income, middle-income and high-income. This classification is used to define the terms and conditions (essentially the grace and repayment periods) of the IDB's financing. Low-income group countries are defined as those having a per capita income of less than US$ 725; middle-income countries are those within the range of US$ 726 and US$ 1500; whereas high-income countries have a per capita income of above US$ 1500. The repayment terms for the three groups of countries are as follows:

- Low-Income Countries: 25 years, including 7 years' grace period;
- Middle-Income Countries: 20 years, including 5 years' grace period; and
- High-Income Countries: 15 years, including 3 years' grace period.

A synopsis of the terms and conditions of the IDB's financing modes—including the criteria for eligibility, how to apply, as well as procurement, disbursement and repayment procedures—is provided below.

Concessional Modes

Loan Financing

The term 'loan financing' as used by IDB has a different connotation from other international development financing institutions. The objective, however, is similar. Loans provide long term financing for the implementation of development projects, mainly in agriculture (such as land development, irrigation networks, smallholder development, rural water supply) and infrastructure development (road transport and social facilities such as schools and hospitals).

Technical Assistance

Technical Assistance (TA) is the provision of technical expertise to assist in the preparation or implementation of a project or a policy. It is also given to help in the development of institutions or human resources. There are two main types of TA activities: those directly related to a project (e.g. feasibility study, detailed design, supervision of implementation, pilot projects) and those of an advisory nature (e.g. definition of policies, preparation of sectoral plans, institution building, research).

Ordinary Modes

Leasing

Leasing *(ijara)*, is a medium to long-term mode of financing which per se is consistent with Sharia. Legally, it is conceived as a sale of usufruct *(manfa)*. Conceptually, it refers to medium and long-term rental arrangement for the financing of capital equipment and other fixed assets in which IDB, the Lessor, may provide the required assets to be leased for a certain period of time against payment of fixed periodical rentals, i.e. semi-annual.

Instalment Sale

Instalment sale is a medium to long-term mode of financing. It is similar to hire/purchase where IDB buys the assets on behalf of the beneficiary and transfers the ownership immediately upon delivery to the beneficiary to repay the amount of financing inherent in instalments with a mark-up.

Istisna'a

Istisna'a is a contract whereby a party undertakes to produce specific goods and services, and made according to certain agreed-upon specifications at a determined price and for a fixed date of delivery. The production of goods includes any process of manufacturing, construction, assembling or packaging.

Lines of Financing

IDB extends lines of financing to the National Development Financing Institutions (NDFIs) and Islamic banks (IBs) in member countries especially to promote the growth and development of small and medium scale enterprises (SMEs) in the industrial, agro-industrial and manufacturing sectors; as well as infrastructure

projects. Exceptions are for the hotel and tourism industry, housing and other such projects, which may be objectionable from the Sharia point of view.

Additional Modes

Equity Participation
IDB participates in the equity or share capital of new or existing companies/ enterprises (including Islamic financial institutions) in member countries that are potentially profitable, Sharia compatible and are projected to have a substantial developmental impact on the economies of their countries.

Profit Sharing
Profit sharing is a form of partnership, which involves the pooling of funds between the IDB and another party for the financing of a project, each partner obtaining a percentage of the net profit accruing from the venture. The profit accruing to (or loss incurred by) each partner is proportional to its share in the venture. This mode might be suitable for projects expected to have a high financial rate of return.

Disbursement Procedures

Article 2.03 (viii) of the Policies and Procedures for Financing Operations provides that the Bank will take necessary measures to ensure that the funds made available by it to a project/enterprise are exclusively used for the purpose for which they were provided. Such measures would involve specific stipulation in the legal documents to this effect, approval of specifications and tender documents.

Disbursement is to be made on the basis of approved tender documents, and dispatch of review missions from time to time to check the progress of the project as well as the fact that the goods and services financed by the Bank are being used for the project and not for any other purpose. Accordingly, amounts of loan shall not be disbursed to the borrower upon signing the loan agreement or immediately after it becomes effective. Payments of these amounts shall be made only to meet or cover approved expenditures actually incurred or are payable, supported by adequate documentation in accordance with the provision of loan agreement.

Guidelines for Procurement under IDB Financing

Purpose

The purpose of these guidelines is to inform recipients of the Islamic Development Bank (the 'Bank') financing, prospective suppliers and contractors about the general principles which should be observed in carrying out procurement of

goods and services (excluding consultancy services) for Bank-financed projects whether by way of loan, leasing, instalment sale, profit sharing, Istisna'a, etc.

Responsibilities of the Recipient

The ultimate responsibility for the effective and economic procurement of goods and services and the successful completion of the project rests with the Recipient of the Bank's financing. The rights and obligations of the Recipient vis-à-vis bidders, contractors, suppliers, etc. for the supply of goods and services or any other party involved with the execution of the project shall be governed by the contracts and agreements entered into by the Recipient and not by these guidelines.

Responsibilities of the Bank

The Bank is responsible for making the disbursement in accordance with the terms and conditions of the Financing Agreement, provided that goods and services purchased are in line with the Financing (loan, leasing, instalment sale, profit sharing, Istisna'a, etc.) Agreement.

For more details visit **www.isdb.org.**

SESSION TWO

Country Presentations

Chair: Prof. S. K. Raina

- Al-Dhala Community Resource Management: Beekeeping
- Income Generation Options for Improving Rural Economies and Their Integration with IFAD Projects in the Sudan
- Livelihood Improvement Through IFAD's Initiatives in the Sudan
- Status of the Sericulture Development Project in Egypt
- Achievements of the Beekeeping Research Department, Egypt
- *icipe*/IFAD Contribution to Apiculture and Sericulture Development in Uganda
- *icipe*/IFAD Contribution to Apiculture and Sericulture Development in Madagascar
- Conservation of Wild Silkmoth Biodiversity in Africa
- Improving Apiculture Enterprises Through Diversification and Value Addition of Hive Products

AL-DHALA COMMUNITY RESOURCE MANAGEMENT: BEEKEEPING

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Introduction

In Al-Dhala governorate, beekeeping is spread throughout the governorate, but the greatest concentration of hives is in Demt and Al-Husha, as shown in the Table 1. There are around 20,000 hives in Al-Dhala governorate of which 50% are in Demt. Most villages have at least one beekeeper with a maximum of around 15 beekeepers per village. Assuming an average of around 5–10 beekeepers per village, the total number of hive owners would be 2000–4000 for the governorate.

Table 1. Distribution of Bee Hives in Al-Dhala Governorate

District	No. of beehives
Juban	1071
Demt	10,189
Qaatabah	1126
Al-Hussain	612
Al-Dhala	318
Jehaf	1756
Al-Azariq	991
Al-Husha	3269
	773
Total	20,105

Source: Agriculture Census, 2001

All the hives in Al-Dhala governorate are traditional, comprising log hives hollowed out from a tree trunk, clay hives, woven reed hives plastered with mud and wooden box hives. The latter predominate and are made from pressed wood. The traditional wooden box hive is 90–120 cm long, 20 cm wide and 16–18 cm high. It is designed in such a way that it can be opened either from the front or the back. It has a small opening for the bees to get in and out of the hive. The bees construct up to 20 frames within the hives. As the design of the traditional hives is totally enclosed, there is no possibility of inspecting the hives to establish the stage of production; this contributes to the low average productivity of the hives as once the hives have been opened, they have to be harvested even if they are at an early stage in the production cycle and production of honey is minimal. The average annual production varies between 0.75 kg and 1 kg per hive. The number of hives per beekeeper varies between 5 and over 100. Not all are active, the number of active hives per beekeeper may range between 3 and a maximum of 40. Beekeepers rely on natural multiplication of colonies by swarming. When a swarm divides, the beekeepers collect the new swarm which typically lodges in a tree and use it to stock an empty hive. The multiplication of the colonies by swarming can lower productivity and weaken the existing colonies if it is not well managed.

Honey Production Seasons

The production seasons for honey correspond to the rainy seasons and the timing of the flowering of the different trees and shrubs which provide nectar and pollen for the bees. Unlike the beekeepers from Hadramout, most beekeepers in Al-Dhala do not migrate with their hives in search of available vegetation due to lack of organisational capacity and doubts over the cost effectiveness of migration.

The main vegetation providing nectar and pollen for the bees in Al-Dhala is sidr (*Zizibus spina-christi*), somor (*Acacia mellifera*) and doubah (desert rose, *Adinium obesum*). The latter produces low quality honey. The flowering period for sidr, which constitutes the most important plant for honey production, is July–September; the flowering period for somor is after the rainfall from March to June. The flowering period for doubah is earlier, from February to April, but these trees are less prevalent and are a lower quality source of bee fodder. In the dry season, the vegetation is very poor and beekeepers remaining in the area have to resort to feeding sugar solution to maintain the bees. As a result, it is important that beekeepers collect honeycombs 2 week's before the main flowering season to ensure that pure honey is produced once the natural flora is available.

In the highlands, the production season corresponding to the rainy season starts as early as February and finishes in September–October. In good production years, two harvests can be made, increasing the total yield to 1.5 kg/hive/year.

The landscape and vegetation cover in Al-Dhala governorate has changed significantly over the past 50–70 years with intensive exploitation of the tress by the communities for fuelwood, fodder and charcoal production. In the past, the flora was lush and more varied with a greater presence of tree cover. The current practice of exploitation of the trees for fuel and fodder which involves cutting off all the branches every other year is also undesirable from the point of view of honey production. At present, optimal benefits are not being obtained from the available vegetation due to the lack of knowledge by the beekeepers.

The harvesting and extraction methods used by beekeepers are rudimentary. The beekeepers harvest the hives by opening them from the back and using a knife, they cut the combs out one after another until they reach the ones which contain the brood. The honey is extracted by hand squeezing or by solar extraction which involves leaving the combs in the sun and waiting for the honey to flow out of the combs. With these methods, around one-third of the honey is lost. There is presently no market for the wax and the residual wax and honey are used as fodder.

Disease Outbreaks

Beekeepers in Al-Dhala have experienced major disease outbreaks in recent years. It is estimated that up to 60% of hives may be contaminated by diseases, reducing the yield and even further reducing the number of colonies. There is inadequate understanding of the disease problems but the main disease is cited

as *Varroa jacobsoni*. Beekeepers have no access to reliable veterinary advice and are trying various treatments on their own initiative, most of which prove not to be successful. It does, however, appear that some of indigenous Yemeni bees *(Apis mellifera yeminitica)*, recover after the first attack of *Varroa* and co-exist with the disease, i.e. they become resistant to the disease. This adds weight to the need to improve the indigenous species of bees rather than replacing them with imported ones.

Women are actively involved in the management of bees, frequently doing most of the beekeeping work. In some instances, women are equipped with protective clothing when involved in hive management.

In Al-Dhala governorate, the beekeepers in the villages have a good knowledge of the local distribution system. Most beekeepers sell to traders and private individuals from the area and from traders and private individuals from other cities like Taiz or Aden who come to the village to buy the honey directly from the beekeepers. Others go to Al-Dhala or to Taiz to sell their honey to traders or directly to retail stores with whom they have established trusting relationships. When the price of honey is too low or the market is overloaded with the supply, some beekeepers do not sell their honey but either consume it themselves or they hold it back for sale at a later time when prices have recovered.

Other bee by-products like pollen, propolis and royal jelly are not used and marketed in Yemen. This is due to the lack of knowledge of these products and their uses on the part of the local beekeepers and the market generally. Also. these products do not have a market locally while the international market is difficult to reach due to reasons of low quantity, quality and lack of institutional capacity to organise any export marketing. Even if the markets were available for such products, with the use of traditional hives, it is difficult to generate a significant production. There are some projects that support programmes for the development of apiculture in various governorates, while it is proposed that the focus of activities should be in Al-Dhala and opportunities should be sought to gain assistance from this programmes for apiculture development in Al-Dhala.

Constraints

Beekeeping in Al-Dhala, however, faces a number of constraints which would need to be addressed to promote its development.

- The present lack of basic knowledge on the part of beekeepers results in poor management and low productivity and hampers the introduction of improved technology.
- The basis for planning is inadequate due to the lack of information on the overall availability of bee forage plants and timing of flowering periods.
- The unpredictable rainfall in the governorate and risk of drought introduces the risk of reduced bee fodder and reduced productivity of bees from time to time.
- The progressive degradation of the environment is impoverishing the flora and threatens to undermine the viability of beekeeping unless steps are taken by communities to protect and rehabilitate the environment.

- Competition from beekeepers coming from other governorates reduces the available bee fodder for local hives and can contribute to the reduction of honey productions per hive. This problem is compounded by social customs which make it difficult to prevent outside beekeepers from coming and the lack of any traditional or statutory regulation for the management of common property resources. In addition, the migration of beekeepers from other areas brings the risk of introducing disease-carrying bees to the region which infect the local bees.
- The present lack of complete understanding of the disease problems affecting beekeeping, which precludes the promotion of adequate disease control measures, resulting in significant reductions in the productivity of hives.
- The excessive use of pesticides for qat *(Catha edulis)* production, which weaken or kill the bees.
- The present lack of rules and regulations (self-regulatory and government) on quality control and standards, utilisation of common rangeland areas and use of sugar by local migrating beekeepers.
- The present lack of institutional support frameworks such as cooperatives and lack of production collaboration between villages.

Recommendations

- Training in beekeeping and beehive products development be provided to the trainers in Al-Dhala district.
- Quality control laboratory for honey and hive products testing be established in the University of Aden, Chemistry department, Aden.
- More hives be provided to the beekeepers in Al-Dhala, especially to women.
- Marketplace be established in Al-Dhala for the local community and market linkages established.

INCOME GENERATION OPTIONS FOR IMPROVING RURAL ECONOMIES AND THEIR INTEGRATION WITH IFAD PROJECTS IN THE SUDAN

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Introduction

Beekeeping has been practised in the Sudan since the days of King Taharqa (690–664 BC) and the Christian age in northern Sudan. A number of wild silkworm species are reported in the Sudan and Central Sudan, but the identity and biology have not yet been investigated. There is no sericulture and apiculture activity in spite of the presence of highly trained entomologists, and forestry and conservation experts in the country. However, the sericulture and apiculture enterprises have a huge potential to improve livelihoods, if only the constraints are addressed. This can easily be achieved by integrating apiculture and sericulture in the ongoing IFAD projects.

Apiculture

History and Status

Beekeeping has been practised in the Sudan since the days of King Taharqa (690–664 BC) and the Christian age in northern Sudan. The first modern hives were introduced in 1961 at the Faculty of Agriculture for educational purposes. In 1978, the National Beekeeping Project (NBP) was inaugurated by the Sudan National Council for Research (NCR). Another project was initiated by the American NEF in 1987, but did not last long. In 1988, apiaries were set up for refugees in a camp in Gedarif area. The Sudanese Beekeepers Association was formed in 1988. Two well organised companies are now involved in beekeeping. Their activities cover the White Nile, Blue Nile and Kordofan.

In the southern states, beekeeping is practised in Darfur, Kordofan and Blue Nile. Southern Darfur has an estimated 100,000 tagal with ownerships of 150–300 per person. In Kabom area, there are about 2000 beekeepers who own 11,000. Sudan has annual honey exports of 20 tons.

Constraints

- Viciousness of the local bees.
- Dearth period during the summer season.
- Natural enemies, e.g. the northern carmine bee-eater, *Merops nubicus* (warwar bird), sphegid wasps and the greater wax moth, *Galleria mellonella*.
- Pesticides use in the major agricultural areas.
- No apiculture unit in the Ministry of Agriculture and Forestry.

Sericulture

A number of wild silkworm species are reported in the South and Central Sudan, but the identity and biology have not yet been investigated. There is no serious activity so far in spite of highly trained entomologists, forestry and conservation experts. In the late nineties, the Forestry Department imported mulberry varieties and hybrid silkworm eggs from *icipe* but the endeavour was not viable. Later on one farmer switched over from tobacco production to silk production. He now imports hybrid eggs from China and exports raw silk to Egypt.

Training

IFAD is the most active international organisation in the Sudan and has good and well-orchestrated agreements with the Government. Four projects are fully operational in South Kordofan, Gash and Tokar Deltas. It is only a matter of seeking ways and means to incorporate these new activities in their ongoing activities. This can easily be achieved as the proposed areas of apiculture and sericulture are within the domain of the IFAD projects.

Conclusion

The authorities should shift attention to commercial insects and their utilisation in income generation to improve rural economies in the following ways:

- Creation of pilot apiculture and sericulture units at MOAs and other institutions.
- Research activities in various aspects of apiculture and sericulture (native silkmoth spp.).
- Management of local bees behaviour.
- Crossing and selection of new strains with imported bee strains.
- Encourage installation of modern apiaries and encourage private sector investment in such ventures.
- Activate quality control measures of bee products.

Recommendations

- Training in modern beekeeping and wild silk farming be provided to NARS and NGOs.
- Marketplace to be constructed to consolidate the fragmented groups into an association.
- Market linkage be established.
- Training in quality control of silk- and honey-based products be provided.
- Organic certification process for honey and wild silk be initiated.

LIVELIHOOD IMPROVEMENT THROUGH IFAD'S INITIATIVES IN THE SUDAN

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Introduction

IFAD's initiatives in the Sudan involve the development of community-driven income-generating and integrated use of commercial insects.

These income generating activities (apiculture and sericulture among others), are well established in the Sudan due to its rich natural resources and the experience of some local people in beekeeping. Moreover, the Sudan is a member state of the Global Environmental Facility (GEF) and is eligible for technical assistance through the United Nations system, e.g. from IFAD.

IFAD has been supporting the Sudan in rural development since 1979. To date, 14 projects have been executed totalling SDR 81, 370,000; four projects with a total amount of SDR 55,665,000 are ongoing.

The government of the Sudan and IFAD every now and then, have developed strategies to reduce poverty among the rural poor.

Country Strategy

The Government of the Sudan and IFAD have agreed on the following strategies to be undertaken in three main thrusts:

The first thrust is to:

- Concentrate on the more disadvantaged populations in the rain-fed agricultural areas and promote the use of natural resources for the sustainability of their livelihood;
- Promote projects that have more relevance to target group livelihood strategies;
- Empower women to fully participate in the development process;
- Encourage the use of investment projects to pilot critical policy reforms (governance, empowerment and accountability of local government institutions, land tenure, rural credit, marketing, etc.) that rely on an enhanced partnership with civil society institutions and is consistent with the main thrusts of the corporate strategy framework, the NENA regional strategy and the government 's own poverty-reduction strategy.

The second thrust is to:

- Empower both men and women to fully participate in the development process.

The third thrust is to:

- Promote good local governance, as a necessary complement to the second thrust.

Within this framework, IFAD has supported the development of the following ongoing projects: Northern Kordofan Rural Development Project; Southern Kordofan Rural Development Programme; Gash Sustainable Livelihood Regeneration Project and Western Sudan Resource Management Programme. (Table 1 below shows the source of finance for these projects and Figure 1 shows their locations.)

Table 1. Financing of IFAD's Ongoing Projects in the Sudan (USD million)

Source of Funds/ Project	IFAD	GOS	States	Localities	ABS	Communities	Total
Northern Kordofan Rural Development Project	10.5	2.9	–	–	0.3	1.2	**14.9**
Southern Kordofan Rural Development Programme	18.4	4.2	–	–	0.3	0.9	**23.8**
Gash Sustainable Livelihood Regeneration Project	25.0	8.9	–	–	0.5	4.7	**39.1**
Western Sudan Resource Management Programme	25.5	9.4	1.6	1.8	0.5	1.6	**40.4**
Total	**79.4**	**25.4**	**1.6**	**1.8**	**1.6**	**8.4**	**118.2**

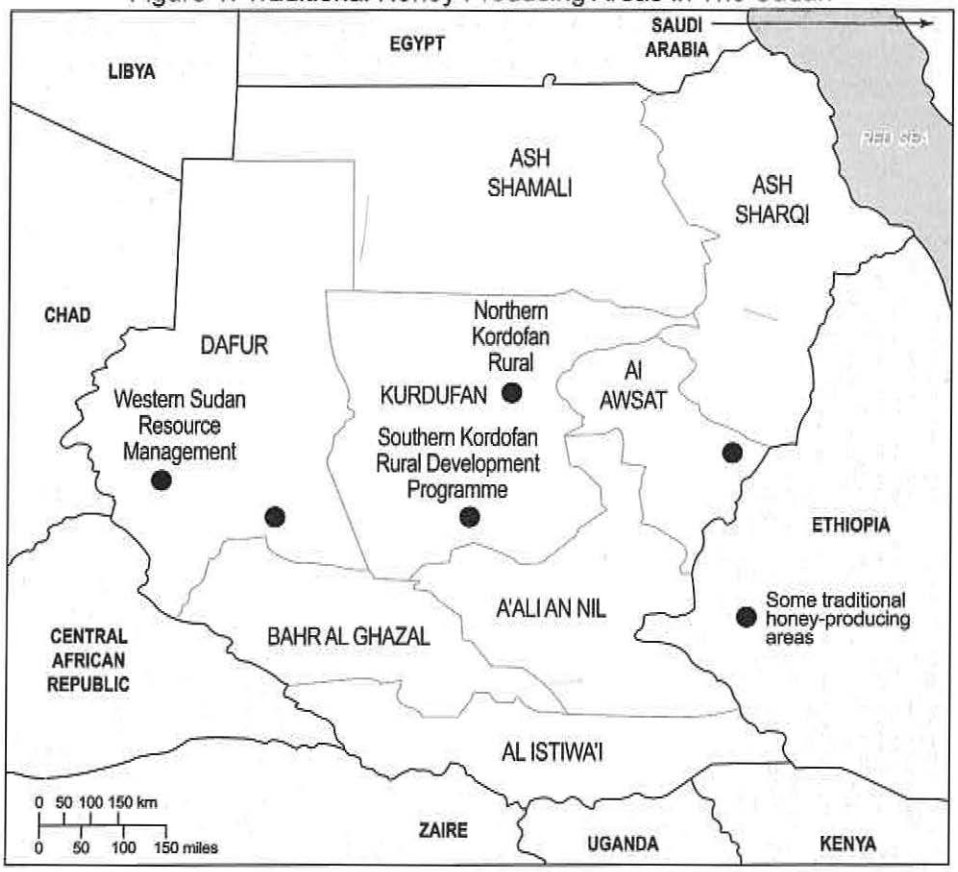
GOS = Government of Sudan, ABS = Agricultural Bank of Sudan.

As mentioned earlier, IFAD and GOS strategies are attracted to specific themes being worked on in a sustainable livelihoods context. These could be achieved through the access of the poor to natural resources, including land, forests, water, fisheries and wildlife, which are essential for sustainable poverty reduction. Landless people in rural areas are particularly vulnerable, because without secure access to land and other natural resources, they face more difficulties obtaining food, accumulating other assets and recovering after environmental and economic shocks or misfortunes.

An example is the Western Sudan Resource Management Programme that allows the rural poor to have access to Natural Resource Management (NRM). The main goal and purpose of the programme is to improve the equity, efficiency and stability of the economy of the project area through rationalising the regulation and use of natural resources, enabling access of poor households to productive services and fair terms of trade. These objectives are in line with the project objectives of developing community-driven income generating, integrated use of commercial insects in the Sudan, Yemen and Egypt.

IFAD-funded projects raise the awareness of the communities towards natural resource management and capacity building in many disciplines, e.g. community forestry and IPM.

Figure 1. Traditional Honey Producing Areas in The Sudan



Integrated Pest Management (IPM) Training

Basic IPM training is currently going on in all IFAD-funded projects in collaboration with the Ministry of Agriculture/Directorate of Technology Transfer and Plant Protection Department. To date, in each project, there is a good number of well-trained IPM workers distributed among the villages who are well equipped with the requisite chemicals, pumps and safety equipment under the Community Fund (Sanduq). Direct supervision of the IPM workers is undertaken by the Plant Protection Department at locality level.

Benefits

- IPM extension workers will add to the already existing potential opportunities for apiculture and sericulture production in the Sudan.
- As depicted in the map, there are some areas in the Sudan producing honey by traditional methods which can be improved through capacity-building initiatives at the village level so that community members are able to adopt the new beekeeping technologies.

- Sericulture can be practised in some IFAD-funded projects like Southern Kordofan Rural Development Programme (SKRDP) and Gash Sustainable Livelihood Regeneration Project (GSLRP) which are in regions where rich forests and dense leaf canopies exist.

Recommendations

- IFAD should include the commercial insects activities in the livelihoods of the rural poor in future projects.
- The *icipe* could organise exchange visits for the traditional honeybee producers of the Sudan to those countries with modern honeybee production technologies.
- Sericulture could be started in Gash area (Eastern Sudan) where there is good potential due to the availability of orchard trees in which the silkmoths could inhabit.

STATUS OF THE SERICULTURE DEVELOPMENT PROJECT IN EGYPT

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Introduction

Several third world countries have identified silk production as a promising sector for development of rural employment opportunities and hard currency earnings. Outstanding successes in Thailand and India have confirmed the assumptions about the potential of sericulture.

Egypt is located in a temperate zone and a climate with brief variable spring and autumn seasons. Winter is about 18 °C with low annual rainfall of about 25 mm. Summer is hot with low humidity because of the surrounding deserts with average temperature of 34 °C.

Mohamed Ali, the Governor of Egypt, attempted to promote the development of the sericulture sector during the early 19th Century by planting over three million mulberry trees in Delta region. These local varieties of *Morus alba* var *rosa* are distributed along the canals and roadsides. They are kept largely for their shade and fruits. They are also used in feeding the silkworm larvae in traditional silkworm rearing. The quality and quantity of the leaves is poor. In traditional rearing, 5–6 huge trees are sufficient for rearing one silkworm box. Local production of raw silk is not sufficient for domestic demand. So, Egypt covers its requirement from abroad. For these reasons, the Sericulture Research Department (SRD) is trying to develop sericulture in Egypt by importing different varieties of mulberry from other countries. A germplasm bank has been established in two sites with 56 mulberry varieties. Also, a silkworm-breeding programme has been started to isolate pure lines of *Bombyx mori* L. But the Sericulture Research Department still needs technical support to establish a silkworm eggs production station.

In brief, the basic conditions, potential and demand for a prosperous sericulture industry as model of agricultural projects are present in Egypt.

The Silk Industry in Egypt

The Ministry of Agriculture and Land Reclamation has been engaged in reclaiming new land from the desert since the mid-fifties. The objective is to extend the agricultural frontier and draw people away from the densely populated Nile valley, and increasingly, to make up for the land lost to urban growth.

Organisations

The Sericulture Research Department (SRD) is the organisation responsible for promoting and supporting sericulture in Egypt. It is dedicated to promotion of silk production and scientific research. The SRD is a division of the Plant Protection Research Institute of the Agricultural Research Centre of the Ministry of Agriculture and Land Reclamation. The SRD is based in Giza Governorate and has four small branches in Alexandria, Sharqiyah, Kafer Elshykh and Dakahlyia Governorates and a small experimental station of 4 feddan (1 hectare = 2.4 feddans).

Mulberry Trees

There are over three million mulberry trees in Egypt. They are distributed along the canals and roadsides. These trees are kept for shade and fruit. Farmers do not care for them in any way. These trees are used for feeding silkworms in traditional rearing. Harvesting of mulberry is difficult; it is done by climbing the huge trees and cutting the main branches. The main variety distributed in traditional sericulture is a local variety. Recommended varieties are distributed in modern sericulture as well.

Egypt has a Mulberry Germplasm Bank in two sites, at the Sericulture Research Department with 56 mulberry varieties, and at the Genetic Engineering Institute of the Agricultural Research Centre.

Silkworm Breeding

Egypt imports about 90% for its silkworm needs every year despite the many problems encountered. Below are some of the major ones.

- The imported hybrids are sometimes very susceptible to Flacheire and Grasserie diseases, which are widespread in Egypt. As a result, most silkworm breeders report that egg production must be carried out in the same place of cocoon production because silkworm hybrids are not resistant to diseases and fluctuations in temperature.
- During the flight or in customs, the imported eggs hatch at the airport or the full amount does not reach its destination.
- The Delta region and Upper Egypt areas have varied temperatures, necessitating that each region import a special hybrid.
- Sometimes the exporting countries experience many climate troubles and cannot send the eggs in time.

The Sericulture Research Department started a silkworm breeding programme to select pure lines from some varieties available at the SRD. Some of them are monovoltine varieties which were imported from Italy a few years ago. Also, some varieties were imported from South Korea as bivoltine hybrids. The cocoon

shape, cocoon weight and shell, and shell ratio are taken into consideration, but this breeding programme has many problems, including the need for:

- A post-harvest laboratory,
- Isolation and selection of pure lines resistant to diseases, high temperature and climate fluctuations,
- Technical and financial support,
- A modern laboratory as SRD has a very simple and old diseases control laboratory,
- A small grainage to produce silkworm eggs suitable for the spring, summer and autumn seasons and also, suitable for the Delta Region, Upper Egypt and the reclaimed land areas which have different climate conditions.

Recommendations

- As mentioned above, a modern post-harvest and diseases control laboratory must be installed.
- The breeding programme must be extended to create varieties suitable for each season and region, i.e. for Delta region, Upper Egypt and reclaimed land areas.
- The need for isolating varieties resistant to diseases and bad conditions and with high productivity.
- The need to establish a germplasm bank of different silkworm races.

ACHIEVEMENTS OF THE BEEKEEPING RESEARCH DEPARTMENT, EGYPT

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Introduction

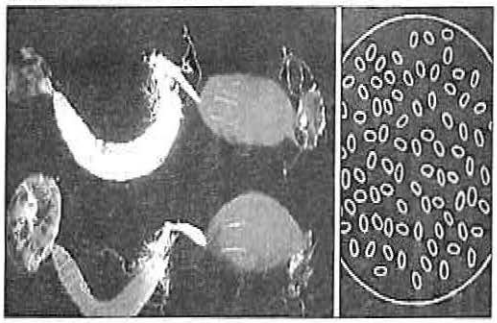
The following are the achievements of the Beekeeping Research Department of the Plant Protection Research Institute.

- Training beekeepers on how to recognise honeybee pests, diseases and parasites and on how to protect their colonies from the following: *Nosema apis* (Nosema), *Ascosphaera apis* (Chalkbrood), *Aspergillus flavus* (Stonebrood), *Acarapis woodi* (Acarine mites), *Varroa destructor* (Varroa mites), *Paenibacillus* larvae (American foulbrood) and *Melissococcus pluton* (European foulbrood). Training on identification of hornets, wasps, moths and wingless flies such as *Vespa orientalis, Philanthus triangulum, Galleria mellonella, Braula coeca* and the African bee-eater bird is also carried out. These parasites, diseases and pests can be controlled by natural means (i.e. without using chemical compounds).
- Training beekeepers on queen rearing, royal jelly production and pollen grains collection, and on large scale and commercial production.
- Cooperation between the Beekeeping Research Department and all social beekeeping colleges of agriculture.
- Cooperation between Beekeeping Research Department and the Beekeepers of Arab countries, the so called Arab United Apicultural Associations.
- Bee genetics and improvement of honeybee races and their crosses.
- Methods of queen rearing:
  - Breeding from the best queens,
  - Line breeding,
  - Hybrid breeding by using artificial insemination.
- Beekeeping in isolated areas:
  - Carniolan bees at Manzala and El-Wadi El-Gadid regions.
  - Italian bees at El-Wahat El-Baharia and El-Swais regions.
  - Egyptian bees at Siwa Oases.

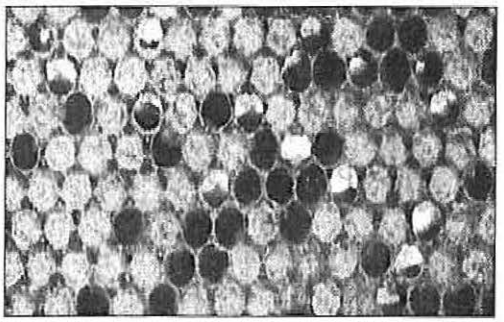
  These races are usually distributed to beekeepers to be used as mother queens to produce the first hybrids from. The aim is to control genetic and breeding races and protect them from deterioration of characters.
- Exportation of package bees and comb-less package bees and control of diseases, parasites and pests (Figure 1a–i).

Figure 1. Diseases, Parasites and Pests of the Honeybee in Egypt

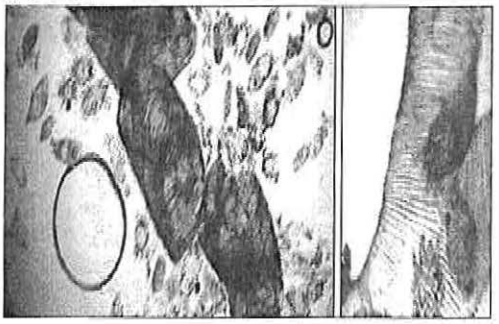
(a) Nosema spores



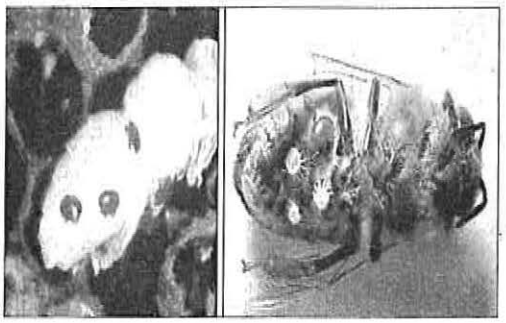
(b) Chalkbrood disease



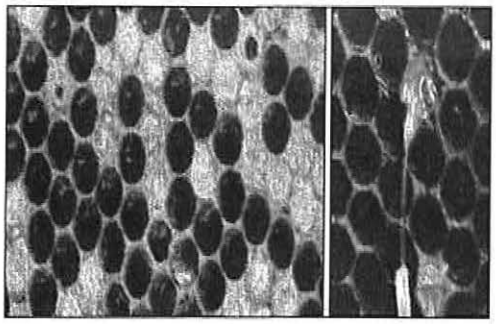
(c) Acarine mites



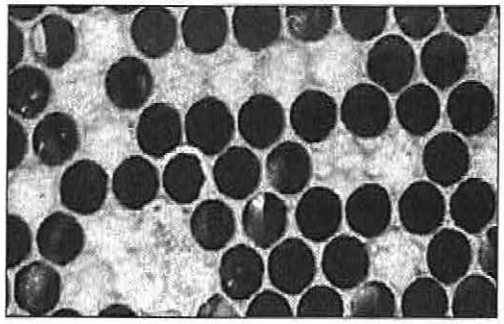
(d) Varroa mites on honeybee larva and adult honeybee cadaver



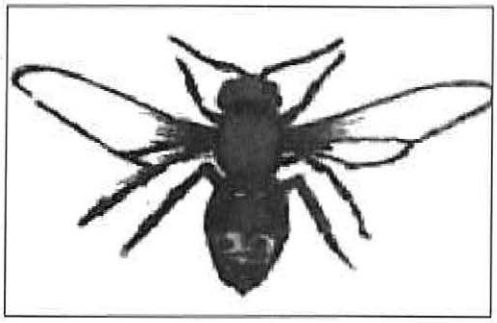
(e) American foulbrood (AFB)



(f) European foulbrood (EFB)

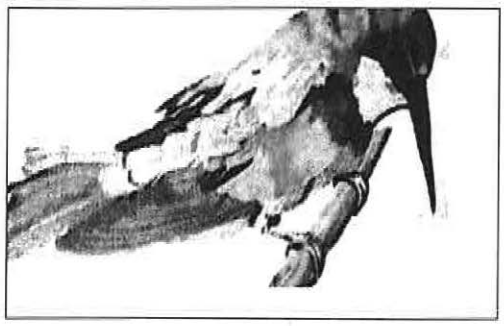


(g) *Vespa orientalis*, the oriental hornet



(h) *Galleria mellonella*, the greater wax moth

(i) The African bee-eater bird



The Apiculture Industry in Egypt

- The number of honeybee colonies in Egypt is about 1.75 million.
- The number of beekeepers in Egypt is about 35,000.
- Honey production is about 23,000 tons/year.
- Average production of honey is about 13 kg/colony/year.
- The production of honey, royal jelly and pollen grains collection covers the local marketing needs and provides a surplus for export.
- The flowering plants in Egypt comprise the citrus, clover, alfalfa, cotton, the sunflower and a variety of medicinal plants.

Table 1. Honeybee Colonies Exported from Egypt (1999–2005)

Year	Number of colonies		
	Comb-less	Combs	Total
1999	14,778	6345	21,123
2000	20,314	33,156	53,470
2001	12,036	22,902	34,938
2002	34,874	29,307	64,181
2003	32,162	23,712	55,874
2004	59,402	34,268	93,670
2005	73,026	32,227	105,253

Table 2. Number of Traditional Colonies and the Production of Honey and Wax by Governorate (1999–2005)

Governorates	Number of colonies	Wax/kg		Honey/kg	
		Total production	Average production/ colony	Total production	Average production/ colony
North Egypt	705	408.9	0.58	1635.6	2.32
Middle Egypt	370	77.7	0.21	1517.0	4.10
South Egypt	12,426	2112.4	0.17	35,787.0	2.88
Total	13,501	2599.0	0.32	38,939.6	3.10

Table 3. Number of Langstroth Colonies and the Production of Honey and Wax per Governorate (1999–2004)

Governorates	Number of colonies	Wax/kg		Honey/kg	
		Total production	Average production/ colony	Total production	Average production/ colony
North Egypt	727,892	65,510.3	0.09	3,319,187.5	4.56
Middle Egypt	481,503	24,075.2	0.05	3,105,694.3	6.45
South Egypt	194,256	9712.8	0.05	1,845,432.0	9.50
Total	1,403,651	99,298.3	0.063	8,270,313.8	6.83

These records until July 2004.

icipe/IFAD CONTRIBUTION TO APICULTURE AND SERICULTURE DEVELOPMENT IN UGANDA

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Introduction

The Plan for Modernisation of Agriculture (PMA) in Uganda envisions that the National Agricultural Advisory Services (NAADS) will be a decentralised, farmer-owned and private sector serviced extension system with a fundamental aim to develop a demand-driven, client-oriented and farmer-led agricultural service delivery system, targeting the poor, the youth and women. The justification for NAADS is the failure of the traditional extension approach to bring about greater productivity and expansion of agriculture, despite costly government interventions.

As a part of its national expansion and resource rationalisation strategy, the NAADS programme focuses on harmonisation and integration of projects/programmes with agricultural extension related components. In Hoima district, the NAADS harmonisation process involves, among others, integration of the apicultural and sericultural enterprise development activities of the agricultural component within the District Development Support Programme (DDSP) supported by IFAD/BSF in collaboration with *icipe*.

According to the PMA annual report, 2003/2004, the Agricultural Advisory Services aims at assisting organised groups to access information, knowledge and technology. It realigns itself and harmonises with the existing resources and on-going extension programmes and projects. In Hoima, the harmonisation process has, among other things, integrated the IFAD/*icipe* supported activities of the agricultural component of District Development Support Programme (DDSP) like apiculture and sericulture development into NAADS implementation structures.

The Poverty Eradication Action Plan

The Poverty Eradication Action Plan (PEAP) is Uganda Government's framework to guide action to eradicate poverty. It was first drafted in 1997 and was revised in 2000. It was prepared through consultative process involving central and local governments, parliament, donors and civil society. It aims at transforming Uganda into a middle-income country. The PEAP has 5 pillars:

- Economic management
- Security, conflict-resolution and disaster management
- Good governance
- Human development, and
- Production, competitiveness and incomes.

Plan for Modernisation of Agriculture

Under the PEAP actions that promote production, competitiveness and incomes are guided by a policy framework known as Plan for Modernisation of Agriculture (PMA). PMA provides guidelines for the transformation of agriculture. It is envisaged that modernising agriculture will contribute to increasing incomes of the poor by raising farm productivity and increasing the share of agricultural production that is marketed, and creating on-farm and off-farm employment. The PMA mission is to eradicate poverty by transforming subsistence agriculture to commercial agriculture. PMA has seven components:

- Rural financial services
- Agro-processing and marketing
- Agricultural education
- Sustainable use and management of natural resources
- Supportive infrastructure
- Agricultural research and technology development
- Agricultural advisory services (NAADS).

National Agricultural Advisory Services

The National Agricultural Advisory Services (NAADS) is one of the seven core components under the PMA. It was established by an act of parliament in 2001. The PMA envisions that NAADS will be a decentralised, farmer-owned and private sector serviced extension system contribution to the realisation of the agricultural sector objectives. The mission of NAADS is increased farmer access to information, knowledge and technology through effective, efficient, sustainable and decentralised extension with increasing private sector involvement in line with government policy.

NAADS Justification

The justification for NAADS is the failure of the traditional extension approach to bring about greater productivity and expansion of agriculture, despite costly government interventions. NAADS is a new approach aimed at overcoming institutional undermining of farmers' access to knowledge and productivity enhancing technologies. These constraints include weak research–extension–farmer linkages; uncoordinated and non-participatory extension services; high level of bureaucracy during service provision; low responsiveness to farmers' needs; and lack of financial and performance accountability.

The fundamental aim of NAADS, therefore, is to develop a demand-driven, client oriented and farmer-led agricultural service delivery system, in particular targeting the poor, the youth and women. The strategic elements of NAADS are as follows:

- Shift from public to private delivery of advisory services.
- Empower subsistence farmers to access private extension services and market information.

- Develop private sector capacity and professional capability to supply agricultural services.
- Create options for financing and delivery of appropriate advisory and technical services for different farmer types.
- Gradually reduce the share of public financing of farm advisory costs such that, by the end of 25 years of NAADS, public finance accounts for not more than 50% of farm advisory costs.

NAADS Principles

Implementation of NAADS is in accordance with the following principles:

- Empowerment of farmers and building their capacity to demand appropriate technologies and agricultural advisory services.
- Targeting agricultural advisory services to the poor farmers especially women who constitute the major farming population.
- Mainstreaming of gender issues into the policy framework and integration of gender concerns into implementation plans.
- Deepening decentralisation to enable farmers to own and control agricultural services.
- Increased commercialisation—including intensification of productivity and specialisation.
- Use of participatory processes in planning, contracting, monitoring and evaluation.
- Ensure sustainable management of natural resource productivity.
- Increasing institution efficiency in providing agricultural advisory services through contracting out of services.
- Creation of better linkages between research, advisors and farmers.
- Harmonisation of externally supported projects with PMA principles.

Private Extension Services

Under NAADS approach, extension services are delivered by private providers who are awarded short term contracts to promote specific enterprises. There is a coordinator at the sub county level who works with the Local Council and the local community to identify priorities and manage the allocation of contracts.

Target

The programme is working principally with the economically-active poor; those with limited physical and financial assets, like skills and knowledge, rather than with the destitute or large-scale farmers. A poverty and gender strategy is in place to provide clear guidelines to be used by staff working under the NAADS programme, in both its design and implementation.

The Role of NAADS in Apiculture and Sericulture Development Through Collaboration of IFAD/*icipe* in Hoima Local Government

As a part of its national expansion and resource rationalisation strategy, the NAADS programme has continued with the harmonisation of ongoing projects/programmes with agricultural extension related components in conformity with NAADS principles. In Hoima district, these include District Development Support Programme (DDSP) supported by IFAD in collaboration with Belgian Survival Fund (BSF) and International Centre of Insect Physiology and Ecology (*icipe*).

DDSP became effective in May 2000 as a follow on phase of Hoima Kibaale District Integrated Community Development Project (H-KICDP). General focus was on community mobilisation for development (using all avenues, e.g. local FM radios, drama), farmer empowerment, participatory planning, production and technology development support to farmers aimed at increased productivity, income generation and improved food security. DDSP laid a firm foundation on which NAADS programme was started in the district.

In Hoima, NAADS began in July 2003, piloting the DDSP/NAADS harmonisation strategy in two sub counties. The two sub counties performed so well that by 2005/2006, NAADS had rolled onto all the 11 sub counties of Hoima District.

The harmonisation process involved integration of the IFAD/*icipe* supported activities, of the agricultural component of District Development Support Programme (DSSP), like apiculture and sericulture into NAADS implementation structures.

Beekeeping as a Priority Enterprise in the NAADS Programme

Enterprises supported under NAADS are selected through a participatory exercise by farmers at parish level. Farmers are facilitated using a given criteria to select enterprises which are profitable, marketable and with low production risks. Food security is also a major consideration. Three enterprises are selected per sub county and farmers are supported in advisory services, enterprise development and market information and linkage.

The enterprises which have been selected by farmers in different sub counties are beekeeping, upland rice, cassava, local poultry, goats, horticultural crops, and local cattle development.

Beekeeping is also supported by *icipe* especially in technology development and capacity building of extension staff.

NAADS Implementation Components

NAADS is implemented through six components. Each component ensures harmonisation of other related programmes and projects of other development partners operating within the district and sub counties. This is aimed at creation of better linkages and synergies, and to avoid duplication at household level.

Component 1: Farmer Institutional Development
This component supports strengthening and capacity development of farmer institutions in the NAADS farmer structures. It supports farmer fora and parish coordination committees, procurement committees and community-based facilitators.

Component 2: Advisory and Information Services to Farmers
This component supports initiatives by men and women farmers, working together in groups with their sub county government, to contract agricultural advisors to deliver identified priority services. Matching grants are channelled from the national level of government through the districts for farmers (through farmer fora and their sub county governments) to use in financing such contracts. Services contracted under this mechanism include programme orientation and group mobilisation for farmers, participatory planning, farm advisory services and information communications.

Component 3: Enterprise Development and Linkage with Markets
This component fosters strong linkages among farmers, advisors and researchers, and between farmers and markets by making funding available to farmers and their farm advisors. Funds are available at the district and sub county levels with which to contract the services of researchers and others with relevant expertise to work with farmers and farm advisors in farmers' fields on specific technology, market development and adaptation.

Component 4: Service Provider Capacity Development
This component assists in capacity building of individual service providers, firms and NGOs to become eligible for award of contracts to provide services to farmers with NAADS financing. Specific activities to be funded include local service provider development and national representative organisations/ institutional support.

Component 5: Planning, Monitoring and Quality Assurance
This component supports planning activities, semi annual and annual review activities, baseline studies, impact assessments and management information systems (MIS). It also supports process monitoring, participatory (farmer) monitoring and service provider technical audits.

Component 6: Programme Management and Coordination

This component establishes and supports entities at both the national and district levels of government, which coordinate and administer NAADS. At national level, this includes establishment and maintenance of NAADS Board and Secretariat. At the local government level, NAADS supports district and sub county NAADS Coordinators to facilitate the bottom up planning process, and liaise with other stakeholders. It supports the facilitation, coordination, financial management and reporting, financial auditing of the programme's financial flows, and oversight of service contracts. In addition, the component supports establishment of a management information system for monitoring of the NAADS, as well as baseline surveys and data gathering procedures for impact evaluation.

Achievements in Apiculture Development Through Collaboration of IFAD, *icipe* and NAADS in Hoima

- Through support from *icipe* and IFAD loan projects, in close collaboration with NAADS, most of the challenges in apiculture, like inadequately trained staff involved in apiculture development, declining swarms due to deforestation, indiscriminate use of pesticides, poor practices, lack of organised marketing system and unavailability of improved technologies for modern beekeeping have reduced in magnitude.
- The *icipe* has built capacity of 5 technical officers in the specialised areas of queen rearing, royal jelly production, candle making, handling and processing and packaging of hive products.
- The trained team has been mobilising and popularising these techniques by training beekeepers.
- A more organised beekeepers association (Hoima Beekeepers Association) with over 300 members is in place.
- Re-orientation of beekeeping from subsistence to commercial enterprise beekeeping is ongoing. There is a gradual shift from the traditional/local low yielding hive (8–15 kg/hive/year) to the improved KTB and Langstroth hives. The harvest from Langstroth hives is 20–30 kg and with good management the harvest can be two times a year. Currently there are over 500 Langstroth hives (200 provided by DDSP, 100 by *icipe*, 60 by other organisations, and over 155 procured by individual beekeepers). There has been increased productivity and incomes at beekeepers' level.
- Beekeepers sell honey at Uganda shillings 1000/kg comb honey; therefore, income from Langstroth honey is Ushs 40,000–80,000 (US$ 20–40) per hive per year (2 harvests). With diversification of production to royal jelly production, queen rearing and other value added hive products, the beekeeper will realise more income.
- Income from the local hive is Ushs 8000 to 15,000 (US$ 2–7.5) per hive per year (1 harvest).
- Training of local artisans has been done; 2 carpenters were trained on how to make Langstroth and KTB hives using templates from *icipe*. In 3 years,

they have made over 1000 hives for organisations and individuals in the programme area.

- Bulindi Marketing Centre was constructed with support from IFAD/BSF, Hoima local government and Hoima Beekeepers Association. The *icipe* provided the honey processing machines. The marketing centre has become the honey production hub of Uganda. It is a link between producers and consumers.
- Technology development and technology development sites have been established at Bulindi, Kikonoka and Wambabya where different apiculture technologies such as pollination services, royal jelly production, queen rearing and candle making are demonstrated and disseminated.

The Main Constraint

One important challenge to NAADS is failure to implement all the seven pillars of PMA at the same rate. NAADS would perform best if it was implemented alongside the PMA pillars of microfinance, infrastructure development, marketing and agroprocessing.

Recommendations

- NAADS focuses mainly on enterprises that can be developed into marketable ventures and yet NAADS alone cannot guarantee a market for any product. Close links between NAADS and the marketing and agroprocessing strategy are needed to minimise marketing risks. As for apiculture, this challenge has been addressed by the development of the marketing centre at Bulindi with support from IFAD/*icipe*.
- Apiculture has been fully integrated into the mainstream NAADS programme. However, Hoima District Local Government still requires the close collaboration and support from *icipe* and IFAD, particularly in apiculture and sericulture technology packages that have not been established, in up-scaling the developed technologies and in farmer institutional development.
- There is also the need to establish and develop the sericulture enterprise, which is not as yet developed as the apiculture enterprises.

icipe/IFAD CONTRIBUTION TO APICULTURE AND SERICULTURE DEVELOPMENT IN MADAGASCAR

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Introduction

The *icipe*/IFAD project started contributing to apiculture and sericulture development in Madagascar in 2000.

In 2000, three Malagasy trainers attended the international training course on apiculture and sericulture at *icipe*, one trainer on beekeeping and the other two on sericulture.

In 2000–2001, (the author) Dr J. J. Randriamananoro, was at *icipe* for a long-term training and research work on beekeeping and silkworm rearing.

In 2002, the author went back home and started working with public and private institutions on beekeeping and sericulture.

In 2006, the *icipe*/IFAD project financed the setting up of the honey marketplace and training in Madagascar at a cost of US$ 20,000.

Achievements in Beekeeping

- More than 150 farmer's associations and groups have been trained in modern beekeeping (see also Figure 1a and b),
- About 50 trainers have been trained in modern beekeeping,
- Fifty farmers' groups have been trained, and
- A honey marketplace is being set up.

Recommendations

- Post-harvest training in sericulture
- Queen rearing stations needed
- Explore the potential of stingless bees
- Wild silk farming to be scaled up
- Pollination of crops by bees and stingless bees to be set up.

Figure 1. Training of Trainers and Farmers' Groups in Beekeeping in Madagascar

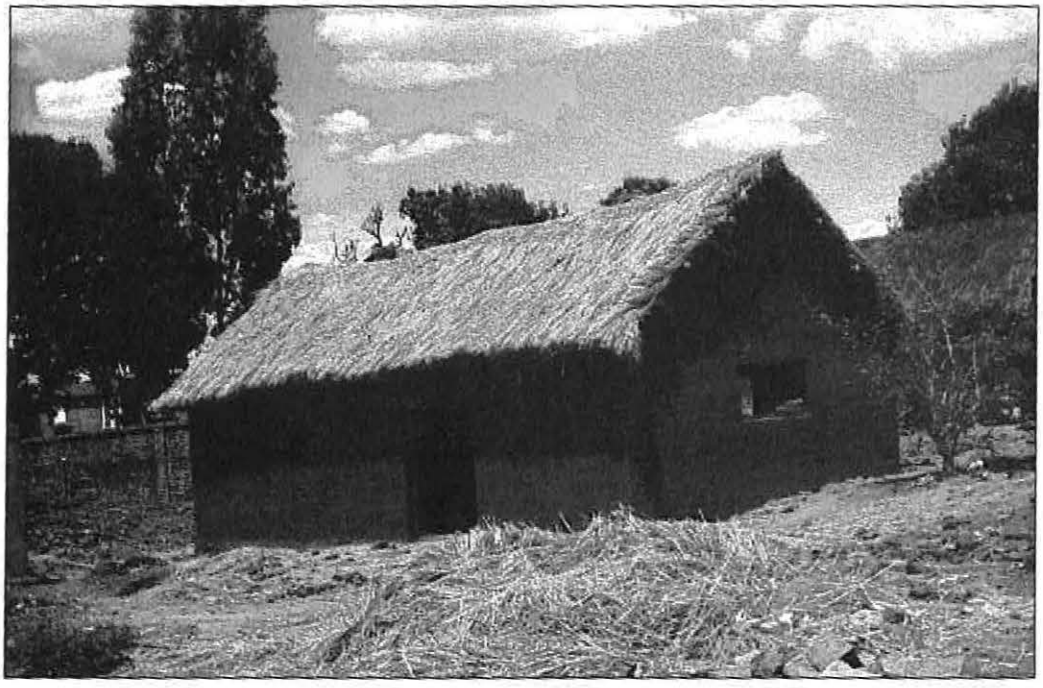
(a) Training in hive frame making in Madagascar

(b) Gentle honeybees covering the hands of a beekeeper in Madagascar

Achievements in Silkworm Rearing

Figure 2. The Mulberry Plantation

Figure 3. Silkworm Rearing House



CONSERVATION OF WILD SILKMOTH BIODIVERSITY IN AFRICA

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Introduction

The future for sustainable management and development lies in the rational use of existing resources, which entails recognising the biodiversity that exists in various ecosystems. Africa has a wealth of wild silkmoths (Lepidoptera) whose caterpillars at maturity produce silk, spinning it into cocoons. The potential of some of these moths to produce silk commercially has been reported by various workers. In many parts of the world today, people are looking for means of diversifying the sources of income, more so those that are sustainable and environmentally friendly. Wild silk farming is a unique eco-friendly agro-practice with the potential for environmental amelioration. Wild silk farming

Table 1. Wild Silkmoth Species and Their Food Plants in Africa

Genera	Families	Representative species	Food plants
Argema	Saturniidae	*Argema mimosae* *A. besanti, A. mittrei*	*Sclerocarya birrea* *Spirostachys venenifera,* *Lannea schweinfurthii*
Anaphe	Thaumetopoeidae	*Anaphe panda,* *A. venata*	*Bridelia micrantha* (Euphorbiaceae), *Cynometra alexandria,* *Triumfetta macrophylla,* *Triplochiton scleroxylon,* *Cassia sieberiana,* *Casuarina equisetifolia*
Epiphora	Saturniidae	*Epiphora mythmnia,* *E. bauhnia*	*Ziziphus mucronata,* *Z. mauritania* (Rhamnaceae)
Gonometa	Lasiocampidae	*Gonometa postica,* *G. podocarpi,* *G. rufobrunea*	*Acacia* spp.; *Podocarpus usambarensis,* *Colophospermum mopane* (Caesalpiniaceae)
Borocera	Lasiocampidae	*Borocera cajani*	*Cajanus indicus* (Leguminosae); *Dodonaea madagascariensis,* *Uapaca bojeri* (Euphorbiaceae) *Mangifera indica*

and the conservation of the silkmoth's food plants is inseparable hence uplifting wild silk farming must encompass conservation of the food plants and the ecosystems in which these wild silkmoth species are found.

Silk has been a highly valued commodity for thousands of years. The vast majority of the silk involves the rearing of *Bombyx mori* L. on mulberry plants. Perhaps lesser known and also highly valued is the naturally occurring wild silk. In East Africa, surveys have shown the existence of diverse species producing wild silk cocoons.

The food plants for some of these African wild silkmoth species are plants highly valued for other products such as nectar for bees, wild fruits and medicine. They include *Ziziphus* spp., *Acacia* spp., *Bridelia* spp. and *Sclerocarya* spp. If these tree species are included in tree planting initiatives, the prospects for wild silk farming will be enhanced (Table 1).

Why Conserve Wild Silkmoth Food Plants?

Wild silkmoths often have a restricted distribution and food plant range. The decline in numbers of a silkmoth species in an area may be the first sign of degradation of the environment.

As food plants play an important role in wild silk production, their conservation is key to the participating communities' engagement in their conservation.

Wild Silkmoth Conservation Baseline Studies

Initiation Process

- Initial surveys were carried out by the (Natural History Museum, UK).
- Food plant availability, distribution and phenology studies have been done.
- Wild silkmoth biology and ecology studies have been completed.
- Production economic studies have been undertaken.
- Community awareness creation and training have been carried out.
- Products diversification, value adding (e.g. use of natural enzymes for degumming cocoons) is being encouraged.
- Market research and linkage studies have been done.

Recommendations

- Wild silk farming be introduced in NENA project countries using indigenous silkmoth species.
- Training in wild silk farming be provided.
- Conservation efforts be made by targeting wild silkmoth food plants in afforestation initiatives.

IMPROVING APICULTURE ENTERPRISES THROUGH DIVERSIFICATION AND VALUE ADDITION OF HIVE PRODUCTS

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Introduction

The majority of the world's poor live in rural areas and farming is the livelihood of most of these estimated 900 million people. Three quarters of this population earns less than US$ 1 a day. As such, without economic growth among poor people in rural areas there will be no significant reduction in world poverty. Studies have established close links between rural poverty and environmental degradation, and that the underlying problems must be tackled in an integrated way by protecting and expanding the environment and natural resources on which the rural poor depend. This degradation, however, can be slowed down by the introduction of economic incentives that integrate conservation with economic enterprises of the rural people. Beekeeping and apiculture are such enterprises.

Nevertheless, many beekeeping activities in developing countries are mainly oriented towards production of honey, and to a lesser extent beeswax. Other hive products are not produced. (Mainly due to lack of knowledge on production techniques and poorly developed marketing systems.) However, new generation hive products like royal jelly, propolis, pollen and queen rearing offer good returns to beekeepers. Most of these products are becoming increasingly popular in cosmetics and medicinal preparations use. As such, beekeepers in developing countries need to be encouraged to take up their production. Information must also be provided on their utilisation to improve the possibility for diversification in beekeeping activities.

The *icipe* has developed technologies for production of royal jelly and propolis using African bees, and through training, these skills can be adopted by most beekeepers.

Potential Areas for Value Addition

Honey

Value-addition of honey could be done through production of creamed honey, comb honey, honey spreads, fruit nuts in honey, honey with pollen and propolis, honey biscuits and honey chocolate. This, coupled with improved packaging and branding, has the potential to improve returns for beekeepers. Production of

of honey from stingless bees (with proved enhanced medicinal properties compared to honey from *Apis mellifera*) is a hugely unexploited area, whose potential is enormous. The *icipe* has developed new hives and hiving techniques for stingless bees species in three forest areas in Kenya.

Beeswax

Value could be added through producing candles, as base for creams and lotions, in textiles, wood preservatives, and for making varnishes and polishes. The cosmetics and pharmaceutical industries have no complete substitute for beeswax, and as such small quantities will always be needed to maintain standards and specific characteristics.

Propolis

Propolis has been used as a medicine since ancient Egyptian times, but in common with other natural medicine, was forgotten for over 100 years. However, in recent times, a renewed interest in propolis has been witnessed mainly due to an increase in awareness and interest in natural ways of staying well and combating disease, increasing concern on the side effects of chemical medicine (especially antibiotics) and the realisation that antibiotics are not the 'magic bullet' we once thought they were. As a result, medical researchers are now questioning their search for a single active ingredient, and it seems we are going back to where medicine started: The use of the whole plant.

Propolis is a complex resinous mixture collected by bees from plant exudates and which is mixed with hypo-pharyngeal secretions, beeswax and pollen. In the hive, propolis is used for comb construction and polishing, to maintain an aseptic hive environment and for protection and adaptation of bees nests. Propolis has a complex chemical composition depending on the diversity of plants and geographic locations from which bees collect it. Research has shown propolis to have antibacterial, antiviral and antifungal activities. Dermatological and cosmetic applications of propolis are well studied and understood. As such, products like ointments, oral and nasal sprays, propolis syrups or honeys, propolis shampoos, creams, lotions, nutritional capsules and soaps could easily be produced to add value and diversify beekeepers' incomes.

Royal Jelly

Royal jelly is a creamy, milky-white, strongly acidic and highly nitrogenous substance secreted by hypopharyngeal and mandibular glands of worker bees of 5–15 days of age. The jelly is fed to queens throughout their larval and adult stages, and is also fed to young worker and drone larvae. The principal constituents of royal jelly are water, proteins, lipids, carbohydrates, fatty acids, vitamins and mineral salts. Like propolis, royal jelly has a wide application in the food and cosmetics industry. It is a nutritional powerhouse that is rich in amino

acids and vitamins. Royal jelly has multiple broad-range actions such as natural nutritional tonic, anti-anorexic, anti-inflammatory and immuno-stimulant.

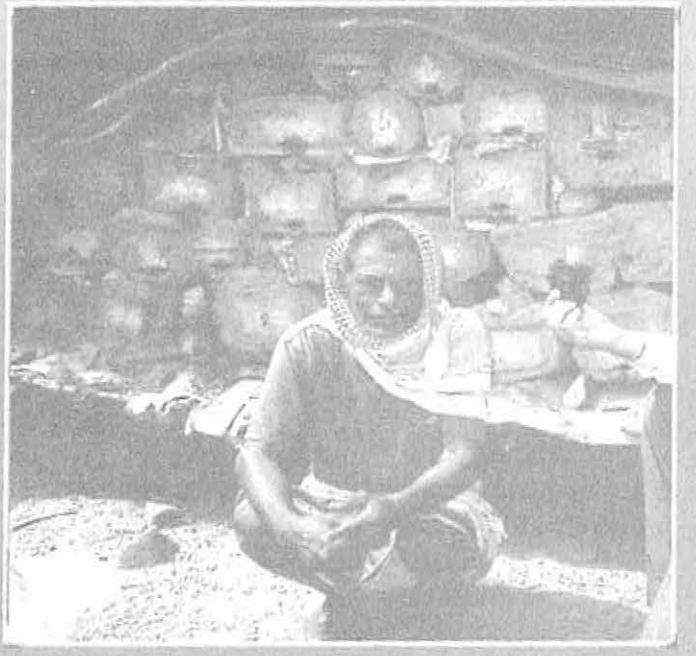
Recommendations

- It is encouraging to note that most value addition of these hive products cannot only be done with traditional skills on small, home-based production level but also on medium to large industrial scale, depending on the cultural and economic environments of the beekeepers. The *icipe* has developed 4 community-owned honey marketplaces in East Africa for value addition of hive products and for bulking up products to interest traders.
- Pollination services by both honeybees and stingless bees is largely unexploited in Africa and the Near and Middle East. Again, employing bees for pollination of fruit crops offers an additional avenue for diversification of beekeeping activities.
- The avenues for diversification and value addition are unlimited, and with little imagination and ingenuity coupled with organised marketing strategies, beekeepers could be trained and encouraged to venture more into value addition. Hopefully increased incomes will lead to improved conservation, thus protecting the environment from which bees and man obtain most of their daily needs.

GENERAL RECOMMENDATIONS

Sessions One and Two

- Training for the trainers in sericulture and apiculture be organised by *icipe* after the approval of IDB/OPEC funds for NENA countries.
- Scale-up of the silk and honey/ hive based products in the NENA countries.
- Market strategy and market linkages be fully defined.
- Organic certification of the silk and honey based products be arranged by *icipe* for the NENA countries.
- Quality control laboratories be established by *icipe* at the strategic places in the NENA countries.
- Silk and honey marketplaces be established.

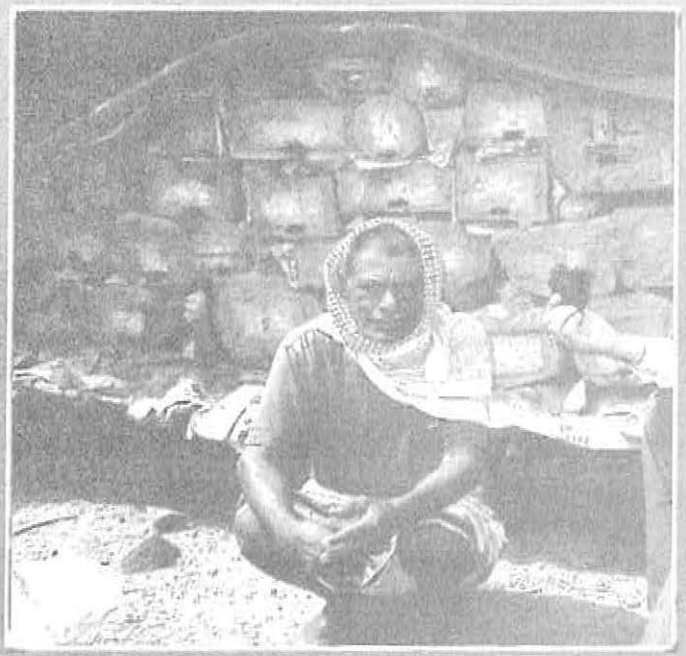


SESSION THREE

IDB/OPEC Project Concept and IDB Recommendations

Chair: Mr Abderrafia Abdelmouttalib

During this session, Prof. Raina made a presentation on the proposed project, emphasising that the grant will support IFAD loan project areas with income generating activities based on apiculture and sericulture enterprises. The *icipe* will link up with country coordinators who, on the ground, are the relevant ministries for the implementation of the various activities. After lengthy discussions on the project proposal, the participants agreed to go through the document keeping in mind the suggestions made during the discussion session and to send their comments to Raina within 14 days.



IDB/OPEC PROJECT CONCEPT

Suresh Raina
Commercial Insects Programmes
icipe – African Insect Science for Food and Health
Nairobi, Kenya

1.	**Project Name:**	**Development of Community-driven Income Generating, Integrated Use of Commercial Insects in the Sudan, Egypt and Yemen.**
2.	**Funding Agencies:**	Islamic Development Bank (IDB), OPEC Fund for International Development (OFID) and the International Fund for Agricultural Development (IFAD).
3.	**Implementing Agencies:**	*icipe* – African Insect Science for Food and Health and the NARS in the Sudan, Egypt and Yemen.
4.	**Participating Countries:**	The Sudan, Egypt, Yemen and Kenya (*icipe*).
5.	**Countries Eligibility:**	The Sudan, Egypt and Yemen are members of the League of Arab States.
6.	**Focal Area:**	Income Generation and Marketing for Sustainable Rural Poverty Reduction.
7.	**Operational Programme:**	All Ecosystem-Strategic Priority: Catalysing the Sustainability of Protected Area Systems.
8.	**Responsible Government Agencies:**	Ministry of Agriculture and Livestock and Forest Department in each country.
9.	**Operating Institute:**	The *icipe*.

10.	IDB contributions:	US$	1,275,000
	IFAD Co-finance	US$	1,400,000
	OFID contributions	US$	600,000
	icipe Co-finance (in kind)	US$	600,000
	Participating Countries (in kind)	US$	600,000
	Viking Ltd and Biop Ltd.	US$	100,000
	TOTAL COST	**US$**	**4,575,000**
11.	**Project Proposed Starting Date**		**June 2007**
	Project Completion Date		**May 2010**

Summary

The overall objective of this Pilot Project in the NENA region (in the Sudan, Egypt and Yemen), is to reduce poverty through improved food security and income levels of farmers, especially for rural women by promoting more effective use of forest resources and biodiversity through introducing income generating activities using honeybees and silkmoths. The project will also improve management practices for better crop yield through pollination services and will provide honey and silk marketplaces and marketing linkages for the products. This will contribute to the governments' poverty reduction and environmental conservation strategies. The project's immediate objective is to enhance equitable use of forest resources with particular focus on commercial insects use for income generation and ecosystem conservation. The project area covers the protected forests and poverty stricken semi-arid zones with spiny woodlands of the Sudan, Egypt and Yemen. In these areas, the IDB / IFAD / OFID grant will support the IFAD ongoing loan projects which are mostly based near the forest zones in all countries and assist them in fulfilling their objectives through training, marketplace development and capacity building. The project uses a two-pronged approach to poverty reduction and ecosystem restoration. The first is by addressing the causes and impacts of ecosystem degradation. The second is by minimising the anthropogenic threat by introducing, through capacity building, alternative sources of income through the development of silkmoth and honeybees technologies using minimal forest resources and by improving agricultural produce through pollination services. To make protection more sustainable in the long term, the local population will be actively involved in the design and implementation of conservation strategies. This participation in planning and management will not necessarily cover the short-term losses incurred: This project aims to achieve protection through utilisation of natural resources and also achieve protection through exclusion. While in the first group the restrictions on utilisation are of limited duration and are confined to a few forms of utilisation, the ban on utilisation in the second group extends to the entire protected area. Both types of projects require training to the local community by NARS and *icipe* to bring changes in behaviour on the part of resource use. The promotion of village level organisations to control by-laws and rules, acts as a stimulus for change within the social system. Capacity development at all levels (community, district, central forestry) is targeted within all core outputs (1–5). The project will provide the local people with needed expertise in community forestry inputs, institutional support as well as product enterprise in sericulture and apiculture. The project assists district involvement (in new districts, with little past institutional support) and provides support to the partnership process. There is a need for better market information services among local communities living near rural areas. This project provides that information in a village friendly manner.

This will bring the change in income generating groups. The IDB / OFID and IFAD-financed and *icipe* / NARS implemented activities in the commercial insects

areas are focused on improving the income of the poor and their livelihoods. This will bring the change in income generating groups. The IDB/OFID and IFAD-financed and *icipe*/NARS implemented activities in the commercial insects areas are focused on improving the income of the poor and their livelihoods. This is an open ended goal since it does not address the level of improvement that would be desirable and hence implies that the never-ending improvement in living standards will always be desirable. While Governments/NARS and *icipe* will support (in kind) capacity building through on-site training on ecosystem management activities in forest areas within the Sudan, Egypt and Yemen, the marketing aspect is undertaken by private groups. The total project cost is US $ 4575 million.

Background

The NENA (Near East and North Africa) region includes the Sudan, Egypt and Yemen. Their geographic locations, administrative details and economic structures are given in the full project document to be submitted to IDB. As indicated, their economies are heavily dependent on agriculture, which contributed 43–55% of the gross domestic product (GDP) in 1999/2000. About 85 percent of the population is engaged in agriculture except for Egypt. The major export items of these countries include coffee, hides and skins, oilseeds, qat, beeswax and sugarcane. The service sector contributes about 35–45% of the GDP and industry accounts for 6–12% of the GDP. The incidence of poverty in Yemen and the Sudan is very high. About 50% of the population of Yemen and the Sudan, for example, cannot afford to spend enough to consume the minimum food requirements. Poverty in these countries is a manifestation of complex factors such as high population growth and unemployment, environmental degradation, drought, low literacy, limited access to resources, and limited access to health and education services. Poverty in these countries is also a multidimensional problem and, owing to poverty's large scope and multiplicity of actors, there is no single guaranteed approach to its eradication. The causes and solutions to poverty are multifaceted. The delivery of income generating options such as sericulture and apiculture products has been viewed as an antipoverty tool in the NENA region. IDB, OFID, IFAD and *icipe* have the mission and vision of poverty alleviation. The delivery of income generating services in the Sudan, Egypt and Yemen through *icipe* will increase the outreach and sustainability of the community-driven enterprises. There is clear empirical evidence that the traditional honey and silkmoth collection enterprises exist in the NENA region but are inefficient and unprofitable due to lack of technical training and infrastructure.

Poverty in the NENA region is a regional/national crisis. The delivery of financial services has also been viewed as an antipoverty tool of the development programmes in the Sudan, Egypt and Yemen because it helps the unemployed become employed. Similarly, commercial insects use does the same, thereby increasing income and consumption and reducing poverty. Improving and supporting these enterprises initially through micro-finance and/or revolving

funds services for the poor, can also facilitate economic growth by easing liquidity constraints in production.

Commercial insects use for income generation in the rural sector is not a panacea for poverty and related developmental challenges. Rather it is an important tool in the poverty eradication programmes. Thus, commercial insects enterprises alone cannot improve roads, housing, water supply, education and health services. However, the activity can play an important role in realising the above interventions. This project empowers the poor and provides them the confidence, self-esteem and financial means to increase income and access to social services. The grant will support IFAD/IDB/OFID ongoing loan projects around the protected forests and assist them in fulfilling their objectives through development strategy and capacity building in the NARS sector.

Project Rationale

Arab countries are rich in natural resources. Natural resources conservation has long been an important element in many policies and management plans in the Sudan, Egypt and Yemen and many other Arab countries. There have been achievements in ecosystem restorations but this is far from sufficient in terms of the magnitude of the problem. A key constraint is poverty and the inadequate or even the complete absence of local people's involvement in natural resource management. Populations living around important natural resources in the rural areas seldom have an input in shaping conservation plans and are not encouraged to participate in their implementation, except as hired labourers. Environmental degradation is mainly associated with absolute poverty. The greatest damage is caused by the richest 5% and the poorest 30%. However, expectations of the poor may have to be tempered by the balance that will have to be found between improvements in their livelihoods (living standards) and the increased natural resource extraction that will be required to achieve this goal. Improving natural resource management requires a strategic mix of planned law enforcement and local capacity building that includes community participation based on incentives. These incentives should be based on the diversification of local livelihood options. All of this needs to operate within a supportive enabling environment at Local, District and Central levels requiring an investment into policy support and institutional strengthening and awareness raising so to allow informed decision-making. Some efforts to this end have produced positive results in the Syrian Arab Republic (El-Lakany, 1993).

Rural poverty can be reduced by more investment in rural changes and the rural poor have to be enabled to take control of their own destiny. The Sudan, Egypt and Yemen have environmentally conscious Government policies that have overhauled their ecological sector, with improved management capacity. Both the policy and regulatory framework stress the need for collaborative ecosystem management and support the poor to generate income through economic restructuring and introduction of income generating activities such

El-Lakany (1993) Syrian Arab Republic Policy Paper. Published in FAO Unasylva, No.178.

as modern apiculture and sericulture. Several ecosystems provide ecological services and carbon credit value to these countries. The last decade has seen a decline in the management of ecosystem conservation capacity. However, the political will is now renewed to rebuild capacity, embracing community–government–private sector partnership. This project provides a mechanism for improved management systems that can contribute towards increased income generating opportunities benefiting the rural poor communities and enhancing and strengthening their forward and backward linkages to production and marketing systems for both local and export outlets (Raina, 2000, 2004 and 2005; Rodgers, 2005).

The Target Project Sites

The focal areas for the project are chosen to cover the range of the three countries' ecological zones based on selected IFAD project areas around the threatened forests. These are the most impoverished zones in Yemen where IFAD, in Al-Dhala governorate, is putting its major share through loan facilities for rural livelihoods and poverty reduction. This IDB/IFAD/OFID project will select 2 villages from Azaria and Al-Dhala districts each, and Z and I villages from Al Maharash. Similarly, the project will support one village each in Southern Kordofan, and one village in the eastern province, Kasala state IFAD projects in the Sudan. Also one village each in northeastern forest Noubaria, IFAD projects of one village near the Petrified Forest Protected Areas in Maadi city and one village in the mangrove vegetation of Wadi Alba at the Nile belt. Consultants have visited these villages and interacted with the local people who are quite enthusiastic to initiate the sericulture and apiculture ventures. (See Reports of consultants from the three countries.) Each of these areas have a high poverty index and also host regionally and globally important biodiversity. In addition, two quality control laboratories, each on silk and honey, will be developed. Honey quality control will be based in the University of Aden, Yemen and a silk quality control laboratory will be based in the Plant Protection Research Institute, Sericulture Research Department in Giza, Egypt (Table 1). A brief description of IFAD loan project is given in the full document to be submitted to IDB.

Raina S. K. (2000) *The Economics of Apiculture and Sericulture Modules for Income Generation in Africa.* IBRA Press, U.K. ISBN 0 86098 236 X. 86 pp.

Raina S. K. (2004) *Commercial Insects: A Practical Guide for Raising and Utilizing Silkworms and Honey Bees in Africa* (Volume 1). Published in seven languages (English, French, Kiswahili, ISBN 0 86098 246 7. 164 pp.; English, Spanish, Luganda, ISBN 0 86098 241 6. 173 pp.; English, Arabic, Amharic, ISBN 0 86098 247 5, 182 pp., IBRA, UK Publications.

Raina S. K. (2005) Developing Incentives for Community Participation in Forest Conservation Through the Use of Commercial Insects in Kenya. UNDP-GEF Project Inception Report Project ID: KEN/04/G35. 31 pp.

Rodgers W. A. (2005) *Crossborder conservation in East Africa*, pp. 3–8. In *Integrating Sericulture and Apiculture Technologies with Regional Development Operations.* Proceedings of the Trainers Course and Third International Workshop on Conservation and Utilization of Commercial Insects, November/December 2000 (eds. S.K. Raina et al.), *icipe*.

Table 1. IDB/IFAD Project Focus Villages and Institutes for Silk and Honey Enterprise Development

Country	Province/District University/Ministries	Villages/Town	Silk and Honey Enterprises
Yemen	i. Azaria district	2 villages	• Apiculture
	ii. Al-Dhala districts	2 villages	• Wild sericulture
	iii. Al Maharash	2 villages, Z and I	• Apiculture
	iv. University of Aden	Aden	• Honey quality control laboratory
Egypt	i. North Eastern Noubaria Province	2 villages	• Mulberry/ sericulture
	ii. Petrified forest, Maadi city, Fayoum	2 villages	• Apiculture/ sericulture
	iii. Wadi alba mangroves	1 villages	• Apiculture
	iv. Plant Protection Research Institute, Sericulture Research Department	Giza	• Silk quality control laboratory
The Sudan	i. Southern Kordofan district	2 villages	• Apiculture
	ii. Eastern province, Kasala state	2 villages	• Wild and mulberry sericulture

Economic Benefits from Sericulture and Apiculture Activities

Mulberry Sericulture

Mulberry sericulture involves four important operations: mulberry cultivation, silkworm rearing, cocoon production and post-harvest operation of cocoons to produce raw silk and silk cloth for the market. A mulberry plantation takes 7–8 months to mature and can support 4–5 cycles per year from the same plants. Using a one acre (0.4 ha) mulberry plantation as a case study in *icipe*, the economics of raising silkworms for profit has been established. One (1) acre of mulberry yields 8–10 tons of leaves in partially irrigated conditions. One box of silkworm eggs (20,000) after hatching into larvae (from I to V instars), consume 400 kg of mulberry leaves to yield 25–30 kg of silk cocoons. In the first year of mulberry plantation and rearing operation, only 1 cycle is possible and the earnings will be US$ 278. The profit margin during the first year will be minimal due to trial rearing and the initial establishment costs in terms of mulberry plantation and rearing appliances. Once the mulberry plantation is established, it lasts for about 15 years. From the second year onwards the income from the minimum four cycles with 4 boxes at each rearing can earn US$ 1500/hectare. Cocoons sale contributes US$ 1200 and silk waste, silkworm excreta, fruits, leaves as fodder and cuttings contribute US$ 300. These cocoons (16 boxes x 25 kg = 400 kg green weight) worth US$ 1200 are converted to 57.1 kg of 21/22 deniers of raw silk

(US$ 27/kg = US$ 1541), which can fabricate 488.7 metres of silk cloth costing US$ 4887 (at the rate of US$ 10/metre). If, for example, this cloth is converted to plain colour silk shirts, this can give 195 shirts worth US $6825 (US$ 35 per shirt).

This project plans to cover 750 acres (303.5 ha) for mulberry plantation across three countries and develop commercial models for the Government to follow. With a total of 250 acres (101.2 ha) of well established mulberry farms in each country, the community (250 households) can produce an average of 100 tons of cocoons from the second year (if all four cycles of production remain successful) and can yield about 14 tons of raw silk, yielding US$ 385,714 divided among 250 households in each country. Each household will earn US$ 1543 per year per hectare of mulberry plantation.

Wild Silk Farming

Using Mwingi, Kenya as a case study, it has been shown that 1 acre (0.4 ha) of land contains 100 *Acacia* trees (approximately) on which the wild silkworm *Gonometa postica* thrives. One tree with a canopy size of 8–10 cubic feet could support 200 larvae. However, during spinning time, more than 50% larvae crawl down and pupate in the surrounding bushes or neighbouring trees. One hundred (100) trees, each supporting 200 larvae but producing 80% cocoons, yield 16,000 live cocoons worth US$ 444.4. The price of the emerged cocoons is 50% (US$ 222.2). There are two wild silk crops in a year, which can yield an income of US $888.8/year depending on good climate conditions. Wise management of natural resources and proper farm training to farmers can conserve the habitat of threatened silkmoth species and their utilisation for silk production and generate additional income. In three countries it is estimated that 3000 acres (1214.1 ha) with 1000 households (the distribution depends on the country size and availability of natural *Acacia* forest) will be involved for wild silk farming translating to a substantial income in each country.

Modern Beekeeping

Beekeeping is a relatively inexpensive activity that generates income for the rural smallholder. Most of the honey-producing regions in the NENA region (the Sudan, Yemen and Egypt) have not been fully exploited and practice traditional beekeeping. Apiculture provides a nutritious commodity and income from production of honey. In addition to honey, the bees produce other highly marketable products such as wax, propolis, pollen and royal jelly. This project is introducing Langstroth hives, which are most efficient for beekeeping. This increases the volume of honey and bee products harvested 5-fold as compared to the traditional beehive, which enhances the economic returns. A colony requires 8 to 10 months to establish. The average honey production per hive is 20 kg/harvest of comb honey. The project will raise 12,000 Langstroth hives (6000 through the project and 6000 by the community) for 2000 households. The average production per hive is 20 kg which gives a supply (if only 70% hives are colonised at one time) of 168 tons of comb honey per year yielding a minimum of 84 tons of liquid honey. The average local selling price for extracted liquid

honey is US$ 3 per kg. This gives the community an income of US$ 252,000. If a marketplace for the community is developed in each country and the process is carried through to packing of the honey in 500 g glass jars (each costing US$ 2.3 wholesale price multiplied by 168,000 glass jars), the gross income value of the product will increase to US$ 386,400. Each household will earn around US$ 193.00 per hive per year. (The honey produced by the *Zizyphus* plant in Yemen has a special significance in terms of medicinal value and hence is 4 to 5 times costlier than the normal floral honey on the international market.) Similarly other hive products such as beeswax and royal jelly can fetch additional income to the beekeepers. After extraction of 84 tons of honey for the second time from Langstroth frames as above, 8.4 tons of beeswax can be produced (1 kg wax costs US$ 4–5 in the world market). In addition, if 25% of the strong colonies from the above groups (around 3000) are utilised for RJ production, it can yield 3 tons of RJ in one year. (The average production of RJ per hive is 1 kg in one floral season.) The cost of RJ in the world market is US$ 30–50.

This present project, based around the NENA region covering globally significant biodiverse rich (but poverty-stricken) areas in the Sudan, Egypt and Yemen is to scale up the rural livelihood support mechanism in villages, to a critical mass that has the ability to protect the ecosystems, as the source of sustainable income using insects as the basis of income. The IDB/IFAD/OFID-financed activities in the NENA region through the commercial insects areas are focused on improving the income of the poor and their livelihoods, while, *icipe*, private traders and Government will support capacity building by providing facilities and (baseline) through on-site training on ecosystem management and marketing linkages in forest areas within the Sudan, Egypt and Yemen. The costs of these activities are explained in outputs 1–5 in an incremental cost matrix table with their domestic and global benefits. Note that IDB alternative/increment figures per output are based on the activity costs per output as in the log-frame below, plus pro-rata costs across the training, equipment, travel lines, etc. in the budget table. Baseline is the existing infrastructure of FD/NARS.

Expected Outputs, Key Components and Budget

The overall goal of the project is that ecosystem degradation trends be reversed in the selected areas in the three countries. The developmental objective is to ensure that communities and management authorities at the project sites in the three participating countries have successfully mainstreamed conservation of ecosystems through adoption of income generating activities using sericulture and apiculture ventures. The project will be implemented through five components, each with a distinct output and specific activities. The linkages between these components and the threats and root causes are detailed below.

Output 1

An ecosystem management framework in place that facilitates community participation in rural areas enterprise in all project sites. Key activities will be implemented through the NARS of three countries.

Activities:

- Awareness raising and capacity building within District Partners (Forestry and District Environment Committees) for community partnership.
- Specific PFM-ICD training for partner staff.
- Buffer Zone management planning stressed within Forest Management Plan processes, and buffer zone pilot intervention areas identified.
- Networking district partners.
- CBO survey and link to District PRSP processes (livelihood/poverty mapping).
- Reserve boundary demarcation in forests of the three countries.
- Biodiversity assessment in Buffer Zones (contrast core) focus on tree regeneration and use, and useful commercial insect indicators.

IDB contribution:	US$	35,000	NARS implementation
OFID contribution:	US$	20,000	NARS implementation
IFAD contribution:	US$	50,000	NARS implementation
Others contribution:	US$	150,000	Govts Yemen, Egypt and the Sudan (in kind)
TOTAL	**US$**	**255,000**	

Output 2

Rural communities through registered associations are actively engaged in ecosystem conservation through new plantations, management and enterprise. Activities will be implemented by NARS/FAO.

Activities:

- Creation of Village Forest Committees (model from Cross Borders/ Arabuko and Mwingi in Kenya).
- Scale up Committees to registered Forest Associations.
- Scale up to overall Site Based Association, linked to DFO/Dist. Environment Committee.
- Buffer zones patrolled and protected, sustainable resource strategies in place.
- Fire breaks installed and village jurisdictions agreed and in management plan.
- Degraded areas restored (buffer planting, regeneration tending, gully plugging).
- Tree nursery support for restoration.
- Training for Forest Associations (FA)—study tours, cross visits, site-training workshops.
- FAs involved in buffer zone M&E processes, targeting insects, tree growth local herbs.
- FAs promote on-farm tree use, fuel wood surveys, pole use surveys
- FAs promote, for example, improved energy stoves on-farm.

IDB contribution:	US$	60,000	NARS/*icipe* implementation
OFID contribution	US$	30,000	NARS implementation
IFAD contribution:	US$	25,000	NARS implementation
Others contribution:	US$	150,000	Govts Yemen, Egypt and the Sudan (in kind)
TOTAL	**US$**	**265,000**	

Output 3

The capacity of communities and institutions to manage and utilise both wild and mulberry silkmoth and honeybee biodiversity use for income generation is increased. Key activities will be implemented by *icipe* and include capacity building and practical training in apiculture and sericulture techniques to the NARS officers and to the participatory groups, creation of village committees etc. utilising *icipe*, Kenya or any other existing training facilities.

Activities:

- Selection of villages, sub-villages and household clusters (link to buffer zone areas) and mobilisation of embryo organisations of beekeepers and silk farmers.
- Household livelihood and income mapping in pilot areas.
- Training of participating groups on-site and at *icipe*, Kenya for apiculture and sericulture ventures.
- Training for apiaries providing honey and hive products, and for processing and packaging facilities.
- Training community members in wild silkmoth recognition, collection of useful races and monitoring.
- Training and support for mulberry planting on field borders, for domestic silkmoths, fuel and fodder.
- Training and support for silk preparation including reeling and weaving in village marketplaces.
- Upgrade these household activities to village processes.
- User groups are formed, registered, trained and capacity to manage enterprises is built.
- Capacity of the local leaders, beekeepers and silk farmers in planning and skills for accountable management of insect based enterprises.
- Communities are linked to and working with private sector markets (Link to Output 4).

IDB contribution:	US$	210,000	
OFID contribution:	US$	105,000	
IFAD contribution:	US$	170,000	IFAD all sites
Others contribution:	US$	400,000	*icipe* facilities
TOTAL	**US$**	**885,000**	

Output 4

Improved methodologies and insect resources are available at sites to allow efficient resource use for improved livelihoods and ecosystem conservation practices. Key activities are implemented by FAO and partners: bee apiaries, quality control labs for silk and hive products, queen rearing, wild and mulberry silkmoth farming systems and postharvest and packaging for the markets are in place. Marketplaces and market linkages established and operational and community ownership driven.

Activities:

- Apiaries established and operational in all sites in the three countries.
- Queen rearing and royal jelly production system, propolis, wax processing, pollen food and bee venom technologies established.
- Silkmoth rearing houses and wild silkmoth farming sites established and operational.
- Marketplaces (including processing/packaging facilities) established for silk/honey products at all project sites in the three countries.
- Marketing linkages established through national and international traders. This activity will also provide an understanding of marketing information system of honey- and silk-based products and will examine a variety of secondary and primary data approaches to researching markets such as:
  - *Market research (Identifying customer requirements):* Motivation and attitudinal studies, studying customer groupings and market segmentation, measuring size and potential of markets and examining competitive position and market-share analysis.
  - *Product research:* New product development programmes, concept and product tests and test marketing.
  - *Pricing research:* Measuring price awareness of buyers and analysing price sensitivity.
  - *Distribution research:* Testing the effectiveness of marketing channels, measuring buyer behaviour towards manufacturer and retailer branding decisions, retail location studies and other retail marketing research.
  - *Promotion research:* Research to help determine promotional objectives, promotional copy testing and promotional media research measuring buyer response campaign.

IDB contribution:	US$	720,000	
OFID contribution:	US$	320,000	
IFAD contribution:	US$	585,000	IFAD
Others contribution:	US$	200,000	*icipe* facilities
	US$	100,000	Viking Ltd/Biop Ltd. Markets
	US$	150,000	Govts Yemen, Egypt and the Sudan (land in kind)
TOTAL	**US$**	**2,075,000**	

Output 5

Effective project administration, monitoring and coordination have enabled timely and efficient implementation of project activities.

Activities:

- Forest facilitators in place and functioning at all three sites
- Overall supervision from FD is functioning and supported.
- Project Management Unit at *icipe* is staffed, functioning and providing leadership and oversight.
- Project partnership between co-finance and baseline is functioning, supported by NEMA at national level and Environment Committees at District level.
- National and Site Level Steering Committees are held as planned.
- Funds disbursed and accounted for satisfactorily (IDB/OFID/*icipe* audit procedures)
- Project Independent Evaluations held on schedule (mid-term and terminal).
- M & E processes are coordinated at site and national levels, from baseline to impact assessments on both biodiversity and livelihoods.
- Project documented and results and lessons disseminated. Training brochures are in place and used.
- Outreach mechanisms in place addressing both livelihood (PRSP) and conservation policy processes.

IDB contribution:	US$	250,000	
OFID contribution	US$	125,000	
IFAD contribution:	US$	570,000	IFAD
TOTAL	**US$**	**945,000**	

Conclusion

We hope that the representatives of NENA Project countries will provide their suggestions to formulate the full project document for submission to IDB/OPEC Funds.

RECOMMENDATIONS BY ISLAMIC DEVELOPMENT BANK (IDB)

The chairman of the session, Mr Abderrafia Abdelmouttalib, the IDB Project Officer, recommended that the proposal be refined with some of the following adjustments:

- To separate the apiculture and sericulture activities as well as their budgets.
- To narrow down to specific sites in each country and focus only on conservation and livelihoods.
- To collect baseline data on the various aspects on both apiculture and sericulture in the focal countries. The IDB would support the consultancy for this exercise to the tune of US$ 25,000.
- To send request letters to the President of the Bank through the Ministries of Finance in each country. Egypt had already done so, and the same was expected of Yemen and the Sudan.
- To provide the letters for the Minister for Agriculture through the Ministry of Finance.
- To submit the full project document as soon as possible.

APPENDIXES

APPENDIX A: LIST OF PARTICIPANTS

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APPENDIX B: WORKSHOP PROGRAMME

Venue: Plant Protection Research Institute Conference Hall, Cairo, Egypt, 9–10 July, 2006

Saturday, 8 July 2006	Arrival of participants
Sunday, 9 July 2006	
0830 h	Registration
0830–0840	Introduction of participants
0840–0920	Opening of the Workshop and Keynote Address: Dr Abbas Kesseba, IFAD/*icipe* Dr Fawzi Naim Mahrouse, Agricultural Research Centre (ARC)
0920–1020	Overview of the Commercial Insects Programme, Prof. Suresh K. Raina, Programme Leader, Commercial Insects Programme, *icipe*
1020–1050	Introduction and Mandate of Islamic Development Bank (IDB), Mr Abderrafia Abdelmouttalib, Country Operations Department
1050–1120	COFFEE/TEA BREAK
	Presentations by Country Coordinators (10 minutes each) **Yemen** (Dr Faiza Saleh and Mr Faisal Muthana) **Sudan** (Dr Magzoub Bashir and Mr Mohamed ElHag Sir Elkhatim) **Egypt** (Dr Magdy El-Hariry) **Madagascar** (Dr Jean Joseph Randriamananoro) **Uganda** (Dr Scola Bwali)
1230–1300	Discussion
1300–1500	LUNCH BREAK
1500–1600	Presentation of the Concept Note by Prof. Raina
1600–1630	Discussion on the Concept Note submitted to IDB
1630–1730	Development of the Full Project Proposal (Formation of Task Forces for Specific Project Proposal Areas)
1730–1800	COFFEE/TEA BREAK
1800–1830	Recommendations and the Way Forward
Monday, 10 July 2006	**Field Visits:** Apiculture/Sericulture Sites in Cairo
0830	Departure from the Safir Hotel to the Sericulture Research Department
0930	Visit to the Sericultural Research Farm and Sericultural Research Station, which is located at Qanater (Barrage), 15 miles (24.1 km) from Cairo to view the following: Rearing houses Types of mulberry fields Mulberry gene bank Rearing rooms Cocoon dryer Types of cocoon cooking machines Types of reeling machines Re-reeling machine

Continued on next page

Continued

	Vacuum pan Silk preparation unit (winding, twisting and doubling) Loom
1130	**Apiculture Research Department** • The identification of important diseases and pests of honeybee colonies in Egypt. • The ideal methods of queen rearing and introducing of virgin queens to queen bees colonies. • Use of pollen and pollen substitutes for activation of honeybee colonies.
1330	Lunch at the Barrage gardens
1430	Return to the Safir Hotel
1930	Departure for dinner (using the Nile City Boat) to the Studieo Misr Hall followed by a short navigational tour of the Nile.
Tuesday, 11 July 2006	Departure of participants.

APPENDIX C: AUTHOR INDEX

APPENDIX D: APPROVAL LETTER

THIRTY YEARS
OF PARTNERSHIP
AND COOPERATION

1172

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Date: March 15, 2007

To: Dr. Christian Borgemeister
Director General
The International Centre for Insect Physiology and Ecology (ICEPE)
Nairobi, Kenya

Dear Dr. Borgemeister,

I am pleased to inform you that the Governing Board of OPEC Fund for International Development (OFID), in its March 2007 session, has approved a technical assistance grant in the amount of US$600,000 in support of the *"Sericulture and Apiculture Technologies for Income Generating Activities in the NENA Region"* sponsored by the International Centre for Insect Physiology and Ecology.

As regards the terms and conditions, which will govern grant effectiveness and disbursement of the grant's proceeds, a detailed letter of agreement will be transmitted to you shortly.

I take this opportunity to express my full appreciation to ICEPE for its valuable work and extend my best wishes for success in its endeavours for research in insect science and its application in Africa.

With best regards,

Suleiman J. Al-Herbish
Director-General

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IDB/IFAD Workshop Participants in West Noubaria Rural Development Project Site (IFAD)

The Programme Leader of *icipe* Commercial Insects Programme (CIP) on extreme right), with consultants and staff of the IFAD and sericulture/apiculture project in Noubaria, Egypt

PROCEEDINGS FOCAL AREA

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