



**IFAD**  
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**REPORT AND RECOMMENDATION OF THE PRESIDENT**

TO THE EXECUTIVE BOARD ON A PROPOSED

**TECHNICAL ASSISTANCE GRANT**

FOR

**AGRICULTURAL RESEARCH AND TRAINING**

BY A

**NON-CGIAR-SUPPORTED INTERNATIONAL CENTRE**





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**REPORT AND RECOMMENDATION OF THE PRESIDENT OF IFAD  
TO THE EXECUTIVE BOARD ON PROPOSED TECHNICAL ASSISTANCE GRANT  
FOR AGRICULTURAL RESEARCH AND TRAINING BY A  
NON-CGIAR-SUPPORTED INTERNATIONAL CENTRE**

I submit the following Report and Recommendation on a proposed technical assistance (TA) grant for agricultural research and training to a non-CGIAR-supported international centre in the amount of USD 700 000.

**PART I - INTRODUCTION**

1. The present report recommends the provision of IFAD support to the research and training programme of the non-CGIAR-supported International Centre of Insects Physiology and Ecology (ICIPE).

2. The document on the TA grant for the approval of the Executive Board is contained in the annex to this report:

International Centre of Insects Physiology and Ecology (ICIPE): Regional Programme for the Development and Dissemination of Improved Apiculture Technologies in North Africa

3. The objectives and content of the applied research programme are in line with the evolving strategic objectives of IFAD, and with the policy and criteria of its TA grant programme for agricultural research and training.

4. The strategic objectives of IFAD's support for technology development relate to: (a) IFAD's target groups and their household food-security strategies, specifically in remote and marginalized agro-ecological areas; (b) technologies that build on traditional knowledge systems, are gender-responsive and enhance and diversify the productive potential of resource-poor farming systems by improving productivity and addressing production bottlenecks; (c) access to productive assets (land and water, financial services, labour and technology, including indigenous technology) and sustainable and productive management of such resources; (d) a policy framework that provides the rural poor with an incentive to reach higher levels of productivity, thereby reducing their dependence on transfers; and (e) an institutional framework within which formal and informal, public and private-sector, local and national institutions provide services to the economically vulnerable, according to their comparative advantage. Within that framework, IFAD also intends to develop commodity-based approaches to rural poverty alleviation, specifically targeting those items that are produced and consumed by the rural poor. Finally, the establishment of a consolidated network for knowledge-gathering and dissemination will enhance the Fund's capacity to establish long-term strategic linkages with its development partners and to multiply the effect of its agricultural research and training programme.

5. The TA grant proposed in the present document responds particularly to (a), (b) and (e) of the foregoing strategic objectives inasmuch as it aims at developing and diffusing improved apiculture technologies for small bee-keepers in North Africa. This will be achieved through applied research and training on apiculture management and post harvest technologies relating to honey bee products with a view to improving the income-generating potential of North African bee-keepers.



## **PART II - RECOMMENDATION**

6. I recommend that the Executive Board approve the proposed technical assistance grant in terms of the following resolution:

RESOLVED: that the Fund, in order to finance, in part, the Regional Programme for the Development and Dissemination of Improved Apiculture Technologies in North Africa, shall make a grant not exceeding seven hundred thousand United States dollars (USD 700 000) to the International Centre of Insects Physiology and Ecology (ICIPE) upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

Fawzi H. Al-Sultan  
President



## **INTERNATIONAL CENTRE OF INSECTS PHYSIOLOGY AND ECOLOGY (ICIPE): REGIONAL PROGRAMME FOR THE DEVELOPMENT AND DISSEMINATION OF IMPROVED APICULTURE TECHNOLOGIES IN NORTH AFRICA**

### **I. BACKGROUND**

#### **Introduction**

1. The countries of North Africa – Algeria, the Libyan Arab Jamahiriya, Morocco and Tunisia – have jointly requested IFAD assistance for a regional applied research programme that would address constraints common to small bee-keepers in the region. Those constraints relate to the breeding of high-performance local races, disease management and quality control of honey as prerequisites for improving product marketability.
2. With an IFAD grant, ICIPE has developed a number of apiculture technologies in East Africa that may be adapted to bee-keeping in North Africa. In order to take advantage of ICIPE's experience and broaden the impact of its previous grant financing for apiculture research, IFAD selected the centre to assist the national agricultural research systems (NARS) in North Africa to design and implement the proposed programme in partnership with one another. In May 1998, an ICIPE mission to the region discovered that various diseases and parasites were prevalent in the bee colonies. It also found that there existed limited facilities to diagnose the diseases and ensure a desirable quality of honey and other hive products, and that the honey bee subsector was unduly dependent on imported queen bees.

#### **Bee-keeping in North Africa – Production and Marketing Constraints**

3. In all four North African countries bee-keeping is a significant economic activity that often also contributes to household nutrition, and there are approximately one million colonies of *A.mellifera*, about 40% of which are kept in traditional hives. A diversity of races is represented, differing in morphology and behaviour and with traits that influence productivity. The indigenous races of bees are *Apis mellifera saharensis* and *A. m intermissa*. The less aggressive and thus preferred European bee races of *A.mellifera* that were introduced to increase honey production are susceptible to pest and diseases.
4. The main floral sources for bee-keeping are acacia, cactus, *Aleppo* pine, red juniper, eucalyptus, citrus, rosacea and jujubes, alfalfa, cotton, sunflower, etc., and rosemary, thyme, artemisia and lavender. The flowering periods are variable but extend all year round, providing a favourable factor for apiculture development.
5. The region is currently facing a growing problem of *Varroa* mite infestation and diseases such as the American foul brood, sac brood, and chalk brood that are having a most important negative economic impact on bee-keeping in the region. The rearing of queen bees is another major constraint on improving apiculture productivity in North Africa and can best be achieved during periods of the year when flowers are at their peak (April-May). Young queen bees of pure land races with superior attributes (mild aggressivity, high honey production capacity, resistance to mites, etc.) are needed to form new colonies, but there is a limited capacity for queen bee rearing and breeding in the four countries in question.
6. Marketing channels for honey and honey bee products need to be improved as only 50% of all the honey produced is marketed through identified channels and the lack of honey quality analysis and labelling is a limiting factor for efficient marketing. The present capacity for honey quality analysis in the four countries is limited and there are no dedicated specialized laboratories to which bee-keepers can have access for honey quality analysis and control.



7. The price of honey at the producer/consumer level does not reflect quality factors based on chemical analysis, including of pesticides residuals, but is based on hypothetical considerations related to floral typology and geographical origin that cannot be authenticated. Consequentially, chemically good quality honey is often sold at low prices and vice versa. Current domestic prices are much higher than those on the international market, as consumers equate higher prices with better quality. There is thus a need for capacity-building through the establishment of dedicated laboratories for chemical analysis of honey and for related training.

8. Given the above-mentioned constraints on production and marketing, the average productivity per hive is 15-20 kg, providing less than 200 g of honey per capita for the consumers compared to more than 1 kg per capita in Europe. In view of these constraints, the countries of the region are net importers of honey. However, they have the potential to become self-sufficient, and even net exporters, depending on the degree to which they can overcome the above-mentioned constraints.

## II. RATIONALE/RELEVANCE TO IFAD

9. It is hoped that the programme will transform the current bee-keeping activities that are dependent on susceptible nucleus colonies from abroad into a modern, independent bee husbandry sector. This will be based on the application of queen bee rearing techniques, disease management, post harvest quality control and the creation of an enabling infrastructure and institutional framework (through training of national scientists, extension agents and bee-keepers), as needed, in each of the participating countries.

10. Honey production in the region is expected to increase both in quantity — through higher productivity and more honey bee colonies — and in quality through the introduction of new production and post harvest/processing practices. The transfer of technology from ICIPE to the region, by means of participatory research and extension, will also diversify apiculture production through the collection of royal jelly, propolis, pollen and venom in addition to honey and beeswax. In the short term, the programme is also expected to lead to direct production improvements to meet domestic honey requirements in the participating countries and, in the longer term, to the production of sufficient quantities of both domestic and export quality honey. There is a market for high quality honey both in the region and in Europe. The proposed programme would thus lead to enhancing the income-generation potential of smallholder bee-keepers, in line with the Fund's evolving regional lending strategy that includes promotion of on- and off-farm employment-generation opportunities for smallholders.

## III. THE PROPOSED PROGRAMME

11. Building on the results of ICIPE's research in East Africa, the programme's objective is to facilitate the development and transfer of validated apiculture technology to smallholder bee-keepers in North Africa by means of participatory adaptive research, training and demonstrations. The programme will assist governments in establishing facilities to enable the bee-keeping communities to overcome the broad spectrum of production, disease and marketing-related constraints in the apiculture industry. The programme will be implemented under four components, as follows:

### **Queen Bee Rearing and Breeding**

12. Three queen bee rearing methods, that are already familiar to bee-keepers in North Africa will be applied, depending on location-specific circumstances and requirements: rearing them in a queenless colony; using a swarmbox method; and in queen-right colonies. These methods will be evaluated in close collaboration with bee-keepers to test their suitability for adoption. Two queen bee rearing and breeding stations will be established in each participating country. The programme will provide both





equipment for rearing and artificial insemination, for the purpose of upgrading existing laboratories, and training for national scientists. The facilities will be used to conduct applied research for rearing, selection, multiplication and distribution of nucleus colonies of more productive and mite-tolerant local races at lower cost (e.g. USD 8 per locally-produced queen bee versus USD 12 per imported queen bee), thus protecting the region from imported diseases.

### **Honey Bee Disease Control**

13. One existing laboratory facility in each country will be upgraded for honey bee disease and mite infestation diagnosis. The programme will provide equipment and consumables and related training of honey bee pathologists. The applied research work will involve the isolation of bee-keepers' hives of local breeds (that are resilient to mite attacks) to be provided to the queen bee rearing laboratories for further breeding and multiplication.

14. Applied research will also include the identification of mite bio-types causing *Varroa* in local bee populations; biology of the mites; determination of the threshold *Varroa* mite population cohabiting with the honey bee; analysis of the mechanisms to contain mite populations below permissible threshold levels; analysis of the impact of mite populations on beehive productivity; comparison of the efficiency of various treatments using different chemical products (parasiticides); development of simple techniques for treatment against *Varroa*, including emerging herbal treatment developed by ICIPE; and a study of the biological cycle of local honey bee races and their genetic potential.

### **Quality Control and Marketing of Honey Bee Products**

15. One small laboratory for quality analysis of honey bee products will be established in each country with equipment to upgrade existing facilities and training will be provided for laboratory assistants. The applied research work will include quality analysis of honey bee products for the establishment of quality standards and grading and labelling specific to international and national markets. This will assist bee-keepers to match international standards and improve the domestic and export marketability of their products. The basic quality parameters that need to be met include, among others, moisture, diastase, fructose, glucose and sucrose content.

### **Bee-keeper Training, Technology Diffusion and Programme Beneficiaries**

16. The programme will provide training at the regional level for 130 contact bee-keepers (trainers) in queen bee rearing, 130 in disease management and 95 in honey analysis interpretation, honey grading/labelling and marketing assistance.

17. The dissemination of improved technologies will be facilitated through the involvement, at the regional level, of 100 national extension agents selected from existing extension staff. The agents will work closely with the contact bee-keepers in organizing 1 050 field days during the three years of programme implementation to benefit approximately 31 500 bee-keepers, including 2 000 women-headed households. It is expected that the programme will have a significant impact on the improvement of small bee-keepers' incomes through: (i) enhanced productivity (35 kg of honey per hive as against the 15-20 kg currently produced) as a result of introducing superior races and disease management; and (ii) higher producer prices as a result of honey and honey product marketing based on quality analysis, grading and labelling.

## **IV. IMPLEMENTATION ARRANGEMENTS**

18. As a lead agency, ICIPE will provide technical backstopping and administrative support to the regional research programme. The responsibility for programme implementation in each country will be entrusted to well established national institutions that have a good geographical coverage through the presence of apiculture stations and substations: the Livestock and Pasture Development Authority in



Tunisia; the Livestock Department of the Ministry of Agriculture in Morocco; the Agriculture Research Centre in the Libyan Arab Jamahiriya; and the Livestock Technical Institute in Algeria. Each institution will appoint a national coordinator to liaise closely with a part-time regional coordinator based at ICIPE, Nairobi (Kenya). Annual work programmes and budgets will be prepared by the national coordinators and consolidated by ICIPE for discussion during the yearly regional coordination meetings and for subsequent approval by IFAD. The programme will be linked to ongoing IFAD projects in Algeria (Loan No. 226-AL); Morocco (Loan Nos. 260-MO and 356-MO); and Tunisia (Loan Nos. 298-TN, 348-TN and 483-TN).

## V. PROGRAMME COSTS AND FINANCING

19. The total cost of the programme is estimated at about USD 1.66 million, to be financed in part by an IFAD grant contribution of USD 700 000. During the June 1999 programme design workshop, all four countries agreed to make substantial contributions in kind and in local currency for a total of USD 956 000. That figure, which constitutes 58% of the programme costs, reflects a sense of ownership and promises institutional sustainability of programme activities. The programme costs and financing plan by component and cost category are given in Tables 1 and 2, respectively.

**TABLE 1. PROGRAMME COST AND FINANCING BY COMPONENT**  
(amounts in USD)

Component	National Contribution	IFAD Contribution	Total Cost
Queen bee rearing/breeding	224 000	108 000	332 000
Honey quality analysis	226 000	270 000	496 000
Honey bee disease control	266 000	138 000	404 000
Bee-keeper training and technology transfer	180 000	-	180 000
Coordination, data analysis and reporting	60 000	94 000	154 000
ICIPE backstopping (overhead costs)	-	90 000	90 000
<b>Total</b>	<b>956 000</b>	<b>700 000</b>	<b>1 656 000</b>

**TABLE 2. PROGRAMME COST AND FINANCING BY COST CATEGORY**  
(amounts in USD)

Cost Category	National Contribution	IFAD Contribution	Total Cost
Civil works	240 000	-	240 000
Equipment	80 000	364 000	444 000
ICIPE scientists	-	172 000	172 000
National scientists (recurrent costs, incl. salaries)	456 000	-	456 000
Workshops and completion reports	-	16 000	16 000
Training and technology transfer	180 000	52 000	232 000
Documentation	-	6 000	6 000
ICIPE administrative and management backstopping	-	90 000	90 000
<b>Total</b>	<b>956 000</b>	<b>700 000</b>	<b>1 656 000</b>