

# **AFRICAN DEVELOPMENT BANK GROUP**



## **MULTINATIONAL**

### **PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN**

#### **Project Performance Evaluation Report (PPER)**

**OPERATIONS EVALUATION DEPARTMENT (OPEV)  
PROJECT AND PROGRAMME EVALUATION DIVISION (OPEV.1)**

**AUGUST 2010**

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## CURRENCY EQUIVALENTS

Year	Currency Unit	Average Equivalent in CFAF
2000	UA 1	938.476
2001	UA 1	934.093
2002	UA 1	905.236
2003	UA 1	816.567
2004	UA 1	783.289
2005	UA 1	772.238

## WEIGHTS AND MEASURES

Metric System

## FISCAL YEAR

1 January to 31 December

## ACRONYMS AND ABBREVIATIONS

ADB	:	African Development Bank
ADF	:	African Development Fund
AFD	:	French Development Agency
CAR	:	Central African Republic
CILSS	:	Permanent Inter-State Committee on Drought Control in the Sahel
FAC	:	Aid and Cooperation Fund
FAO	:	United Nations Food and Agriculture Organization
GDP	:	Gross Domestic Product
GEF	:	Global Environment Fund
GTZ	:	German Technical Cooperation (Gesellschaft für Technische Zusammenarbeit)
HCH	:	Hexachlore Cyclo Hexan
ICRISAT	:	International Crops Research Institute for the Semi-arid Tropics
IITA	:	International Institute of Tropical Agriculture
IMF	:	International Monetary Fund
INRAN	:	National Agronomic Research Institute of Niger
IPM	:	Integrated Pest Management
IRAD	:	Institute of Agricultural Research for Development - Cameroon
IsDB	:	Islamic Development Bank
ITRAD	:	Institute of Agricultural Research for Development- Chad
LCBC	:	Lake Chad Basin Commission
NIU	:	National Implementation Unit
NPK	:	Manure containing Nitrogen (N), Phosphate (P) and Potassium (K)
NRI	:	Natural Resource Institute
PCU	:	Project Coordination Unit
PTA	:	Principal Technical Assistant
SNPV	:	National Plant Protection Service (Mali)
TA	:	Technical Assistant or Technical Assistance
TAF	:	Technical Assistance Fund
UA	:	Unit of Account of the ADB Group
UDEAC	:	Customs Union of Central African States
UNDP	:	United Nations Development Programme
UNEP	:	United Nations Environment Programme
USAID	:	United States Agency for International Development
WB	:	World Bank

## BASIC PROJECT DATA

### General Data

1. Project Name : Pilot Research/Development Support Project on Integrated Pest Management for Subsistence Farming in the Lake Chad Basin
2. Project Number : P-Z1-AA0-006
3. Location : Lake Chad Basin
4. Sector : Agriculture/Rural Development
5. Grant Number : 2100155000467
6. Borrower : Lake Chad Basin Commission / LCBC
7. Beneficiary : 4 LCBC countries: Cameroon, Niger, Nigeria and Chad
8. Executing Agency : LCBC P.O. Box 727 N'Djamena (Chad) Tel.: (235) 52 41 45; Fax: (235) 52 41.

### A. Grant Data

	Estimate	Actual
Grant Amount (UA million)	1.40	1.39
Grant Approval Date	March 2000	10 May 2000
Grant Signature Date	April 2000	15 September 2000
Date of Entry into Force	June 2000	5 January 2001

### B. Project Data

Financing Plan (Equivalents in UA million)

Source	Estimate				Actual			
	Foreign Exchange	Local Currency	Total	%	Foreign Exchange	Local Currency	Total	%
TAF	1.32	0.08	1.40	89.7	1.32	0.08	1.40	81.9
LCBC	0.00	0.16	0.16	10.3	0.00	0.31	0.31	18.1
Total (%)	1.32	0.24	1.56	100.0	1.32	0.39	1.71	100.0

### C. Implementation Performance Indicators

Cost Overrun /Underrun	UA -0.007 million	- 0.5%
Delay/Advance on Implementation Schedule at Appraisal		
- Slippage on Effectiveness	6 months	
- Slippage on First Disbursement	28 months	
- Slippage on Estimated Completion Date at Appraisal	27 months	
Number of Extensions of Last Disbursement Deadline	2	
Project Implementation Status	Completed in 2005	

**D. Missions**

Type of Mission	Dates	Number of Persons	Composition		Staff- days
			Agro-economist	Consultants	
1. Identification					
2. Preparation	July - August 1999				
3. Appraisal	January 2000				
4. Supervisions					
Supervision 1	30/06 to 13/07/2001	1	1		13 staff-d
Supervision 2	8 to 21/12/2001	1	1		14 staff-d
Supervision 3	29/06 to 10/07/2002	1	1		12 staff-d
Supervision 4	15 to 28/06/2003	1	1		14 staff-d
Supervision 5	18/12/2003 to 4/1/2004	2	1		34 staff-d
Supervision 6	10 to 22/10/2004	1	1		12 staff-d
Annual account audit (external)	2003 to 2004				
5. Completion	23/10 to 01/11/2005	2	1	1	20 staff-d
6. Ex- post Evaluation	12/10/2009 to 30/12/2009	3		1	51 staff-d

**E. ADF Grant Disbursements**

Year	Disbursements (UA)	% Disbursement	Year- to-Date (UA)
2002	29,945.40	15.18	209,945.40
2003	318,777.19	21.21	528,722.59
2004	701,472.65	52.58	1230, 19.24
2005	163,074.56	11.70	1393,269.80

## SUMMARY OF RATINGS

No.	Indicators	PPER Remarks		
		PCR	PPER	
1	<u>Relevance and quality at entry</u>	2.5	3	The project is in line with the strategies of LCBC member countries and the Bank. It addresses a real need of Lake Chad Basin dwellers, the majority of whom are farmers, who often record pest-related crop losses of up to 50%. To ensure widespread use of integrated pest management techniques, the appraisal report indicated the need for an Action Plan to intimate as many farmers as possible with the results obtained from implementing this pilot project. An undertaking to implement the pilot project results was a condition precedent to entry into force. Therefore, relevance and quality at entry are deemed satisfactory.
2	<u>Achievement of objectives and results (Effectiveness)</u>	2.8	2	Most of the expected short-term effects in terms of research and training were achieved. Yields under controlled conditions increased, and pest-related losses have reduced on the experimental farms. However, by limiting the project to its pilot phase, without ensuring widespread use or real ownership to enable the member countries concerned to take over, it became impossible to achieve the expected medium- and long-term development results, notably the ultimate goal of strengthening food security which remains fragile.
3	<u>Efficiency</u>	NA	2	Despite increased yields and reduced spending on imported chemical insecticides (replaced by biological insecticides) following the use of IPM techniques, the project's efficiency was affected by the high (unit) cost of the Farmer Field Schools approach used on a limited number of farmers and the cost of technical assistance. Extending the project duration also generated additional costs.
4	<u>Impact on institutional development (ID)</u>	3	2	LCBC was unable to build on knowledge acquired in project management due to the use of coordinators, technical assistants and LCBC counterparts, whose tenures were limited to the duration of the project. The project initiated collaboration between research institutes, extension and plant protection services and village brigades. However, this cooperation ceased at the end of the pilot phase. Furthermore, national farmer support and guidance structures had difficulty carrying on with the dissemination of technological packages. Lastly, the project did not bring about changes in the laws, regulations, etc. on the promotion of IPM techniques or "soft" methods.
5	<u>Sustainability</u>	2.71	2	The project helped to develop a self-reliance crop protection strategy, based on the initiative of farmers organized at village or community level to control the pests. Such techniques which have been widely adopted by farmers have definitely had a positive economic, financial and environmental impact in the pilot areas. However, the expertise imparted to the pilot farmers and shared with other farmers needed to be spread further. The ripple effect has been hampered by: (i) the dissolution of the institutional mechanism; (ii) the problem of institutional sustainability of the LCBC; and (iii) the weak capacity of extension structures to help more farmers to access project results. As a result, the sustainability of project results has been greatly undermined and is deemed unsatisfactory.
6	<u>Overall performance indicator</u>	2.75	2	The overall project performance is unsatisfactory since the results are limited to the experimental phase. The sustainability of project results is unlikely.
7	Borrower's Performance	2.50	2	The Borrower's performance is unsatisfactory given that no steps have been taken by the LCBC to ensure project sustainability, build on the achievements of the experimental phase and resolve governance issues.
8	Bank's Performance	2.75	2	The Bank's performance is unsatisfactory since it limited itself to a pilot phase which cannot help to create conditions for lasting change.

## SUMMARY OF THE EVALUATION

### 1. The Project

1.1 The Pilot Research/Development Support Project on Integrated Pest Management for Subsistence Farming in the Lake Chad Basin was designed to reduce the huge crop losses caused by numerous pests. The Basin's Sahelian zone is an endemic zone covering migratory locust (*Schistocerca gregaria*) outbreak areas. It is regularly invaded by crop-devouring pests (locusts, grasshoppers, insect borers, hairy caterpillars, cantharides, seed-eating birds, rodents, diseases and weeds), causing a substantial drop in yields. Such pests can cause losses of up to 50% of production. *Striga hermonthica* for instance is capable of damaging over 60% of production.

1.2 Pest control is a key concern of the authorities of countries in the area. Due to the high cost of chemical pesticides and the human and environmental risks involved, each country recognizes the need to fight this scourge at the regional level. Clearly, the crop protection problem can be resolved only through concerted effort among LCBC member countries. To that end, the LCBC opted for IPM<sup>1</sup>, which is a non-chemical, environmentally-friendly and highly cost-effective method for farmers. It combines the use of resistant varieties, agronomic techniques and biological control with phyto-sanitary measures. It is based on direct farmer participation and does not rely on direct and massive State subsidies.

1.3 The project's goal is to strengthen food security in four countries of the Lake Chad Basin area, namely Cameroon, Niger, Nigeria and Chad. This requires the reduction of pest-related crop losses through the regionally coordinated use of tested IPM techniques, particularly on food crops (millet and sorghum) and the acquisition of basic skills by farmers to adopt and implement such techniques. Through regionally coordinated plant protection, the project also aimed to contribute to regional integration. The project had two main components: (i) research and development to establish a technology transfer system based on the use of integrated pest management (IPM) with the support of research institutes in the region; and (ii) training and information to enhance the IPM capacity of extension workers and farmers.

### 2. Implementation Performance

2.1 The initial two-year implementation period (2001 and 2002) was finally postponed to the 2003-2005 period, to take into account delays in fulfilling the conditions precedent to entry into force of the grant, processing of dossiers and application of disbursement procedures. Moreover, the two project coordinators left and were replaced by a third and final coordinator in 2003, i.e. 29 months beyond the deadline set at appraisal. Faced with this situation, the LCBC made two requests for extension of the disbursement deadline (December 2004 and June 2005), both of which the Bank approved. The first enabled the conduct of the 2003 and 2004 crop season activities and the second, the completion of final project activities (2004 audit, preparation of the project's extension phase document and the PCR). Extending the duration of the project caused an operating cost overrun borne by the LCBC. As a result, the LCBC's contribution nearly doubled, from UA 0.16 million to UA 0.31 million.

2.2 Despite start-up difficulties, most of the research, training and information activities were completed, except for the wide dissemination of guides and brochures on the range of IPM techniques. The performance was deemed satisfactory as regards research but less so in terms of full-scale development that could guarantee sustainable development outcomes.

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<sup>1</sup> Integrated Pest Management

### **3. Ex-Post Evaluation Methodology**

3.1 This report was prepared following the ex-post evaluation mission conducted from 12 to 30 October 2009 in the four LCBC member countries concerned by the project (Chad, Niger, Nigeria and Cameroon). The main criteria used are: relevance and quality at entry, effectiveness, efficiency, sustainability, impact on institutional development, Borrower's performance, Bank's performance and overall project performance.

3.2 The evaluation is based on a review of project documents and other relevant studies. It is also based on discussions and interviews with key players from diverse backgrounds. It was conducted in three phases: (i) information gathering and front-end analysis at the Bank headquarters, resulting in a guidance document for the evaluation; (ii) a field mission to collect data and visit the project intervention areas, exchange views with various stakeholders (LCBC, research, extension and plant protection services, beneficiaries and representatives of development agencies that supported the LCBC) on key issues of the evaluation; and (iii) analysis of information collected with a view to preparation of the PPER. Measurement techniques combine "with-without" and "before and after" approaches. The "before-after" approach has been used especially for measuring the impact of IPM techniques in the Farmer Field Schools, compared to control plots. A number of shortcomings were pointed out in the application of experimental protocols, to facilitate undisputable attribution of increased yields to the project. Overall, the evaluation largely takes into account the views expressed by the stakeholders interviewed, particularly the ultimate beneficiaries who are the farmers.

### **4. Key Findings**

4.1 Relevance and Quality at Entry: The project objectives are in line with the needs of LCBC member countries in terms of food security, environmental protection (through the adoption of soft technologies against devastating pests and the introduction of suitable crop varieties), regional integration and the emergence of a common policy for the protection of the Lake Chad Basin.

4.2 The pilot project is also consistent with the Bank Group's policy on economic cooperation and regional integration. This project takes into account the need to: (i) streamline regional integration activities; (ii) foster collaboration with other national and international research institutions; (iii) integrate and harmonize regional initiatives with national development objectives; and (iv) mainstream environmental issues in the implementation of national and regional initiatives.

4.3 To ensure widespread use of integrated pest management techniques, the appraisal report mentioned the need for an action plan to popularize the results obtained following project implementation. The plan was to specify the various technical, institutional, socio-economic and financial resources required to subsequently implement a large-scale project. An undertaking to implement the pilot project results was a condition precedent to entry into force of the loan. Thus, the relevance and quality at entry are deemed satisfactory.

4.4 Achievement of Objectives (Effectiveness): The project achieved its expected short-term (direct) research and training objectives. Specifically, it has had a positive impact especially in the pilot and surrounding villages, including: (i) higher yields; (ii) environmental protection through rational use of pesticides; and (iii) foreign exchange savings. Under controlled conditions, it has helped to reduce the damage caused by devastating cereal crop pests in the pilot villages of the four member countries, through the application of plant protection techniques that have proven their worth elsewhere.

4.5 The pilot project's key achievement is the training in IPM techniques of trainers and farmers who are the primary beneficiaries. This knowledge should be a decisive factor in creating the conditions for survival of the system beyond the end of the funding period. The population was genuinely enthused

by the project, with numerous requests that could not be met. They have high expectations for an extension phase. Similarly, all the other stakeholders in the countries concerned have expressed their hope to see the project extended, given the results obtained.

4.6 The project introduced IPM techniques as a pest management technology package. Their adoption has enabled pilot farmers to reduce pest-related losses and significantly increase their yields. The resulting increase in production has gone into improving the feeding of households and helping to reduce poverty in the area. Using *neem*<sup>2</sup>-based botanical insecticides has become a common practice among pilot farmers who are convinced of their effectiveness against the major pests, despite difficulties in grinding almonds in mortar. These botanical insecticides have also reduced the farmers' dependence on chemical pesticides. As a result, production and marketing of *neem* could become a source of income for farmers.

4.7 However, due to the low proportion of the targeted population (1.6%) and limited use, the reduction of crop pest-related losses through IPM techniques, which was the intermediate objective, could not reach a suitable level to significantly improve yields. Accordingly, food security, which faces many risks, remains fragile in the Lake Chad Basin area. In short, there is a need to take into account other crops and all pests on a larger scale, to contribute effectively to food security which is the project's ultimate goal.

4.8 The implicit objective of regional integration could not be achieved due to lack of collaboration between the research and supervisory services in the area at the end of the project, and weaknesses at the LCBC in terms of communication about the project and its impact. The achievement of project objectives (effectiveness) is deemed unsatisfactory.

4.9 Efficiency: Despite increased yields and pilot farmers' income, the Farmer Field Schools approach used by the (pilot) project on a limited number of farmers (120), is considered more costly than traditional extension. The increase in the number of farmers targeted by the project would have reduced the unit cost. In addition, the high cost of technical assistance (about half of the project cost) affected project efficiency since the assistance was provided to the detriment of support to extension workers and farmers. The project efficiency is deemed unsatisfactory. The extension of project implementation deadlines generated additional costs and adversely affected project efficiency.

4.10 Impact on Institutional Development: In its pilot phase, the project with its institutional framework helped to enhance the LCBC's integrated pest control planning and management capacity. It established collaboration dynamics between research, extension and plant protection services. During its implementation, the LCBC was able to build national expertise at both the central and peripheral level, enough to largely replace the international experts. These dynamics between the different structures helped to enhance their capacity and facilitated the technology transfer that has led to the application of research results. Furthermore, the existence of village brigades that serve as effective links between these structures and farmers, is a major innovation, since they help to alleviate the task of extension services. The project also highlighted the important role of plant protection and extension services in pest control. Lastly, the project helped to enhance the response capacity of the LCBC Regional School in Ngala (Nigeria) by providing equipment, teaching materials and training courses on IPM techniques. However, these positive dynamics ceased at the end of the project. The project failed to improve or change norms and practices (institutional, political, legal, etc.) in LCBC member countries as regards promotion and use of IPM techniques. The project's impact on institutional development is thus unsatisfactory.

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<sup>2</sup> A tropical tree from East India (or more precisely the south of the Himalayas), the *neem* (*Azadirachta indica*), belongs to the mahogany family. It has been used for thousands of years, notably in India, for its extraordinary insecticidal, medicinal and cosmetic properties.

4.11 Sustainability of Project Impact: Despite its relevance, the project was unable to achieve the ultimate objective of contributing to food security, or expand and sustain its direct impact. It remained at the pilot stage, despite the good results. Upon completion, the different management structures put in place were dissolved and the field officers ceased operation. As a result, interventions stopped abruptly, leading to the reduced level of IPM extension activities.

4.12 Constraints inherent in full-scale extension of *neem* adoption remain and need to be removed. These concern *neem* production and processing as well as the fact that unlike synthetic pesticides, its effect is not as immediate and overwhelming. Furthermore, the lack of an aggressive policy of member states, some of which subsidize phyto-sanitary treatment of food crops with synthetic pesticides, is an obstacle to the promotion of botanical insecticides, hence the failure of the project to promote harmonized and coordinated pest control.

4.13 For its part, the LCBC has, been unable to ensure the sustainability of project impact since its current funding and governance systems remain somewhat cumbersome, preventing it from ensuring the sustainability of project actions and operation. Moreover, although pest control features among the LCBC's priorities as set out in the Priority Action Programme, it is not included in the Sustainable Development Program initiated by the GEF/World Bank and ADB. In short, conditions for sustaining the project's impact are lacking. Therefore, project sustainability is unlikely at both the LCBC and the national and regional level.

## 5. Conclusions

5.1 The project helped to develop a self-reliance crop protection strategy, based on the initiative of farmers organized at the village or community level to control pests. Although largely adopted by farmers, these techniques have reached only a limited number of them. The ripple effect has been hampered by: (i) the dissolution of the institutional mechanism at the end of the pilot phase; (ii) the problem of institutional sustainability of the LCBC; and (iii) the weak capacity of structures to provide the extension services required to make available the project gains to a larger number of farmers.

5.2 The project has neither led to changes in laws and regulations nor given a fillip to the promotion of IPM techniques or "soft" methods in the Lake Chad Basin area due to lack of sufficient coordination between ministries responsible for agriculture and agricultural research in different countries. All of these factors have significantly undermined the sustainability of project results.

5.3 In adopting an integrated approach to agricultural pest control using proven research and development results which received a highly positive response from the four member countries, their farmers and technical and financial partners, the project obtained significant results in the short term in the pilot area at the technical, social, environmental, institutional and financial level. However, due to limited use and ownership of these techniques at country level, the medium- and long-term impact of reducing pest-related crop losses and therefore producing higher yields - which should contribute to food security - has not been achieved. Overall, the project is deemed unsatisfactory.

## 6. Key Lessons and Recommendations

### 6.1 Key Lessons

6.1.1 The coordination of pest control in subsistence farming by a regional structure working in collaboration with research institutes and extension services using proven research and development results constitutes an asset only when conducted with long-term perspective and after forging real ownership of the mechanism in the member countries concerned.

6.1.2 There is a need to strengthen national agricultural extension and research systems through better dissemination of good practices to small producers, notably women, so as to significantly improve productivity and the food security situation which remains fragile in some Bank Regional Member Countries.

6.1.3 The establishment of a monitoring and evaluation system is essential to measure the real impact of the results of IPM techniques on yields, production costs and income beyond pilot farmers and countries.

6.1.4 A research and development pilot project that has achieved encouraging results and aroused genuine interest among farmers requires support measures at the end of the project, in order to preserve and consolidate project gains, and sustain its impact.

6.1.5 Although costly, the Farmer Field School approach should enable the training of a larger number of village brigades and extension workers in farming and plant protection techniques.

## **6.2 Recommendations**

### To the Bank

- i. The Bank should engage in promoting integrated pest management (IPM) systems in regional member countries whose rural dwellers suffer enormous pest-related losses. In such cases, it should target the regions to be reached and include such activities in its rural development strategy.
- ii. The Bank should extend the experiments and research/development to other crops, other predators and other areas of the Basin. Crops, notably food crops to be introduced, are those for which less costly IPM techniques are likely to improve yields or farmers' income, or enable a significant reduction in pesticide use, to preserve the already fragile environment of the Lake Chad Basin.
- iii. In promoting "soft" plant protection techniques, the Bank should target areas to be promoted, so as to get a critical mass of technical capacity on IPM and progressively expand to other areas. The use of indicators to trigger transition from one phase to another, based on results, will ensure project effectiveness.
- iv. For future integrated crop pest and disease management projects, the Bank should create synergies with other initiatives to facilitate farmers' access to inputs and agricultural credit, promote the creation of farmer associations and support micro-credit institutions operating in the area.
- v. This type of research and development project must thoroughly examine the experimental protocols in terms of reducing the factors to be tested at the same time and ensuring observance of the required spacing of testing on other fields, to ensure the authenticity of results.

### To LCBC Member Countries

- i. LCBC member countries must spread IPM techniques that have received the support of farmers, since such techniques have demonstrated their technical feasibility and financial profitability. The sustainability of project impact hinges on new initiatives further involving the respective Governments, in particular national plant protection and extension services, farmer organizations and the private sector. It also hinges on extending experiments and research and development to other crops and predators.

- ii. Member States must implement an effective integrated agricultural pest management policy by adopting appropriate laws or regulations on the use of natural products such as *neem*, and exploring the possibilities of large scale *neem* production, processing and marketing.
- iii. LCBC member countries should strengthen extension and plant protection activities to adapt to women's concerns, given their vital role in family holdings.

To LCBC

- i. LCBC should fully play its role as knowledge manager on the Lake Chad Basin and establish an information and data system of regional scale.
- ii. LCBC must strengthen the Ngala Regional School to support member countries in enhancing their pest management capacity in subsistence farming. It should also ensure wide dissemination of educational materials developed by the project in order to intimate as many people as possible with integrated pest management (IPM) techniques.

## **I. THE PROJECT**

### **1.1 Background and Rationale for Bank's Involvement**

1.1.1 Established in 1964 in Fort Lamy (now N'Djamena), the Lake Chad Basin Commission (LCBC) currently comprises five countries: Chad, Niger, Nigeria, Cameroon and Central African Republic. The mandate of the Lake Chad Basin Commission covers the conventional basin of 966,955 km<sup>2</sup>, or 41% of the total basin surface area estimated at about 2,335,000 km<sup>2</sup>. The Sahelian zone, which is the pilot project area, has suffered declining rainfall and droughts over the past forty years. As a result, the river system is degraded and the lake area has shrunk drastically due to increased dryness, losing nearly 90% of its surface water over the forty-year period. The major subsistence crops grown are millet and sorghum, both of which have low yields owing mainly to the various pests rampant within the zone.

1.1.2 The Sahelian zone also covers major infestation sites that often thwart the people's efforts, creating a situation of persistent food insecurity that is further exacerbated by high population pressure and decreasing farmland. Crop pests (insects, seed-eating birds, rodents, diseases and weeds) can cause losses of over 50% of production. For instance, the damage on cereals attributable to *Striga hermonthica* could affect over 60% of production.

1.1.3 Therefore, pest management for subsistence farming in the Lake Chad Basin is a major concern to the authorities of member countries. In March 1994, an LCBC Master Plan was adopted by Heads of State, with developing food security operational programs as one of its objectives. The master plan comprises 36 priority projects, including the Integrated Pest Management Project.

1.1.4 In the past decades, pest control programmes have been marked by the use of pesticides with high remanence. These pesticides are extremely costly and harmful to human health and the environment. To avoid such risks, the LCBC opted for IPM based on farmer participation and the use of effective environmentally-friendly and highly cost-effective products and techniques. Some Sahelian countries, notably Senegal, Mali and Niger, have already conducted Integrated Pest Management studies on millet among small farmers that have revealed obvious comparative advantages over the use of synthetic pesticides.

1.1.5 However, no appropriate legislation has been developed to promote integrated pest management and the use of 'soft' methods (i.e. effective methods that are not harmful to the environment and are the only ones that ensure increased sustainability). This is all the more important as pesticide residues in the area may accumulate in Lake Chad.

1.1.6 The FFS<sup>3</sup> approach was chosen as strategy to ensure the extension of IPM in the four countries involved in the project. The priority crops to be supported were also selected. The Farmer Field Schools system was originally developed in Asia as a means of promoting integrated pest management of crops. FFS do not teach farmers new technologies outside their environment; they rather provide the tools to be used to analyse their own practices and identify specific solutions to the problems they face.

1.1.7 The project was also an opportunity for LCBC to promote collaboration between institutions and operational departments of the four member countries, thus fostering regional integration. Indeed, the crop protection problem can be effectively resolved only through concerted effort among LCBC member countries.

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<sup>3</sup> Farmer Field School

1.1.8 Against this backdrop, LCBC requested Bank support for an integrated pest management project in the Lake Chad Basin to control pests at the regional level. The procedure for obtaining ADB funding dates back to August 1992. An ADF preparation mission visited Chad in July 1993. The memorandum prepared at the end of the mission could not be submitted to the Bank Group's Board of Directors for lack of sufficient resources under ADF VI. It was finally on 15 September 2000 that the project became eligible for funding under ADF VIII, almost 8 years after the first request from LCBC. The project was funded to the tune of UA 1.4 million by the Bank and UA 0.31 million by LCBC.

1.1.9 The project had two key components:

- (i) The research/development component was aimed at putting in place a technology transfer system based on the use of the Integrated Pest Management (IPM) method, combining biological control, varietal resistance, farming practices and chemical control, with the support of research institutes in the region.
- (ii) The training and information component aimed at training extension workers (20) and farmers in IPM techniques (120 farmers of both sexes), information dissemination through simple, pictorial and adapted publications, and capacity building for LCBC in training, through the LCBC Regional Agricultural Training School in Ngala, Nigeria.
- (iii) Project organization and management by a Project Coordination Unit (PCU), comprising a senior technical assistant (as coordinator, supported by an agronomist counterpart, a plant protection expert, an agricultural economist, an accountant, a secretary and seven (7) drivers (3 at the headquarters and 4 in the four implementation units, or 1 per country).

## **1.2. Objectives and Scope at Appraisal**

1.2.1 The project goal was to strengthen food security in four member countries of the Lake Chad Basin area (Cameroon, Chad, Niger and Nigeria). That hinged on the reduction of pest-related crop losses, through regionally coordinated use of tested IPM techniques, notably on crops (millet and sorghum) and the acquisition by farmers of skills enabling them to adopt and apply such techniques. Through such regional level coordination, the project also aimed to contribute to regional integration.

1.2.2 The assumptions and risks identified at appraisal showed that the adoption of IPM methods by farmers, lack of integration of initiatives at the regional level and frequency of rainfall deficits were limiting factors for the success of the project. However, the institutional mechanism put in place by the project, the management methodology based on the participatory and decentralized approach through the implementation units and village brigades, collaboration between research, extension and plant protection institutions in the four beneficiary countries as well as the distribution of villages across a wide range of rainfall isohyets were likely to mitigate this risk. The retrospective logical framework matrix in Annex 6 shows the specific risks concerning project implementation and sustainability.

### 1.3 Financial Arrangements

The total project cost was estimated at CFAF 1.399 billion or UA 1.56 million, net of taxes and customs duties, comprising CFAF 1.182 billion (UA 1.32 million) in foreign exchange and CFAF 217.19 million (UA 0.24 million) in local currency. Of this amount, the Bank's share stood at UA 1.4 million and the LCBC counterpart contribution at UA 0.16 million. The latter finally increased to UA 0.31 million to cover operating expenses due to project start-up delays.

## II. EX-POST EVALUATION

### 2.1 Evaluation Methodology and Approach

2.1.1 The purpose of this evaluation is to provide an independent review of the Pilot Research/Development Support Project on Integrated Pest Management (IPM) for Subsistence Farming in the Lake Chad Basin, based on OPEV<sup>4</sup> guidelines. The methodological approach consisted of a front-end analysis of the available background literature, including appraisal reports, country strategy papers, supervision summaries, mid-term review reports, country portfolio reviews, audit reports and borrower's completion reports, the Bank's completion reports (PCR) and PCR evaluation ratings. This analysis helped, among others, to highlight the salient points to be covered by the evaluation as well as evaluation issues. The visit to the LCBC headquarters enabled the collection of a large (albeit incomplete) amount of information, not available at Bank headquarters. The evaluation had to contend with poor project institutional memory due to lack of proper filing system at both the Bank and the LCBC. Thus, many key technical documents (e.g. pre-appraisal working documents) could not be found.

2.1.2 Besides data collection and analysis at the Bank headquarters, the methodology included visits and meetings organized in the project impact areas in Chad, Niger, Nigeria and Cameroon to discuss key issues concerning the evaluation with various stakeholders (LCBC, research, extension, plant protection services, beneficiaries and representatives of development institutions). Such issues included: (i) assessment of the criteria to use in evaluating project performance; (ii) verification of the results presented in the self-evaluation documents for observations and recommendations, while drawing lessons for the design and implementation of similar operations in future.

2.1.3 Field data was collected using interview guides prepared for the purpose (see example in Annex 9). The evaluation mission visited thirteen villages, including 10 pilot villages (4 for Nigeria, and 2 for each of the other three countries), or 50% of the 20 villages covered by the project, and 3 non-pilot villages (i.e. not covered by Pilot Project activities). Non-pilot villages were taken into account to have a better perception of the influence and scope of project impact in the Basin area. The opinions of final beneficiaries (farmers) are taken into account and reflected in this report. The main results of interviews with these beneficiaries are given in Annex 10.

2.1.4 Measurement methods combine "with-without" and "before and after" approaches. The "before-after" approach has been used especially for measuring the impact of IPM techniques in the Farmer Field Schools compared with control plots. A number of weaknesses<sup>5</sup> in the application of experimental protocols were pointed out, to facilitate undisputable attribution of increased yields to the project. Besides in-house evaluation, an external impact assessment of the IPM project was also conducted by the IITA in December 2004<sup>6</sup>.

<sup>4</sup> Revised Guidelines on Drafting Progress Completion Reports (PCR) and Project Performance Evaluation Reports (PPER), ADB/OPEV 2001.

<sup>5</sup> Sometimes, the choice of control plots was not optimal, for instance to avoid contamination, etc.

<sup>6</sup> This concerned producers from pilot and nearby villages across the four countries. The target groups were: (i) pilot farmers who were members of village brigades, trained in the Farmer Field School during two crop seasons (2003 and 2004); (ii) farmers that were not members of brigades living in the pilot villages; and (iii) farmers from nearby villages.

## **2.2 Availability and Use of Baseline Data and Key Results Indicators**

2.2.1 Matrices of the ex-ante evaluation report and the PCR of the Pilot Project were revisited following an initial description of the logical model of intervention (Annex 6) and preparation of an ex-post logical framework matrix designed to provide better information on the indicators concerning the various performance criteria (see Annex 7).

2.2.2 The evaluation is based on indicators identified in the appraisal report, namely: (i) brigade members, including women, who have been trained; (ii) level of understanding of IPM techniques; (iii) rate of increase in yields; (iv) coverage of basic cereal needs, measured by the cereal production and proportion of malnutrition; (v) level of crop losses, etc. An evaluation of the economic, social and environmental impact of all the tests conducted in the 20 pilot villages was also made at the end of the project.

2.2.3 The activity, impact, completion and in-house evaluation reports as well as the report of the external evaluation conducted by IITA in July 2004 and other reports were consulted. Other documents were not available due to the dissolution of the institutional mechanism at the end of the project. Field observations and interviews with stakeholders were conducted.

## **III. IMPLEMENTATION PERFORMANCE**

### **3.1 Compliance with Implementation Schedule and Project Costs**

3.1.1 The initial implementation schedule was not followed due to delays in fulfilling the conditions precedent to entry into force of the grant and compliance with disbursement procedures. This held the project back for over two years. Delays were also incurred in recruiting technical assistance, establishment of the Coordination Unit and the various national implementation units, procurement of goods and services, installation of village brigades, publication of brochures and the first disbursement. As a result of these delays, LCBC twice requested the extension of the last disbursement deadline.

3.1.2 The total project cost is estimated at CFAF 1.399 billion or UA 1.56 million, net of taxes and customs duties, funded jointly by the ADF and LCBC. The latter's contribution was initially estimated at UA 0.16 million and covered the salaries of staff seconded by LCBC to the project. At the end of the project, LCBC's contribution stood at UA 0.31 million. This operating cost overrun borne by LCBC is due to the extension of project duration. However, there was good control over the cost of activities.

### **3.2 Project Management, Reporting, Monitoring and Evaluation of Outputs**

3.2.1 The pilot project was implemented by LCBC's Department of Project Planning, Appraisal and Monitoring, through a Project Coordination Unit (PCU). In each country, the activities were implemented by a National Implementation Unit, attached to the body responsible for research. Supervision was carried out by a Steering Committee, which, however, had difficulty running. Six technical meetings bringing together members of the Coordination Unit and researchers were organized to prepare the crop seasons and report back results.

3.2.2 The institutional arrangement put in place included the coordination unit, the implementation units and village brigades. Overall, this arrangement worked well. In particular, the training and equipment provided to village brigades were valuable assets enabling the beneficiaries

to protect their crops themselves. However, these assets did not survive past the end of the pilot phase.

3.2.3 The reporting system was based on the grant protocol and followed a specific frequency (quarterly and annual) for information flow between the Bank and LCBC. Twelve quarterly and four annual progress reports, two evaluation reports (in-house and external<sup>7</sup>), two account audit reports for 2003 and 2004 and three activity programmes were forwarded to the Bank. Two steering committee meetings were held in January 2003 and March 2004, the reports of which, similar to those concerning socio-economic studies (situation in the area, food security and women's role in rural areas) and Phase II of the project, were also sent to the Bank.

3.2.4 The progress of activities was monitored by the steering committee at the regional level and a local steering committee in each of the four countries of the Basin. The steering committee at the regional level had difficulty functioning and was able to hold only two meetings out of four. Monitoring and evaluation of field activities was the responsibility of the coordination unit and national implementation units.

### **3.3 Implementation Performance**

3.3.1 The Integrated Pest Management Project was implemented over four years (2001-2005), instead of the two specified in the appraisal report. The first two years were devoted to the establishment of institutional arrangements before the first disbursement in November 2002 (recruitment of staff; equipment of implementation units, training of extension workers and village brigades). In 2003 and 2004, the project gained momentum with the application of research protocols on IPM techniques and training of farmers in Farmer Field Schools.

3.3.2 The implementation performance is deemed unsatisfactory due to non-compliance with the initial schedule, the resignation of two coordinators and serious delays in processing files and executing disbursement procedures.

## **IV. KEY FINDINGS OF THE EVALUATION AND PERFORMANCE RATING**

### **4.1 Key Findings of the Evaluation**

#### a.) Relevance and Evaluation of Quality at Entry

4.1.1 The Integrated Pest Management Project features among the 36 priority projects of the LCBC Master Plan adopted by member Heads of State, one key objective of which is the satisfaction of food security in the Lake Chad Basin area. The project objectives are consistent with the needs of LCBC member countries.

4.1.2 The population of these countries, mostly farmers, record huge losses (over a third of their production) due to insect pests, weeds and diseases affecting crops, notably millet and sorghum. This jeopardizes their food security. Given the adverse consequences of the exclusive use of chemicals on the relatively fragile ecosystems of LCBC countries and the population's health, not to mention the costs that remain unaffordable to small farmers (about 80% of the Basin's population), IPM techniques have received a very positive response in the four member countries, especially among farmers.

<sup>7</sup> In-house monitoring/evaluation was conducted by the technical assistant in charge of farming activities (farming methods extension), while external evaluation was entrusted to ICRISAT and IITA

4.1.3 Providing institutional support to a regional structure in charge of policy coordination among member countries, research institutes and extension services, using tested research and development results, constituted significant progress towards regional integration and better coordination of plant protection in the Lake Chad Basin. It was a response to regional priorities aimed at reducing poverty and involving farmers in the protection of their environment.

4.1.4 The pilot project, which is consistent with the Bank Group's policy on economic cooperation and regional integration, took into account the need to: (i) streamline regional integration activities; (ii) foster collaboration with other national and international research institutions; (iii) integrate and harmonize regional initiatives with national development objectives; and (iv) mainstream environmental issues in the implementation of national and regional initiatives.

4.1.5 With a view to ensuring widespread use of integrated pest management techniques, the appraisal report mentioned the need to establish an action plan to popularize the results obtained following project implementation. The action plan was to specify the various technical, institutional, socio-economic and financial resources required to render a subsequent large-scale project feasible. An undertaking to implement the results of the pilot project was a condition precedent to entry into force of the grant. Therefore, the relevance and quality at entry are deemed satisfactory.

b.) Achievement of Objectives and Expected Outcomes (Effectiveness)

4.1.6 Most of the expected short-term objectives in terms of research and training were achieved. Yields under controlled conditions have increased and pest-related losses have reduced in the experimental fields. However, an appropriate mechanism should have been considered for these results to translate into real development actions, obtain such good performance on a large scale and achieve the ultimate goal of enhancing food security which remains fragile. Effectiveness is thus rated as unsatisfactory. Furthermore, the regional coordination of IPM techniques could not be sustained beyond the pilot phase.

4.1.7 *Testing and regional coordination of IPM techniques:* In its pilot phase, the project initiated a form of collaboration between research institutes, extension and plant protection services and village brigades, coordinated by LCBC. Regarding research institutes and extension, beneficiary countries honoured their commitments, each setting up an implementation unit. They each mobilized a team of skilled technicians which was maintained throughout the duration of the pilot phase (June 2002-March 2005). These national implementation units (NIU), attached to research institutions in each country comprised a researcher (Unit Head) and five extension officers. Project supervision was provided by a Steering Committee, comprising three representatives from each country, the four Unit heads (as observers) and members of the Coordination Unit. Through this mechanism, LCBC was able to provide immediate institutional support to the structures, without however thinking of the sustainability of the actions undertaken by the management and research structures.

4.1.8 The coordination unit was able to ensure the full participation of agricultural research institutions of the four countries concerned (IRAD in Cameroon, INRAN in Niger, ITRAD in Chad and the University of Maiduguri in Nigeria), and plant protection and extension services. Indeed, apart from the steering committees, the officers of these services were invited to several meetings (harmonization of protocols, feedback on the results of crop seasons, preparation of brochures, supervision missions and external evaluation of the project).

4.1.9 The Coordination Unit also established collaboration with research centres such as ICRISAT and IITA, and maintained good relations with such projects as MEGA-CHAD, funded by Belgian Cooperation and UNEP, the goal of which is biodiversity conservation and the fight against desertification in the Lake Chad Basin, and the project to reverse land and water degradation trends in the ecosystem of the Lake Chad Basin, funded by GEF. Cooperation with these two (2) projects enabled LCBC to encourage national research institutions to reflect together on a regional issue.

4.1.10 The institutional framework created by the project led to the establishment of village brigades in the pilot villages. Research and development was conducted in 20 pilot villages, at the rate of 5 in each country (Chad, Nigeria, Niger and Cameroon). Technical guidance was provided through the establishment of village brigades made up of 6 farmers per village, trained in basic plant protection techniques (total: 120 farmers, of which 29 women, i.e. 24%). Farmer Field Schools and individual demonstration test plots were set up in the pilot villages, taking into account the major insect pests and diseases. The establishment and equipment of such brigades were valuable assets that enabled the beneficiaries to protect their crops themselves.

4.1.11 Training and supervision of farmers through the village brigades allowed for the: (i) adoption of new farming methods; (ii) identification of major insect pests and diseases affecting millet, sorghum, maize and cowpea; (iii) mastery of *neem* extraction and spraying techniques; and (iv) identification of useful insects and their conservation in the ecosystem. Among the themes examined, regular weeding and seed treatment were applied most by pilot farmers in their own fields. Their adoption rates are respectively 89% and 88%, followed by thinning (79%), row seeding (78%) and pre-planting soil preparation. The pre-planting seed germination test was least adopted as only 20% of pilot farmers applied it.

4.1.12 In total, almost 500 Farmer Field School days and 600 visits to demonstration plots established in pilot farmers' fields were organized each year (2003 and 2004). Through the application of IPM techniques, nearly ten thousand (10 000) farm managers (compared to one thousand envisaged at project start-up) were able to increase their yields of subsistence crops (millet, sorghum, cowpea).

4.1.13 *The research and development methodology applied to the pilot villages identified, follow the recommendations of the planning meeting held in Maroua and the crop season protocol made available to implementation units. However, the project failed to fully implement all the techniques provided, such as the use of the geographic information system (GIS) in pest detection. Furthermore, extension teaching aids such as manuals, posters and guides to the integrated control menu, were not widely published. In addition, the village brigades did not receive sufficient guidance from plant protection services.*

**Box 1: A Significant Change!**

*The Director of Agricultural Development in Cameroon knows the pilot project well for having been for almost seven (7) years, the Provincial Delegate of Agriculture in Maroua, the project area, and attended various project supervision meetings. He feels that the IPM concept is becoming increasingly popular, given its positive effects on the environment and health. Besides in Cameroon, natural products are gradually replacing chemical products, even in the production of cash crops such as coffee and cocoa. Lastly, he believes farmers are still using IPM techniques, which they value highly, and that only monitoring and retraining are now required. - **Source:** Field visits*

4.1.14 *Adoption and use of IPM techniques by farmers:* The project provided training to 20 extension workers, at the rate of 5 per country and 120 farmers in Farmer Field Schools. Training on IPM techniques took place five to six months before the crop season, thus enabling the trainees to acquire sufficient experience to apply the techniques.

4.1.15 The Coordination Unit conducted a survey<sup>8</sup> based on the following indicators and criteria: farmers' level of understanding, their assessment of the project, their attendance and participation rates, the project's scope. The results of this survey reveal that: (i) the rate of pilot farmer participation in Farmer Field School activities is at least 80%; (ii) the level of understanding of IPM techniques introduced is high; (iii) farmers appreciated the techniques demonstrated and applied them; and (iv) the problems identified concern only choice of species, disregard of sowing date and lack of treatment equipment.

4.1.16 The use of organic manure was recognized by all farmers as beneficial to plants, but access is in general difficult. The creation of farmer associations that could obtain micro-credit from NGOs, micro-credit institutions and other development projects operating in the area could help to address this issue.

**Box 2: Pilot Farmers' Views on Certain IPM Techniques**

*The farmers of one of the pilot villages, -Mandjafa in Chad - raised the problem of full-scale implementation of IPM techniques in their fields. Due to lack of sufficient resources, they make limited use of inputs in their fields, notably organic manure and chemical fertilizers. According to them, a demonstration plot of 900 m<sup>2</sup> (30x30) requires approximately 15 bags of manure at a cost of CFAF 7,500. This means that for one hectare, they need at least CFAF 82,500, excluding transportation costs. Due to this constraint, the farmers have developed an original strategy, which is to allow the Arab shepherds in transhumance to pen animals in their fields in exchange for two kilogrammes of sugar. -Source: Field visits*

4.1.17 The privileged status acquired by pilot farmers in their villages has attracted several other farmers to them to be taught IPM techniques, which some of them have already applied in turn. On average in each village, each pilot farmer has been contacted by 24 other farmers who are either from the same village or nearby villages. Besides the pilot farmers who constitute the direct beneficiaries, other farmers in pilot villages and even nearby villages were also interested in the techniques taught.

4.1.18 The use of *neem*-based botanical insecticide (powder, aqueous extracts and oil) is now common among pilot farmers who have mastered the techniques of production, formulation, application and storage. The most interesting result is that all farmers are convinced of the effectiveness of these botanical insecticides against the major pests (nearly 90% of farmers have found these products effective against stem borers, defoliating caterpillars and aphids). Some believe that the main difficulty in producing *neem*-based pesticides is the grinding of almonds using mortar. Yet, over 70% of producers find these botanical insecticides readily available and inexpensive. Most of them (57%) mention the absence of any toxicity and sufficient efficacy of *neem*. Other farmers are willing to produce *neem* powder (53%), oil (52%) and almonds (36%). In this regard, the establishment of producer groups for the acquisition of mechanical mills and semi-

<sup>8</sup> The survey on the impact of the project among farmers in pilot and surrounding villages was conducted from 1 to December 31 2004, after the two crop years 2003 and 2004. It was conducted by extension workers and unit heads in the 20 pilot villages involved and the surrounding villages within a radius of 10 km. In total, over 600 farmers were interviewed.

artisanal presses could facilitate the production of powder and oil extraction. Moreover, an Indian company would be willing to produce *neem* oil and powder on a large scale for use by farmers.

**Box 3: Assessment of IPM Methods**

*In a sample of 13 villages visited, including three non-pilot villages, only the farmers of two pilot villages and one non-pilot village believe that neem is less effective, even though they admit that it is harmless to humans. However, they all agree that they derive much benefit from the use of neem in terms of crop protection and increased production and income. Furthermore, comparing the IPM method to the other methods (chemical and traditional), they all state that the IPM method is the least costly and the most effective and that they are willing to continue using it unconditionally (even without foreign aid).*- **Source: Field visits**

4.1.19 The levels of adoption and use of IPM techniques by pilot farmers reflect the feasibility of the IPM approach that only requires countrywide dissemination and ownership to achieve the desired effects.

4.1.20 Reduction of pest-related crop losses: The application of IPM techniques ensures effective control of certain pests and diseases in field trials. Hence, thanks to these IPM techniques, the project has helped to fight against *Striga hermonthica* attacks on sorghum, with an average number per square meter, based on tracking plot counts according to site. Infestation reduced from 60 to 100% in Farmer Field Schools compared to control plots. The use of *neem* extracts also provided effective protection against insects such as stem borers. Seed treatment with Apron Star 42WS fostered excellent emergence and sturdiness. Overall, farmers appreciated the integrated management and expressed their willingness to continue its application.

4.1.21 The reduction of losses resulted in higher yields. The sorghum yield increase in Farmer Field School plots was 163% and 168% in Cameroon and Chad, and 483% in Nigeria where the climate and soil conditions were better. The integrated pest management techniques (the different uses of *neem* as an insecticide, crop rotation, the fight against *Striga* with organic manure, use of resistant varieties, etc.) also helped to increase the yields of two other crops, namely cowpea and millet in Farmer Field Schools, compared with control plots (Table 1). In each country, the results obtained in pilot farms far exceeded expectations.

4.1.22 The rate of increase in crop yields using IPM techniques, obtained in the Farmer Field Schools, ranged from 163% to 483% for sorghum, 83% to 89% for millet and 74% to 162 % for cowpea, resulting in improved income levels for farmers reached by the project<sup>9</sup>.

<sup>9</sup> In 2004, cowpea cultivation in Niger came under heavy attack by hairy caterpillars during the vegetative phase in all 5 pilot villages of the project, destroying the crop entirely.

**Table 1**  
Yields Recorded during the 2003 and 2004 Crop Seasons by the Project

Country	Crops	Yields 2003 (kg/ha)			Yields 2004 (kg/ha)		
		IPM Plot	Control Plot	Increase Rate (%)	IPM Plot	Control Plot	Increase Rate (%)
Cameroon	Sorghum	3726	1417	163	1904	1036	84
	Cowpea	945	517	83	1672	480	248
Niger	Millet	1137	639	78	540.5	230	135
	Cowpea	835	617	35	-	-	-
Nigeria	Sorghum	6930	1189	483	2670	600	345
	Maize <sup>10</sup>				1813	578	213
	Cowpea	1296	432	200	940	400	135
Chad	Sorghum	1104	412	168	744.8	493	51
	Millet	2781	1527	82	515	264	95
	Cowpea	-	-	-	207.33	483.33	-57

**Source:** 2003 and 2004 Activity Reports; In-house (2003) and External (2004) Evaluation Missions of the Pilot Project

4.1.23 For Cameroon, the average yields among farmers are around 1000kg/ha for rain-fed sorghum and 750 kg/ha for cowpea<sup>11</sup>. Thus, the objectives of increasing the yield of rain-fed sorghum from 1000 to 1500 kg/ha, and of cowpea from 750 to 900 kg, were largely exceeded. As shown in Table 1, Farmer Field School plots in 2003 obtained an average yield of 3726 kg/ha for sorghum and 945 kg/ha for cowpea respectively, against 1417 kg/ha and 517 kg/ha in control plots.

4.1.24 Although satisfactory, the results achieved, particularly in terms of increased productivity, can be improved by streamlining the demonstration tests used. Indeed, some demonstration plots were testing several factors at the same time (phyto-sanitary treatment, varietal testing, fertilization, pest resistance, etc.). This complicates the analysis of results and understanding of the effects of a particular factor. Moreover, the spacing required between tests is not always observed. This increases the risk of interaction with other exogenous factors.

4.1.25 All these results were obtained under relatively controlled conditions. The cessation of the key activities, notably extension at the end of the pilot project, could not guarantee such results in the real socio-economic conditions of farmers.

5.1.26 *Strengthening food security:* Increased yields in experimental fields have improved the availability and accessibility of food to the households concerned, who consume most of their own harvests. This has contributed to their food security. However, due to limited use and low level of country ownership of IPM techniques, the project was a missed opportunity to significantly improve food security in the Lake Chad Basin area.

4.1.27 Although there has been an increase in cereal production at the national level, reflecting a favourable situation since 2004, food security remains a major challenge in the four countries concerned. The lack of local statistics limits the measurement of the real extent of the project's contribution in the area. The coverage of cereal needs in the project area which receives average rainfall of 300-500 mm/year could not be validated.

<sup>10</sup> In some villages in Nigeria, maize is replacing sorghum as the staple food

<sup>11</sup> National Agricultural Research Centre, Maroua, 2004, "Annual Activity Report of the 2003 Crop Season"

**Table 2**  
**Harvested Areas and Cereal Production**

COUNTRY	Harvested Areas					Cereal Production				
	(1000 ha)					(1000 tonnes)				
	1994-1996	1999-2001	2004	2005	2006	1994-1996	1999-2001	2004	2005	2006
Cameroon	1,002	714	1,077	1,175	1,070	1,146	1,272	1,684	1,660	1,407
Niger	7,108	7,570	7,862	8,397	8,952	2,253	2,714	2,730	3,669	4,030
Nigeria	18,115	17,536	17,716	18,310	19,172	21,517	21,288	24,321	26,031	28,884

Source: FAO Statistical Yearbook 2007-2008, Statistics Division 2009

4.1.28 Nonetheless, at the national level, FAO indicators on food security in the four countries show a downtrend in undernourishment between 1995-1997, 2000-2002 and 2004-2008, as shown in Table 3 below.

4.1.29 This table also indicates that except for Nigeria, the percentage of undernourished persons remains high in the countries concerned, notably in Chad and Niger, with more than one in four (25%) caught in a situation of food insecurity. This remains a cause for concern.

**Table 3**  
**Dietary Deficiency in the Four Countries**

COUNTRY	Nutritional Deficiency: Proportion of Undernourishment (%)				
	1995-1997	2000-2002	2004-2008	1995-97 à 2002-02	2000-02 à 2004-2006
	Annual Change				
Cameroon	35	27	23	-5.2	-4.4
Niger	40	32	28	-4.1	-3.2
Nigeria	10	10	8	0.8	-5.6
Chad	51	42	38	-3.8	-2.6

Source: FAO, Country Profiles – Food Security Indicators, Last update: 12/10/2009

### c) Efficiency

4.1.30 Despite the increased yields and rising farmers' income, the Farmer Field Schools approach applied to a limited number of farmers (120), is often costly. An increase in the number of pilot farmers would have reduced the unit cost. Furthermore, the high cost of technical assistance (about half the cost of the project) affected project efficiency, since it was provided at the expense of more substantial support to extension workers and farmers. In short, more pilot farmers would have been reached at the same cost.

4.1.31 Compared to the number of farmers reached (3000 according to the PCU survey<sup>12</sup>), the unit cost of the project stands at UA 520<sup>13</sup> (about USD 1,000). The Farmer Field School approach is blamed for being more costly compared to traditional extension and able to reach only a limited number of pilot farmers. Dissemination of project results to a larger number of farmers could reduce this cost.

4.1.32 The project is research/development-based and is located in 20 villages that make up only 1.6% of the basin's population. Its economic impact during this phase remains extremely limited.

<sup>12</sup> Report of the survey on the project's impact among pilot farmers

<sup>13</sup> Total project cost over number of farmers reached

However, the financial impact on beneficiaries may be significant. At appraisal, for a typical farm (2 ha), the annual gross income (excluding cost of family labour) rose from CFAF 134,000 in the “no-project” situation to CFAF 204 000 in the “with-project” situation. At completion (PCR), this income increased from CFAF 146,600 to CFAF 408,100, or three times the income in the “no-project” situation.

4.1.33 These results show that activities undertaken were financially viable and sufficiently attractive, to the extent that ten times as many farmers have applied the IPM method on their farms. Beyond the pilot phase and by extrapolating the income at the level of the budgets of LCBC member states concerned, the project, by substituting the imported chemicals with IPM method, helped to realize foreign exchange savings estimated at CFAF 2 billion, which was previously used by farmers to purchase pesticides to treat their crops. In addition, the participatory approach based on the system of village brigades through which the IPM method was disseminated, eased the task of mentorship services. The extension of the project implementation period by two years brought about additional costs that affected the efficiency. The project’s overall efficiency is deemed unsatisfactory.

d.) Impact on Institutional Development

4.1.34 With its institutional framework, the project created collaboration dynamics between research, extension and plant protection organizations. During the implementation phase, the LCBC was able to have national experts at both the central and peripheral level, largely capable of replacing international experts. These collaboration dynamics created between the different structures contributed to enhancing their capacity and facilitated technology transfer, leading to the application of research results.

4.1.35 Furthermore, the existence of village brigades that serve as effective links between these structures and farmers, is a major project innovation, since they help to alleviate the task of extension services.

4.1.36 The project also helped to enhance the capacity of the LCBC Regional School in Ngala (Nigeria) by providing equipment, teaching materials and training courses on IPM technological packages. The Coordination Unit also had to intervene directly in the training of students by organizing a seminar on integrated pest management and involving the trainers of extension workers.

4.1.37 With the multiplicity of institutions involved in the rural development sector in member countries, the institutional mechanism set up by LCBC proved sufficiently operational and had qualified personnel, since it was able to ensure greater operational coherence and effectiveness. Furthermore, to facilitate contacts and have officially recognized contact persons, LCBC took appropriate steps by appointing commissioners and focal points in each country, all of who proved very useful during project execution. The project also fostered the development of resources in a regional framework and contributed to the preservation of the environment, but within an extremely limited intervention framework.

4.1.38 All these measures were effective during the implementation of the pilot project. Abandoning the project may dissipate beneficiaries’ hopes and make it more difficult to promote subsequent development efforts.

4.1.39 LCBC<sup>14</sup> has been unable to build on the knowledge acquired in project management due to the use of coordinators, assistants and LCBC technical counterparts whose tenure was limited to the project duration. This practice neither allows the building of institutional memory nor the use of knowledge acquired to improve LCBC's effectiveness. In addition, the national farmer support and supervision structures were unable to continue with disseminating technological packages beyond the project, owing to lack of resources (according to officials of Chad's plant protection departments). The same situation was noted in the other countries.

4.1.40 In short, the project did not contribute to any improvement or other changes in the laws, regulations or other standards and practices. For instance, no LCBC country has developed appropriate legislation to promote the use of IPM techniques and "soft" methods. This is due mainly to insufficient coordination between the ministries responsible for agriculture in the different countries that were expected to come up with novel legislation in this area. As a result, the impact on institutional development is deemed unsatisfactory.

e.) Impact on Gender

4.1.41 Women play a special role in food security in the region. They participate actively in all village socio-economic activities. They alone perform household chores and devote much of their income to household expenses. They contribute significantly to food production and processing and marketing of foodstuffs. However, their effective participation in agricultural development is fraught with obstacles that hinder the development of their business activities and their ability to exert greater influence on decision making in their communities. The said obstacles include lack of access to key inputs (land, credit, agricultural equipment) and training (literacy, agricultural techniques, accounting, etc.). This situation varies across communities, according to social, cultural, economic, legal and religious factors. In the project area, women have low decision-making powers within the household and the community, and are yet to receive substantial support that could give value to their work and enhance their capacity.

4.1.42 Women represented 24% of pilot farmers (29 women out of 120) trained in Farmer Field Schools. Their participation in the FFS activities was highly satisfactory, averaging above 70%. Concerning mentorship, at least 20% of extension workers trained were women. The presence of women extension workers facilitated the active participation of rural pilot women farmers. This training afforded them the opportunity to benefit from innovations, enhance their capacity to upgrade their production techniques and respond to market opportunities. It also enabled farmers to substantially increase their food production and income, improve their health and that of their families, manage their resources and strengthen their participation in decision-making. Those who own individual fields experimented integrated pest management techniques in their fields, and taught such techniques to other women who were not members of their village brigades and even those from nearby villages. This means that the application of integrated pest management by women farmers is of very special importance. Hence, this population segment should be advised against using harmful and persistent products in pest control. The impact on gender is not satisfactory, considering the low representation of women in the structures put in place, including the pilot farmers, and non-removal of barriers to women's access to factors of production. The project's impact on gender is unsatisfactory.

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<sup>14</sup> The steering committee is chaired by the LCBC Executive Secretary and comprises four plant protection officers (one per country), four extension service officers, four officials of research institutions and two LCBC Delegates. It met only once per year instead of twice to monitor project implementation in general, review the work programmes and ensure their effective implementation.

**Box 4: Women – A Group to be Encouraged**

*The transfer of knowledge most often takes place in Farmer Field Schools and at periodic meetings in the villages. The ratio between the number of farmers participating in Farmer Field School days and the number of farmers in the village, varies across villages. However, the percentage ranges from 7.5% to over 75%. Of these, women may represent between 15% and 60%. The various occupations of the other farmers (farm work, other income-generating activities) are mentioned as causes of their non-participation. Most farmers in non-pilot villages have heard of neem, but do not know IPM techniques. Moreover, neem extracts are used by farmers in these villages - **Source: Field visits***

f.) Impact on Regional Integration

4.1.43 In terms of regional coordination, the unified implementation of integrated pest management (IPM) techniques, through work done in synergy by research, plant protection and extension structures of the four member countries, should foster regional integration. This objective was not achieved due to lack of a real policy of communication on the project and its effects at LCBC, failure by the project to promote a harmonized and concerted control of devastating pests, and lack of real collaboration, knowledge sharing and networking.

4.1.44 The project suffered from insufficient coordination between the ministries of agriculture of the different countries notably at start-up, thus limiting the adoption of project results by the authorities concerned, particularly those that were to renovate legislation in this area. The promotion and regulation of proven gains, especially in biological control and sustainable development, have been limited. Indeed, member states pursued no aggressive policy in this regard. Some actually subsidize the phyto-sanitary treatment of food crops using synthetic pesticides, thus constituting an obstacle to the promotion of botanical insecticides, despite the fact that insecticide residues may accumulate in a lake already severely undermined by increased drying-up. The impact on regional integration is unsatisfactory.

g) Impact on the Environment

4.1.45 One of the objectives of this project - to help protect the environment - is squarely in line with the Strategic Action Programme (STAP) for environmental protection and sustainable development prepared in 2005 by LCBC, for implementation of Vision 2025 for Lake Chad.

4.1.46 The project did record much more success in the pilot areas as concerns the use of *neem* extracts (powder, aqueous extract and oil) which, according to nearly 90% of farmers, are effective against a wide range of pests, including stem borers, defoliating caterpillars and aphids. Such application significantly reduces the use of toxic pesticides that the poor farmers can ill afford. Furthermore, the project laid considerable emphasis on environmental protection through: (i) the restrictive use of environmentally-friendly pesticides (e.g. pyrethroids in case of high infestations); (ii) the use of farming methods in pest control (crop hygiene, tilling before planting, etc.); and (iv) taking the activities of natural enemies of pests into account.

4.1.47 Before implementing the pilot project, 77% of farmers used pesticides to protect their crops against only 14% who practised traditional methods. The products most frequently used were pyrethroids, but in certain cases, banned products of the organochlorine group (e.g. HCH). Furthermore, the project impact assessment report shows that each farmer was using an average of 3 litres of pesticides, which represents a consumption of more than 30,000 litres for the ten thousand

farm managers identified in 20 villages. Compared to the entire Basin area, the quantities are enormous. The abandonment of the systematic use of toxic pesticides with the advent of the project might therefore have had a considerable environmental impact, had there been widespread use of this technique in the region. The low project coverage rate has limited its impact on the environment, which is deemed unsatisfactory.

#### h) Impact on Poverty Reduction

4.1.48 The pilot project was particularly geared towards smallholders. It targeted subsistence farming, which concerns the majority of people of the Basin. In its implementation, the project tested cost-effective technologies adapted to the environment and aimed at reducing pest-related losses. The results obtained in the Farmer Field Schools and demonstration plots were so spectacular that from 1,000 farmers targeted at appraisal, the number of farmers who benefited from the project rose to nearly 10,000. In the Farmer Field Schools, the increased yield obtained was over 150%, with the millet or sorghum yield rising from 500 kg/ha on average to over 1500 kg/ha, i.e. an increase of more than 1000 kg/ha. This higher production attributable to reduced crop losses would undoubtedly have contributed to reducing poverty had adoption been on a larger scale.

4.1.49 Regarding the financial aspect, for the standard farm considered (2 ha) and based mainly on the cultivation of sorghum (1 ha), cowpea (0.5 ha) and millet (0.5 ha), annual income rose from CFAF 146,600 in the pre-project situation to CFAF 408,100 with the project. The increase in income is estimated at CFAF 261,500 against CFAF 130,000 forecast during the appraisal in 2000. This corresponds to a valuation of family labour of CFAF 586/day and CFAF 1626 per day, respectively, representing an increase of 177%. This result shows that the measures considered were financially viable and sufficiently attractive to encourage farmers to apply the IPM method on their farms.

4.1.50 The increase in production generated following the application of IPM techniques, helped to improve household nutrition and meet some basic needs such as clothing, children's education, health and various ceremonies (weddings, baptisms, funerals, etc.). Pilot farmers' income rose, contributing to poverty reduction among them. Others who approached the farmers and applied these techniques also benefited. The wealth generated by the pilot farmers has earned them a prime place in their communities where, for various ceremonies, they waste no time in fulfilling their social obligations.

4.1.51 Economically, the benefits at the farm were relatively high. As shown in the PCR, the production value generated with the application of IPM techniques is estimated at CFAF 1 billion. Member countries have realized savings of around CFAF 2 billion with the use of *neem* extracts, not to mention the environmental benefits resulting from reduced use of pesticides. However, given the pilot nature of the project and its limited area of intervention (20 villages that make up only 1.6% of the Basin population), the economic impact is relatively limited. The use of *neem*-based products opened new opportunities for farmers. *Neem* production can generate income for farmers planning to engage in this activity. In the villages of Shehuri and Abbar in Nigeria, some farmers produce and sell these products on the local market. Overall, the impact on poverty reduction is deemed unsatisfactory.

#### i) Private Sector Development

4.1.52 The Project has laid the groundwork for large-scale actions in each country. Using natural products such as *neem* has indeed raised farmers' hopes. However, production, processing and marketing remain under-developed. Yet, the production potential exists. The involvement of the private sector, especially SMEs formed by farmers in this sector, could give a real boost to *neem*

and contribute to improving production, processing and marketing if appropriate support measures were taken. The project had no significant impact on private sector development.

j) Sustainability

4.1.53 The pilot project enabled the development of a self-reliant crop protection strategy, based on the initiative of farmers organized at the village or community level to control pests (IPM). Widely adopted by farmers, these techniques had a positive economic, financial and environmental impact. To foster their dissemination, IPM guides for technicians and farmers were prepared as well as an IPM manual to control pests in the Basin for technicians. The expertise imparted to the pilot farmers has been transferred to other farmers and is likely to spread further. However, the ripple effect has been hampered by: (i) the dissolution of the institutional mechanism; (ii) LCBC's sustainability as an institution; and (iii) the weak capacity of extension facilities to provide the services required to make the project results accessible to a larger number of farmers. Overall, project sustainability is unsatisfactory.

4.1.54 At the end of the project, the different management structures put in place were dissolved. The field officers ceased operation and the project came to an abrupt end. Furthermore, the withdrawal of means of transport (motorcycles) from extension workers (despite the fact that the motorcycles were virtually written off) was a factor of demobilization. Had the motorcycles been sold to them at their residual value, as they themselves had requested from LCBC, they would probably have pursued the mentoring and extension activities, which would have contributed to project sustainability. The countries and the Bank did not fulfil their commitment to implement the results of the pilot project (project condition). LCBC should have provided more information to and sensitized the authorities of the countries concerned on what action should follow the pilot project.

4.1.55 *Technical viability:* The research results showed that the pilot project was technically viable, but only to a relatively limited scale, since IPM technique have proven their worth. The stakeholders, especially women, were involved in project implementation. However, the question of farmers applying some IPM techniques in their own fields (e.g. organic manure and chemical fertilizer) remains pending, given the cost implications. Without sufficient resources, farmers use few inputs. According to them, a demonstration plot of 900 m<sup>2</sup> (30 x 30 m) requires approximately 15 bags of manure, for a total of CFAF 7,500. This means that for one hectare, they need at least CFAF 82,500, excluding transportation costs. Faced with this situation, they have developed a strategy of allowing Arab transhumant pastoralists to pen animals in their fields in exchange for two kilogrammes of sugar (see Box 2).

4.1.56 In addition, the varieties so far identified as being resistant to certain pests, are not always available on the local market and there are no plans to multiply them. Similarly, *neem*-based insecticides are yet to be produced and marketed on a large scale. This constitutes an obstacle to the dissemination of project achievements.

4.1.57 To sustain training activities, the project produced documents in the form of IPM training manuals and brochures. A guide to IPM menus for each major crop of the project area, notably millet, sorghum and rain-fed cowpea, was produced. Two posters, one on *Striga* and the other on the use of *neem* powder to control stalk borers, were also prepared. These documents were translated into four languages spoken in the area covered: Arabic, Fulfulde, Hausa and Kanuri. Unfortunately, these guides and brochures were not widely circulated due to the printer's failure to deliver as expected.

4.1.58 *Economic and financial viability:* Through its research and training activities, the project has had an economic impact, helping to reduce expenses on the purchase of pesticides. According to estimates validated by the evaluation, the income of farmers in the “project” situation could be about three times higher than the “no project” situation. In this case, were the IPM techniques widespread, the financial impact would be significant.

4.1.59 *Institutional sustainability:* Owing to the lack of sustained commitment by LCBC, the institutional framework set up at the start of the project no longer exists, although member countries participated in project implementation by paying their counterpart contribution to the ADF funding and providing the project with the required personnel. Until 2005, the institutional arrangement worked well at the organizational, administrative and financial management level. Since its dissolution, uncertainty looms about the sustainability of the practice of integrated pest management (IPM). In its current state, LCBC is unable to carry out sustainable actions that could guarantee the sustainability of achievements. On the ground, it was noticed that despite the enthusiasm aroused by the project, farmers and even mentors lacked sufficient time to fully implement all the IPM techniques, the duration of the pilot phase having proved insufficient. Moreover, the withdrawal of motorcycles from the extension workers could affect project sustainability.

4.1.60 Established under an agreement dating back to May 1964, LCBC has relatively cumbersome financing<sup>15</sup> and governance<sup>16</sup> systems that hamper it from sustaining its actions and operation. An institutional assessment conducted under the GEF/WB project in 2008, followed by support from German Technical Cooperation (GTZ), recommended a refocusing of LCBC activities on its core functions, the revision of its organizational structure and the creation of a Lake Chad Basin Observatory. A new organizational structure was adopted in 2009 and the recruitment of senior staff is underway to fill the management and expert positions. The LCBC governance system was not reviewed as part of institutional assessment, despite persistent operational problems and repeated requests from donors for implementation of development projects around the Basin<sup>17</sup> (for instance, the Sustainable Development Project funded by the ADB and the European Union, the Water Charter, knowledge management (GTZ), etc.

4.1.61 Furthermore, due to lack of adequate funding, the resolutions taken by the Commissioners at their ordinary and extraordinary sessions are not implemented. For instance, the Heads of State and Government directed the LCBC to draw up a priority programme to strengthen cross-border cooperation in the conventional basin of Lake Chad in the key areas of consolidating peace and security, protecting the ecosystem, food security, education, health, economic infrastructure and gender mainstreaming. A strategic action programme was prepared within this framework, but was not followed by the development of an investment plan and the organization of a round table of development partners.

4.1.62 Despite on-going reforms, if no action is taken to review the LCBC’s governance and funding system other than through contributions from member countries, LCBC’s institutional

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<sup>15</sup> At the meeting of Heads of State in May 2008, the decision was taken to define a new allocation of contributions and seek ways and means to finance activities other than through LCBC dues. Due to lack of funds to hire a consultant, the Executive Secretariat has not yet implemented the decision and requests to ECA and ADB have so far been to no avail.

<sup>16</sup> The decision-making organ is in the hands of Commissioners (2 Commissioners per country, both ministers) who decide the annual work program and its budget based on annual contributions. To date, the contributions arrears total nearly CFAF 4 billion. No member country has paid its contribution for 2009.

<sup>17</sup> GTZ sponsored a project, the key objective of which was to provide to LCBC technical advice and methodology for setting up a sound knowledge management system and providing digital maps and hydro-meteorological data, with improved data exchange between riparian countries through an Internet map server. Member States decided to instruct LCBC to develop a Water Charter for the Lake Chad Basin (with ADB financing), and its adoption at the highest levels of government. This would expand LCBC’s mandate, based more on the ecosystem. LCBC was to establish a unit specifically charged with putting in place an information and data system of regional scope and forming part of LCBC’s capacity to assume a coordinated and systematic role in controlling the Basin’s natural resources, including preparing agreements for the collection, synthesis, storage and dissemination of data and targeted information.

sustainability would be called into question since the Commission is currently unable to provide institutional support capable of triggering a catalysing and leveraging effect on the achievements of the project, through appropriate incentives.

4.1.63 *Environmental Sustainability*: In terms of research results, the project has had positive effects on the environment, due to its control methods using natural enemies of crop pests. Such is the case of *neem* extracts (natural product), *Metharizium sp* (specific locust fungal pathogen), resistant varieties and mechanical control. Chemical control is quite moderate and is done with substances that are non-persistent and non-toxic to humans and animals. In addition, some equipment purchased under the project include thermo-hygrographs, an automatic weather station and rain gauges to measure climatic parameters to ensure better monitoring and control of the population dynamics of pests and their impact on the environment (especially given the close correlation between climate change and the evolution of pests).

4.1.64 *Resistance to exogenous factors*: The project outputs can hardly resist the droughts in the area and the situation caused by major endemic pests, such as locusts and grasshoppers, that are not taken into account by the project. The shrinking of Lake Chad due to low rainfall, the intensive use of water for irrigation and the doubling of the population of the area, is also likely to have a negative impact on project results. The economic conditions of member countries can also affect the level of resources channelled to LCBC, which has a vital role to play in controlling these pests in subsistence farming in particular, and in promoting and coordinating projects to tap natural resources and research, in general.

4.1.65 In light of the foregoing, the sustainability of the project is deemed unsatisfactory.

## 4.2 Performance Rating

### a.) Overall Project Performance and Results

4.2.1 The overall project performance is deemed unsatisfactory with a score of 2 out of 4, insofar as it remained in its pilot phase. The sustainability of project achievements has been adversely affected by the fact that no action has been taken to further spread IPM techniques to a wider audience, although a project condition was provided in that regard. Intermediate development results concerning the reduction of losses and the project goal concerning food security could not be achieved.

### b.) Borrower's (Donee's) Performance

4.2.2 Although LCBC provided the facilities and local staff, none of the recommendations made to it since 2005 has been implemented, namely: (i) invite the countries concerned to strengthen the dissemination of project results to ensure better sustainability of achievements; (ii) seek ways and means to help the pilot farmers to acquire the required inputs and equipment through micro-credit; (iii) continue assistance to beneficiaries to ensure sustainability of project achievements; (iv) finalize and distribute the guides and brochures on IPM techniques; (v) seek, in collaboration with research institutes and ministries of agriculture of member countries, the resources needed to initiate a research program capable of providing an adequate solution to the damage caused by other pests such as *Striga* and *Cantharides*; and (vi) consider consolidating gains by implementing a second phase with the Bank's assistance (the phase will apply the results of the pilot phase on a large scale, while expanding the range of crops affected).

4.2.3 LCBC has not taken measures to ensure project sustainability. It has also been unable to build on the gains of the experimental phase owing to the use of foreign counterparts and governance issues facing the Commission. Therefore, its performance is unsatisfactory.

c.) Bank's Performance

4.2.4 From a conceptual standpoint, the Bank's performance was affected by the fact that it limited itself to the pilot phase without actually supporting one of the project conditions (extension). Despite recognizing the need for sustainable change at appraisal, the necessary conditions could not be fulfilled.

4.2.5 During implementation, the Bank regularly fielded missions that identified gaps and made recommendations to improve the project management system. However, delays regarding the date of first disbursement and the lengthy delays in processing disbursement documents seriously affected the project throughout the implementation phase. Resources were not utilized optimally. Therefore, the Bank's performance is deemed highly unsatisfactory.

### 4.3 Factors Affecting Implementation Performance and Outcome

4.3.1 The factors affecting project implementation performance and outcomes are, among others:

- a) Factors not subject to Government control: recurrent droughts, endemic situations caused by major pests.
- b) Factors subject to Government control: insufficient knowledge of the pilot project by the authorities due to lack of an effective reporting system between the local and national level, insufficient information and sensitization of country authorities on the outcome of the pilot project, the prospects of development of integrated control in the four countries not being commensurate with the interest generated among rural dwellers, and the constraints inherent in large scale popularization of *neem* related to its production, processing and the fact that it does not have the same immediate and overwhelming effect as synthetic pesticides, the absence of an aggressive policy on the part of member States, some of which subsidize the phyto-sanitary treatment of food crops with synthetic pesticides, thus constituting an obstacle to the promotion of botanical insecticides; the weak capacity and disruption of national research and extension systems, failure by some extension workers to follow the guidelines provided by research, as they do not recognize the authority of the researchers, insufficient building on project achievements at the country level, and insufficient involvement of plant protection services in guiding the brigades.
- c) Factors subject to Executing Agency Control : LCBC's ignorance of Bank rules of procedure, LCBC's cumbersome system of governance, lack of anticipation by LCBC regarding the pilot project, the positive evaluation of which should automatically have led to its continuation to a broader phase, the insufficient level of resources made available to the extension workers, who moreover, saw their already written-off means of transport (motorcycles) withdrawn, lack of feedback from LCBC; insufficient popularization of IPM techniques following project completion, the high cost of technical assistance (about half of the project cost, provided at the expense of more substantial support to extension workers and farmers).

- d) Factors subject to Bank control: the temporary relocation of the ADB from Abidjan to Tunis, which took almost four (4) months; administrative inertia between LCBC and ADB, and the lengthy procedures for procuring goods and services, long delays in processing documents and in disbursement procedures.

## **V. CONCLUSIONS, LESSONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

5.1.1 Considering the damage caused by crop pests, the exclusive use of chemical products has had a negative impact on the relatively fragile ecosystems of Lake Chad Basin countries. IPM techniques are alternative methods adapted to the socio-economic and ecological environment of the Basin. They consist in applying techniques combining biological control, varietal resistance and farming practices.

5.1.2 The project has enabled the development of a self-reliant crop protection strategy, based on the initiative of farmers organized at the village or community level to control the pests. These techniques that were widely adopted by farmers, could reach only a limited number of farmers. The multiplier effect has been hampered by: (i) the dissolution of the institutional mechanism at the end of the pilot phase; (ii) the problem of institutional sustainability of LCBC; and (iii) the weak capacity of extension structures to provide the services required to make project results available to a larger number of farmers.

5.1.3 The project has neither led to changes in laws and regulations nor given a fillip to the promotion of IPM techniques or "soft" methods in the Lake Chad Basin area due to lack of sufficient coordination between ministries responsible for agriculture and agricultural research in different countries. All of these factors have significantly undermined the sustainability of project results.

5.1.4 By adopting an integrated approach to agricultural pest control using proven research and development results, which received a highly positive response from the four member countries, their farmers and technical and financial partners, the project obtained significant short-term results in the pilot area at the technical, social, environmental, institutional and financial level. Crop yields, for instance, witnessed increases of over 200% on average in the pilot farms, compared to control plots. However, due to the limited use and lack of ownership of these techniques at country level, the medium- and long-term results on reducing pest-related losses and therefore producing higher yields - which should contribute to food security - were not achieved. Overall, the project is deemed unsatisfactory.

### **5.2 Key Lessons**

5.2.1 The coordination of pest control in subsistence farming by a regional structure working in collaboration with research institutes and extension services using proven research and development results constitutes an asset only when conducted with long-term perspective and after forging real ownership of the mechanism in the member countries concerned.

5.2.2 There is a need to strengthen national agricultural extension and research systems through better dissemination of good practices to small producers, notably women, so as to significantly improve productivity and the food security situation which remains fragile in some Bank Regional Member Countries.

5.2.3 The establishment of a monitoring and evaluation system is essential to measure the real impact of the results of IPM techniques on yields, production costs and income beyond pilot farmers and countries.

5.2.4 A research and development pilot project that has achieved encouraging results and aroused genuine interest among farmers requires support measures at the end of the project, in order to preserve and consolidate project gains, and sustain its impact.

5.2.5 Although costly, the Farmer Field School approach should enable the training of a larger number of village brigades and extension workers in farming and plant protection techniques.

### **5.3 Recommendations**

#### To the Bank

- i. The Bank should engage in promoting integrated pest management (IPM) systems in regional member countries whose rural dwellers suffer enormous pest-related losses. In such cases, it should target the regions to be reached and include such activities in its rural development strategy.
- ii. The Bank should extend the experiments and research/development to other crops, other predators and other areas of the Basin. Crops, notably food crops to be introduced, are those for which less costly IPM techniques are likely to improve yields or farmers' income, or enable a significant reduction in pesticide use, to preserve the already fragile environment of the Lake Chad Basin.
- iii. In promoting "soft" plant protection techniques, the Bank should target areas to be promoted, so as to get a critical mass of technical capacity on IPM and progressively expand to other areas. The use of indicators to trigger transition from one phase to another, based on results, will ensure project effectiveness.
- iv. For future integrated crop pest and disease management projects, the Bank should create synergies with other initiatives to facilitate farmers' access to inputs and agricultural credit, promote the creation of farmer associations and support micro-credit institutions operating in the area.
- v. This type of research and development project must thoroughly examine the experimental protocols in terms of reducing the factors to be tested at the same time and ensuring observance of the required spacing of testing on other fields, to ensure the authenticity of results.

#### To LCBC Member Countries

- i. LCBC member countries must spread IPM techniques that have received the support of farmers, since such techniques have demonstrated their technical feasibility and financial profitability. The sustainability of project impact hinges on new initiatives further involving the respective Governments, in particular national plant protection and extension services, farmer organizations and the private sector. It also hinges on extending experiments and research and development to other crops and predators.

- ii. Member States must implement an effective integrated agricultural pest management policy by adopting appropriate laws or regulations on the use of natural products such as *neem*, and exploring the possibilities of large scale *neem* production, processing and marketing.
- iii. LCBC member countries should strengthen extension and plant protection activities to adapt to women's concerns, given their vital role in family holdings.

#### To LCBC

- i. LCBC should fully play its role as knowledge manager on the Lake Chad Basin and establish an information and data system of regional scale.
- ii. LCBC must strengthen the Ngala Regional School to support member countries in enhancing their pest management capacity in subsistence farming. It should also ensure wide dissemination of educational materials developed by the project in order to intimate as many people as possible with integrated pest management (IPM) techniques.

#### **5.4 Feedback on the Evaluation Findings**

Issues requiring follow-up action are shown in the matrix of recommendations in Annex 5.

## EVALUATION CRITERIA

PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN			
N°	COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
1	<b><u>Relevance and quality at entry</u></b>	3	The project is in line with the strategies of the Bank and LCBC Member Countries. It addresses a real need of the people in the Lake Chad Basin.
i)	Consistency with overall Country Development Strategy	3	IPM is a priority in the LCBC master plan, which aims to ensure food security in member States
ii)	Consistency with Bank Assistance Strategy	3	The project is consistent with the Bank's assistance strategy for regional integration
iii)	Macroeconomic Policy	3	All demonstration test results showed that the use of IPM techniques at national or regional level could have a positive macroeconomic impact since the cost of importing synthetic pesticides would be significantly reduced.
iv)	Sector Policy	3	The project objectives of food security for the people of the area are consistent with those of the agriculture and rural development sector.
v)	Poverty Reduction	3	The project targeted smallholders in selected areas. They were able to increase their income by using the IPM techniques, which enabled them to improve their purchasing power and to cater for social spending (health, education, housing) - all factors of poverty reduction. Even though the project is located in 20 villages that make up only 1.6% of the population, the impact on poverty may be considered satisfactory.
vi)	Social and Gender Equality	3	The preliminary diagnostic study undertaken by the project showed that women represent about 52% of households in the project area. Thus, the project gives them special attention. Women play a vital role in food security.
vii)	Environmental Concerns	3	The project pursued a policy of environmental conservation, using the IPM method. Ending the systematic use of synthetic pesticides with the advent of the pilot project should have a positive environmental impact.
viii)	Human Resource Development	3	The LCBC, the coordination unit and implementation units had staff capable of taking over.
ix)	Institutional Development	3	The institutional framework was appropriate and was conducive to significant institutional development.
x)	Regional Economic Integration	3	Collaboration on integrated control between the research, extension and plant protection structures from the four countries for the benefit of farmers is a powerful factor of regional economic integration.
xi)	Quality at entry (including level of demands, complexity, risks, etc.)	3	The project design and implementation conditions are appropriate. The undertaking to implement the results of the pilot project was a condition precedent to entry into force.

PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN			
N°	COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
2	Achievement of objectives and outcomes("Effectiveness")	2	The research and training goals were achieved. However, the limitation of the project to its pilot phase, without its general use or real ownership in the member countries concerned to ensure takeover, has not achieved the expected medium- and long-term outcomes, notably the ultimate goal of strengthening food security, which remains fragile.
i)	Achievement of Direct Project Objectives	3	Most of the expected short-term research and training objectives have been achieved. The achievement of direct project objectives is satisfactory.
	- Test and Coordination of IPM Techniques at the Regional Level	3	In its pilot phase, the project initiated a form of collaboration between research institutes, extension and plant protection services and village brigades. The training and supervision of farmers through the village brigades led to: (i) adoption of new farming methods; (ii) identification of major insect pests and diseases affecting millet, sorghum, maize and cowpea; (iii) mastery of <i>neem</i> extraction and spraying techniques; and (iv) identification of useful insects and their conservation in the ecosystem. A total of nearly 500 Farmer Field School (FFS) days and 600 visits to demonstration plots created on pilot farmers' holdings were organized each year (2003 and 2004). Through the application of IPM techniques, nearly ten thousand (10000) farm managers (compared to one thousand (1000) envisaged at project start-up) were able to increase their yields of subsistence crops (millet, sorghum, cowpea).
	- Adoption and Use of IPM Techniques by Farmers	3	(i) The rate of pilot farmer participation in the activities of Farmer Field Schools is at least 80%; (ii) the level of understanding of integrated pest management techniques introduced is extremely high; (iii) farmers appreciated the techniques demonstrated and applied them; (iv) the problems identified concern only choice of varieties, disregard of sowing date and lack of processing equipment.
ii)	- Achievement of Intermediate Objectives	2	Unsatisfactory. The intermediate objectives on reduction of pest-related crop losses and higher yields were achieved in the experimental fields and relatively controlled conditions. These results cannot be guaranteed in the real socio-economic conditions under which farmers operate. Unsatisfactory
	- Reduction of Pest-related Crop Losses	2	The application of IPM techniques provided effective protection against certain insect pests and diseases in field trials. Due to these IPM techniques, there was reduced <i>Striga hermonthica</i> infestation on sorghum, from 60 to 100% in Farmer Field Schools, compared to control plots. Limited use of this project confines this effect to the Lake Chad Basin area.

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>			
N°	COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
	- Increased Yields	2	Loss reduction has resulted in increased yields. The increased yields of sorghum on Farmer Field School plots were respectively 163% in Cameroon, 168% in Chad and 483% in Nigeria, where the climate and soil conditions were better. All results were obtained under relatively controlled conditions and the cessation of key activities, notably extension at the end of the pilot project, could not guarantee such results in the real socio-economic conditions under which the farmers operate.
iii)	Long-Term Impact: Strengthening Food Security	2	Increased yields in experimental fields have increased food availability and accessibility to the households concerned, which consume most of their own harvest, thus contributing to their food security. However, due to limited use and low level of country ownership of IPM techniques, the project was a missed opportunity to significantly improve food security in the Lake Chad Basin area.
iii)	Other Impacts	2	Unsatisfactory
	- Gender Equality	2	Women were extension workers and pilot farmers as were men. However, women who play a special role in food security represented only 24% of pilot farmers.
	- Regional Integration	2	In terms of regional coordination, the implementation of integrated pest management (IPM) techniques in a unified manner, through working in synergy between research structures and plant protection and extension services of the four member countries should promote regional integration. This objective was not achieved due to lack of a real policy of communication on the project and its effects at LCBC, on the one hand, and failure by the project to promote a harmonized and concerted policy of controlling the devastating pests, on the other hand, due to lack of real collaboration and knowledge sharing through networking.
	- Environment	2	Ending the systematic use of toxic pesticides with the advent of the project would have had a significant environmental impact, if IPM techniques were widespread in the region
	- Poverty Reduction	2	Nearly 10,000 farmers have been able to increase their production and income. In the Farmer Field Schools, the yield increased by over 150%. Such increased output due to reduced crop losses, could help to reduce poverty in the event of large-scale application.

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>			
N°	COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
	- Gender Equality	2	Women were extension workers and pilot farmers as were men. However, women who play a special role in food security represented only 24% of pilot farmers.
	- Natural Resource Management	2	The rational use of <i>neem</i> in IPM instead of chemicals which are factors of resource degradation, contributes to the judicious exploitation of natural resources of the area covered by the project.
vii)	Private Sector Development	1	Unsatisfactory. The private sector could eventually play a role in the production, processing and marketing of natural products such as <i>neem</i> .
<b>3</b>	<b>Efficiency</b>	2	Despite the increased yields and reduced spending on imports of chemical insecticides, which have been replaced by biological insecticides as a result of IPM techniques, the project's efficiency was affected by the high unit cost of the Farmer Field School approach and technical assistance.
i)	Economic Rate of Return		Not applicable to this project
ii)	Financial Rate of Return		Not applicable to this project
iii)	Cost-Effectiveness Indicator	2	The project's efficiency was affected by the relatively high cost of the FFS approach and technical assistance compared to the limited number of farmers reached. The two-year extension of the project implementation period also affected efficiency.
<b>4</b>	<b>Institutional Development (ID) Impact</b>	2	LCBC has been unable to build on knowledge acquired in project management, due to the use of coordinators, assistants and LCBC technical counterparts, whose mandate was limited to the project duration. There are also constraints on national farmer support and supervision structures continuing to disseminate technological packages. Lastly, the project has not led to any changes in the laws, regulations, etc. on the promotion of IPM techniques or "soft" methods.
i)	National Capacity	2	The LCBC, the coordination unit and the implementation units had qualified, but non-permanent staff.

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>			
N°	COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
	- Environment and Natural Resources	2	The project has contributed to environmental preservation and promoted the development of resources in a space too small to have a real impact at regional level.
ii)	Executing Agency	2	
	- Analysis of Planning/Policy	2	LCBC's organization chart included a project planning and execution department, of which the project coordination unit was an integral part. However, this unit did not survive the end of the pilot phase.
	- Management Control and Auditing	2	The project conducted the 2003 and 2004 account audits. However, statutory deadlines were not observed.
	- Training/Skills Upgrade	3	One of the project components focuses on training and dissemination of information to supervisors and farmers. However, the project did not implement all its activities, notably remote sensing and dissemination of guides and brochures on the menu of IPM techniques.
	- Technology Transfer	3	The project is based on the transfer of IPM techniques to farmers
<b>5</b>	<b>Sustainability</b>	2	The project has enabled the development of a self-reliant crop protection strategy, based on the initiative of farmers organized at village or community level to control the pests. These techniques that have been widely adopted by farmers have definitely had a positive economic, financial and environmental impact in the pilot areas. However, the expertise imparted to the pilot farmers and spread to other farmers needed to spread further. The multiplier effect has been hampered by: (i) dissolution of the institutional mechanism; (ii) the issue of LCBC's institutional sustainability; and (iii) the weak capacity of extension structures to provide the services required to make the results of the project available to a larger number of farmers. This has greatly undermined the sustainability of project results.
i)	Technical Viability (including O&M facilitation, availability of recurrent funding, spare parts, workshops, etc.)	2	The demonstration tests showed that the project is viable to a relatively small scale, the IPM techniques having been tested and adopted by farmers. However, the question of farmers applying IPM techniques, including organic manure and chemical fertilizers, in their own fields arises, given the cost implications.
ii)	Continued Borrower Commitment (including legal/regulatory framework)	1	The institutional framework established by the LCBC at project start-up no longer exists
iii)	Socio-political Support (including beneficiary participation, protection of vulnerable groups, political stability)	3	During project implementation, the socio-political support did not fail. Furthermore, beneficiary participation in project implementation, including women, was high due to the adoption of a participatory approach.

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>			
<b>N°</b>	<b>COMPONENT INDICATORS</b>	<b>SCORE (1 to 4)</b>	<b>REMARKS</b>
iv)	Economic Viability	2	The project has helped cut pilot farmers' spending on pesticides, but economic viability is only limited to the project area.
v)	Financial Viability	2	Farmers' income has increased three-fold (from the "no project" to the "project" situation). Farmers could realize substantial savings if the research phase had been followed by a real development phase. Such has not been the case.
vi)	Institutional Arrangements (organizational and management)	2	The institutional arrangement worked well until 2005. Since its dissolution, there is uncertainty over the development of integrated pest management (IPM) practices.
vii)	Environmental Viability	2	The project has positive effects on the environment due to the use of botanical insecticides such as <i>neem</i> , but within a fairly limited space.
viii)	Resistance to Exogenous Factors	2	The project is sensitive to exogenous factors such as recurrent droughts, endemic situations, etc.
<b>6</b>	<b>Overall Performance Indicator</b>	<b>2</b>	Overall project performance is unsatisfactory

### BORROWER PERFORMANCE

PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN		
COMPONENT INDICATORS	SCORE (1 to 4)	REMARKS
<b>1. Quality of Preparation</b>	<b>2</b>	The project preparation is deemed unsatisfactory, for not anticipating mechanisms for sustaining the achievements.
- Monitoring, Beneficiary Participation	3	LCBC monitored the project preparatory stages by making relevant comments on the appraisal report. Moreover, the beneficiaries effectively participated in project design.
- Government Commitment	2	The governments of the four LCBC member countries expressed their commitment by helping to finance the project, but took no steps to ensure returns on the investment.
- Macroeconomic and Sector Policies	2	The project objective was to contribute to food security for the population of the Basin by reducing pest-related crop losses - a goal that can only be achieved if the development aspect is taken into account.
- Institutional Arrangements (counterpart contributions)	3	LCBC and States paid their counterpart contributions, but with considerable delay. LCBC bore the 193% overrun of its counterpart contribution.
<b>2. Quality of Implementation</b>	<b>2</b>	The project implementation was relatively unsatisfactory due to delays in implementing various activities.
- Assignment of Key Staff	2	The appropriate staff were assigned to the project. However, the resignation (twice) of the principal technical assistant, who also served as the project coordinator, affected project start-up.
- Managerial Performance of Executing Agency	2	Despite the difficulties encountered at start-up, the executing agency performed satisfactorily up to project completion. The agency was dissolved following the project completion.
- Use of Technical Assistance	2	The project obtained technical assistance from Agri-consulting Italy, albeit delayed
- Mid-Term Adjustments	3	Except for the adjustment due to the delay in providing technical assistance, no further adjustment was made by mid-term
- Adherence to Time Schedule and Costs	2	The initial schedule was not observed. There were delays due to goods, services and works procurement procedures. Cost overruns on wages of nationals were borne by LCBC.
<b>3. Compliance with Covenants</b>	<b>3</b>	There were few weaknesses in applying the rules of procedures.
<b>4. Adequacy of Monitoring/Evaluation and Reporting</b>	<b>2</b>	The monitoring and evaluation system was put in place. The reports were produced regularly and forwarded to the Bank. However, monitoring by the steering committee did not meet expectations (two meetings only, instead of four)
<b>5. Satisfactory Operations (where applicable)</b>	<b>2</b>	The recommendations in the PCR were not implemented.
<b>Overall Borrower Performance</b>	<b>2</b>	<b>LCBC performance is deemed unsatisfactory</b>

**BANK PERFORMANCE**

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>		
<b>COMPONENT INDICATORS</b>	<b>SCORE (1 to 4)</b>	<b>REMARKS</b>
<b>1. At Identification</b>	<b>2</b>	The Bank participated at the identification stage.
- Project consistency with government development strategy	3	The quest for food security through integrated pest management (IPM) is in line with the development strategy of the governments of the four countries.
- Project consistency with Bank strategy for country	3	The project is consistent with the Bank's strategy which supports any cooperation and regional integration policy.
- Involvement of governments/beneficiaries	2	The States were involved as from identification in terms of consultation rather than actual participation, hence the lack of ownership.
<b>2. At Preparation</b>	<b>2</b>	The project did not sufficiently take into account the divergent views and interests among countries in the framework of a multinational project.
Relevance of Bank support	2	The project is in line with the logic of cooperation and regional integration among LCBC member countries on food security for the people, which is one of the thrusts pursued by the Bank. The Bank limited itself to the pilot stage.
Timeliness of Bank support	2	The Bank's preparation mission memorandum certifies the appropriateness of Bank support, but the response was not adequate
<b>3. At Appraisal</b>	<b>2</b>	The conditions and agreements were not sufficiently analysed. For that reason, they were difficult to meet, notably the undertaking to implement the results of the pilot phase.
Quality of technical, economic, financial, institutional, social, environmental analyses	2	The technical, economic, financial, institutional, social and environmental analyses did not sufficiently deepen the condition regarding the undertaking to implement the pilot project results.
Relevance of conditions and covenants	2	The conditions and agreements were difficult to fulfil.
Adequacy of lending instrument	3	The ADF grant was most suitable for this type of project.
Adequacy of financial package	2	Almost half of the funding was allocated to technical assistance
Quality of co-ordination with other donors/partners	3	Coordination with other donors/partners was not always given precedence
Implementation and supervision plans (including performance indicators, monitoring and evaluation requirements)	2	The implementation plan was radically altered due to delays (24 months) in fulfilling the implementation and disbursement conditions. Monitoring/evaluation and supervision were properly conducted.

**BANK PERFORMANCE**

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>		
<b>COMPONENT INDICATORS</b>	<b>SCORE (1 to 4)</b>	<b>REMARKS</b>
<b>4. At supervision</b>	<b>2</b>	The Bank conducted the required supervision and recommendations were well followed and enforced. However, it took no action to sustain the project achievements.
Adequacy of Bank staff (skills, time and continuity)	3	The Bank had the required expertise for the project. However, delays in processing disbursement request documents were deplorable.
Problem solving	3	Missions dispatched by the Bank were extremely useful in implementing activities as they always noted weaknesses and made recommendations to improve the project management system.
Adequacy of follow up on recommendations/decisions	3	The Bank implemented recommendations made in the PCR.
Realistic ratings at CPPR/APPR	2	Over-estimated.
Attention to likely social development impact	3	This was a pro-poor project that was intended to have an impact on improving the living conditions of smallholders.
Attention to sustainability issues	2	Sustainability not sufficiently taken into account.
<b>Overall Evaluation of Bank Performance</b>	<b>2</b>	<b>The Bank's performance is deemed unsatisfactory</b>

**FACTORS AFFECTING IMPLEMENTATION PERFORMANCE AND OUTCOME**

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>						
<b>N°</b>	<b>FACTORS</b>	<b>Sub-stantial</b>	<b>Partial</b>	<b>Negligible</b>	<b>N/A</b>	<b>Remarks</b>
<b>1</b>	<b>Not subject to Government Control</b>					
1.1	Climatic factors	-				Rainfall deficit
1.2	Socio-political security	-				Crisis in one of the member countries
1.3	Adoption of IPM methods by farmers	+				Farmers' commitment essential
<b>2</b>	<b>Subject to Government Control</b>					
2.1	Macro policies		+			Liberalization of trade, movement of goods Pricing policy incentives
2.2	Sector policies		+			Food security and poverty reduction
2.3	Commitment of Governments and LCBC	+				Establishment of an appropriate mechanism
2.4	Appointment of key staff	+				Recruitment of qualified staff
2.5	Counterpart contribution		+			Financial resources available and satisfactory conditions for provision
2.6	Administrative capacity		+			Grant managed in accordance with Bank rules of procedure
<b>3</b>	<b>Subject to Executing Agency Control</b>					
3.1	Management	+				Effective management capacity of the project coordination unit
3.2	Staffing	+				Provision of the required staff
3.3	Use of technical assistance	+				Technical assistance adequately provided, despite change of Project Coordinator twice
3.4	Monitoring and evaluation		+			Monitoring and evaluation effective
	Beneficiary participation	+				Active beneficiary participation in project design, implementation and evaluation
3.5	Goods and services procurement		+			Failure of suppliers due to failure to meet delivery deadlines and/or quality of products delivered
<b>4</b>	<b>Factors Affecting Implementation</b>					
4.1	Changes in project scope, scale, design			+		No change in project design. A TA position was dropped in favour of field activities

**FACTORS AFFECTING IMPLEMENTATION PERFORMANCE AND OUTCOME**

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>						
<b>N°</b>	<b>FACTORS</b>	<b>Substantial</b>	<b>Partial</b>	<b>Negligible</b>	<b>N/A</b>	<b>Remarks</b>
4.2	Over- or under-estimate of physical inputs, the base unit costs			+		No over- or under-estimate of inputs and base unit costs
4.3	Inadequacy of price/physical contingencies			-		Provision for physical contingencies and price escalation are 5.13% of project base cost, which is adequate
4.4	Changes in exchange rates, in financial and institutional arrangements			-		Not recorded
4.5	Unrealistic implementation schedule		-			The Bank did not take into account the possible difficulties that LCBC States could encounter in fulfilling the conditions precedent to entry into force of the grant.
4.6	Quality of management, including financial management		+			Satisfactory, despite delays in goods and services procurement and disbursements
4.7	Delays in selecting staff/consultants/contractors and in receiving counterpart funds		-			Delays in selecting national staff, technical assistance and contractors. Counterpart contribution in place prior to project start-up.
4.8	Inefficient procurement and disbursement procedures	-				Procurement and disbursement procedures affected the project's implementation as scheduled at appraisal

### RECOMMENDATIONS AND FOLLOW- UP MATRIX

PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN			
FINDINGS/LESSONS	RECOMMENDATIONS	FOLLOW-UP ACTIONS	RESPONSIBILITY
Increased yields in experimental fields have improved the availability and accessibility of food to the households concerned, which consume most of their own harvests, thus contributing to their food security. However, due to the limited use and low level of country ownership of IPM techniques, the project was a missed opportunity to significantly improve food security in the Lake Chad Basin area.	The Bank should engage in promoting integrated pest management systems (IPM) in regional member countries whose rural dwellers suffer enormous pest-related losses. It should in this case target regions to be reached and include such promotion in its rural development strategy.	Initiate projects to promote integrated crop pest management systems in its agriculture sector interventions.	BANK
For greater efficiency, an integrated pest management project should take into account several crops, based on demand in different areas to meet the needs of producers and include all pests.	The Bank should extend the experiments and research and development to other crops, other predators and in other areas of the Basin. Crops, notably food crops to be introduced are those for which less costly IPM techniques are likely to improve yields or farmers' income, or enable a significant reduction in pesticide use, to preserve the already fragile environment of the Lake Chad Basin.	Ensure that in future interventions on integrated pest management, all crops grown in the area and all pests such as <i>cantharides</i> and <i>striga</i> are taken into account.	BANK
	In promoting "soft" plant protection techniques, the Bank should target areas to be promoted, so as to get a critical mass of technical capacity on IPM and gradually expand to other areas. The use of indicators to trigger transition from one phase to another, based on results, will ensure project effectiveness.	Use indicators to trigger transition from one phase to another, based on project results.	BANK

RECOMMENDATIONS AND FOLLOW-UP MATRIX

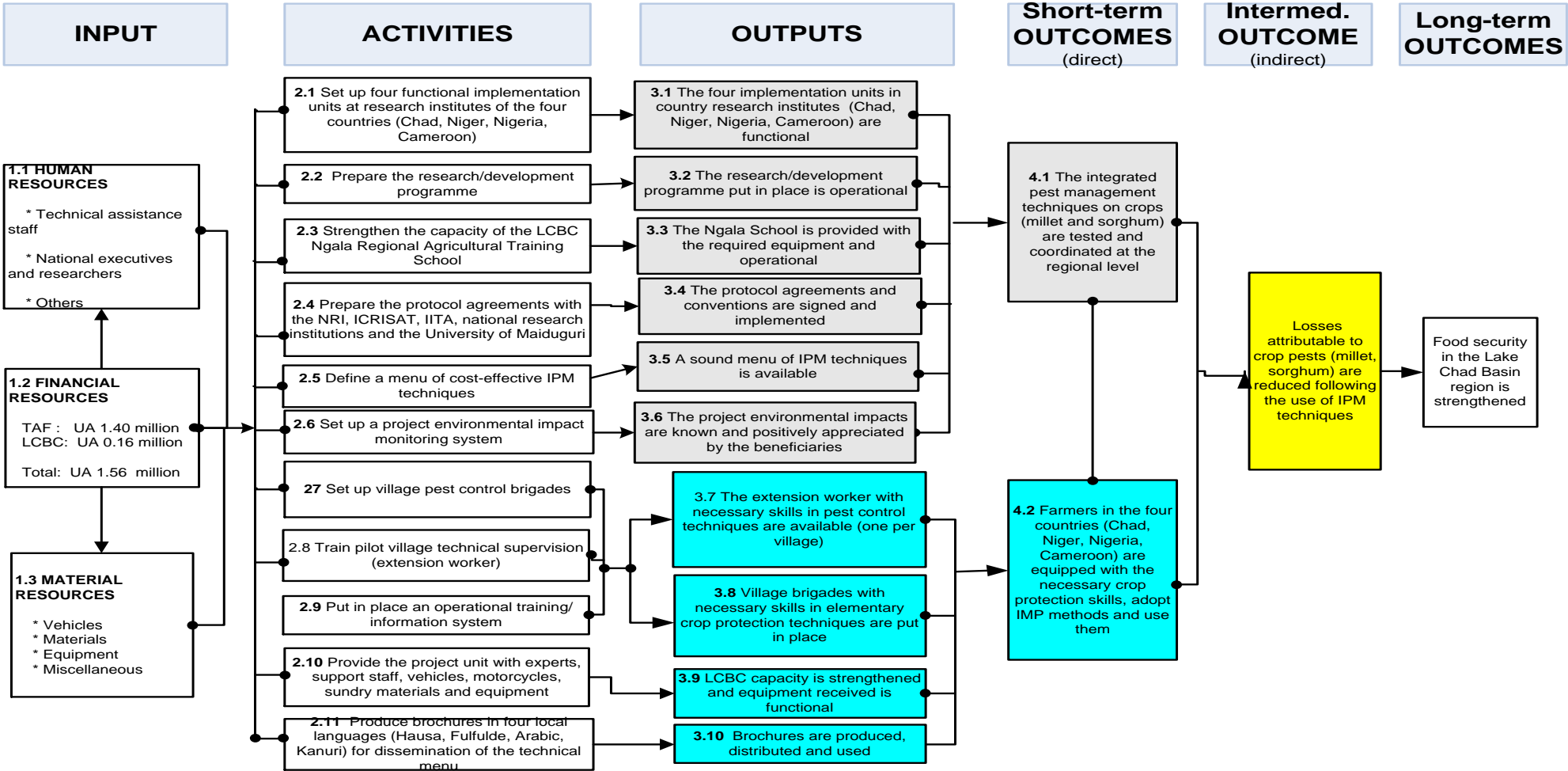
PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN			
FINDINGS/LESSONS	RECOMMENDATIONS	FOLLOW-UP ACTIONS	RESPONSIBILITY
The use of organic manure was recognized by all farmers as beneficial to plants, but access, in general, is difficult. The creation of farmer associations that could obtain micro-credit from NGOs, micro-credit institutions and other development projects operating in the area could help address this issue.	For future integrated crop pest and disease management projects, the Bank should create synergies with other initiatives to facilitate farmers' access to inputs and agricultural credit, promote the creation of farmers' associations and support micro-credit institutions operating in the area.	Encourage the creation of farmers' associations that could benefit from micro-credit from NGOs, micro-credit institutions or other development projects operating in the IPM project area.	BANK
The coordination of pest control in subsistence farming entrusted to a regional structure working in collaboration with research and extension institutes using proven research and development results constitutes an asset only when conducted in a long-term perspective with real ownership of the mechanism in the member countries concerned.	LCBC member countries must spread IPM techniques that have received the support of farmers, as they have proved their technical feasibility and financial profitability. The sustainability of project impact hinges on new initiatives further involving the respective Governments and in particular national plant protection and extension services, farmer organizations and the private sector. It also hinges on an extension of experiments and research/development to other crops and other predators.	Promote the use of IPM techniques in the control of these pests.	LCBC MEMBER COUNTRIES
	Member states must implement an effective integrated agricultural pest management policy, by adopting appropriate laws or regulations for the use of natural products such as <i>neem</i> and explore the possibility of large scale production, processing and marketing of <i>neem</i> .	Develop policies and strategies for promoting IPM techniques. Establish legal and regulatory frameworks for promoting IPM techniques.	LCBC MEMBER COUNTRIES

**RECOMMENDATIONS MATRIX OF AND FOLLOW-UP ACTIONS**

<b>PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN</b>			
<b>FINDINGS/LESSONS</b>	<b>RECOMMENDATIONS</b>	<b>FOLLOW-UP ACTIONS</b>	<b>RESPONSIBILITY</b>
	The LCBC must strengthen the Ngala Regional School to support member countries in enhancing their pest management capacity in subsistence farming. It should also ensure wide dissemination of educational materials developed by the project for better dissemination of integrated pest management (IPM) techniques.	Strengthen the Ngala Regional School	LCBC
The strengthening of national agricultural extension and research systems through better dissemination of good practices to small producers, especially women, is a necessary condition to significantly improve productivity, since the food security situation remains fragile in some Bank Regional Member Countries.	LCBC member countries must strengthen extension and plant protection activities, and adapt extension activities to women's concerns, given their vital role in family farms.	Give a prime place to IPM in the extension system and provide the extension and plant protection structures with specific means to that end.	LCBC MEMBER COUNTRIES
The establishment of a monitoring and evaluation system, notably on the adoption of IPM techniques, yields, production costs and income beyond pilot farmers, is essential for measuring the real impact of IPM techniques.	LCBC should fully play its role as manager of knowledge on the Lake Chad Basin and establish a regional information and data system.	Establish a reliable and efficient information system	LCBC Development Partners
The results achieved, although satisfactory particularly in terms of increased productivity, can be improved by simplifying the demonstration tests used. Some demonstration plots have been testing several factors at the same time (phyto-sanitary treatment, varietal testing, fertilization, pest resistance, etc.).	This type of research and development project must properly study the experimental protocols in terms of reducing the factors to be tested at the same time and ensuring observance of the required spacing of tests on other fields, to guarantee the authenticity of results.	Streamline experimental protocols	BANK

PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN

LOGICAL INTERVENTION MODEL



**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level				
			Target (Pilot zones)	Completion (Pilot zones)	Post-Evaluation		
<b>GOAL</b> (Sector Objective)	<b>LONG TERM EFFECTS</b>						
Ensure food security in the Lake Chad Basin area.	Food security in the Lake Chad Basin area is strengthened.	Coverage of basic cereal needs in the project area with average rainfall of 300 to 500 mm/year.  <u>Proxy</u> - Cereal production - Proportion of undernourished	Not indicated		See details in the <u>body of the report</u>	Food security statistics	Socio-political security ensured  No widespread pest invasion
<b>PURPOSE</b> (Specific objective)	<b>INTERMEDIATE</b> (indirect)	<b>EFFECTS</b>					
IPM techniques on crops (millet and sorghum) are tested and coordinated regionally	Pest-related crop losses (of millet/sorghum) decreased following the use of IPM	Reduction rate of pest-related crop losses (of millet/sorghum) through use of IPM techniques on demonstration plots and Farmer Field Schools	Over 50 %	60 to 100% reduction of <i>Striga hermonthica</i> attacks on sorghum. • 104 to 309% for sorghum in 2003/2004 • 83 to 89% for millet	Coordination of control using IPM techniques did not continue beyond the pilot phase	Agricultural Statistics Project annual reports Effective establishment of IPM approach in the area	Liberalization of trade, movement of goods Pricing policy Incentives

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level				
			Target (Pilot zones)	Target (Pilot zones)	Target (Pilot zones)		
	Yields are increased	Rate if increase of yields	Rainfed sorghum: 1000 to 1500 kg/ha  Cowpea: 750 to 900 kg/ha	Rainfed sorghum: 3726 kg/ha in 2003  Cowpea: 945 kg/ha in 2003			
	<b>SHORT-TERM (direct) EFFECTS</b>						
	Farmers have acquired the skills required for plant protection, have adopted IPM methods and use them	Rate of farmers' participation in Farmer Field School activities  Number of farmers that have contacted the pilot farmers % of farmers: - deemed effective producers - readily available - ready to produce powder, <i>neem</i> oil and almonds  Number of farmers that have increased yields	80 % (7.5% to 75% for women)  24 on average  90% 70% 53%, 52% and 36%	80 % (7.5% to 75% for women)  24 on average  90% 70% 53%, 52% and 36%  10 000	Farmer Field Schools closed and no system for monitoring post-project effects	Agricultural Statistics Project annual reports Effective establishment of IPM approach in the area	Liberalization of trade, movement of goods Pricing policy Incentives

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level				
			Target (Pilot zones)		Target (Pilot zones)		
	IPM techniques on crops (millet and sorghum) are tested and coordinated regionally	Status of fulfilment of commitments of research and extension institutes	Highly satisfactory	Highly satisfactory	Unsatisfactory		
		Status of composition of national implementation units	Highly satisfactory	Highly satisfactory	Unsatisfactory		
		Participation of agricultural research institutes in the four countries	Highly satisfactory	Highly satisfactory	Unsatisfactory		
		Implementation of the experimentation protocols	Satisfactory	Satisfactory			
		Number of Field Farm School days	500 days	500 days			
		Number of visits to demonstration plots	600 visits	600 visits			

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level				
			Target (Pilot zones)		Target (Pilot zones)		
<b>ACTIVITIES</b>	<b>OUTPUTS</b>						
Set up four functional implementation units in research institutes of the 4 countries (Chad, Niger, Nigeria, Cameroon)	The four implementation units in research institutes of the countries (Chad, Niger, Nigeria, Cameroon) are functional.	Make available researchers and national officers  Appointment of the steering committee	Appointment and staff assignment decisions taken  In 2000	Appointment and staff assignment decisions taken  In 2000	The units have stopped operating and assigned staff have resumed their pre-project activities	Appointment and assignment decisions  Status of salaries  List of staff  Reports	
Develop the research/development curriculum	The research/development program put in place is operational	Recruitment of TAs  Activity programs prepared;  Field trials are conducted	Done  In 2002  In 2002		The research program stopped at the end of the pilot phase	Research/development program	
Enhance the capacity of the Ngala Regional School	The Ngala Regional School equipped with the required materials (operational); it has also benefited from training in IPM	Level of equipment  Capacity building activities implemented	Satisfactory	Satisfactory  70 students		Ngala training report	
4. Prepare MoUs with NRI, ICRISAT, IITA, national research institutes and the University of Maiduguri	Four (4) MoUs and agreements are signed and implemented	Rate of implementation of MoUs with National research institutes and the University of Maiduguri.	100%	100%	N.A	MoUs with NRI, ICRISAT, IITA, national research institutes and the University of Maiduguri	

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level				
			Target (Pilot zones)		Target (Pilot zones)		
		Establish links with national and regional research institutes and training services.	In 2001	In 2005	n.a.	MoUs with NRI, ICRISAT, IITA, national research institutes and the University of Maiduguri	
5. Define a menu of cost-effective IPM techniques.	5. A menu of IPM techniques is available	Quality of IPM menus	Highly satisfactory	Satisfactory	n.a.	Menu of IPM techniques	
6. Produce IPM menu brochures in the 4 local languages	6. IPM menu brochures produced in the 4 local languages are duplicated.	Duplication of brochures	Done	Not done	n.a.	Availability of brochures for dissemination	
7. Establish a system for monitoring project environmental impact	7. The project's environmental impact is known and appreciated positively by the farmers	Quality of monitoring and evaluation, and survey reports	Highly satisfactory	Satisfactory	n.a.	Monitoring and evaluation, and survey reports	
8. Technical supervision of extension workers and village brigades	8. Extension workers and village brigades equipped with the necessary skills in basic plant protection techniques are trained and operational	Number trained and tools: - extension workers - village brigades - 900m <sup>2</sup> Farmer Field Schools, - 900m <sup>2</sup> control plots	20 120 20 20 120	20 20 20 20 120	n.a.	Training reports  Activity and supervision reports	

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN  
RETROSPECTIVE LOGICAL FRAMEWORK MATRIX**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	ASSUMPTIONS/ KEY RISKS
		Description	Level		Target (Pilot zones)		
			Target (Pilot zones)				
		<ul style="list-style-type: none"> <li>- demonstration plots in pilot farmers' own fields (one pilot plot and one control plot)</li> <li>- Number of plot visits</li> <li>- Number of training sessions</li> </ul> Training quality	90  600  480  Highly satisfactory	90  600  480  Satisfactory			
<b>INPUTS :</b>	<b>INPUTS :</b>						
		1.1 Resources in UA million ADF: 1.40 CBLT: 0.16 Total: 1.56	1.1 Resources in UA million ADF : 1.40 LCBC : 0.31 Total : 1.71		1.1 Status of disbursements 99% for ADF and 193% for LCBC		

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN**

<b>EVALUATION MATRIX</b>							
<b>Criteria</b>	<b>Questions</b>	<b>Sub-Questions</b>	<b>Indicators</b>	<b>Measurements</b>	<b>Data Sources</b>	<b>Data Collection</b>	<b>Collection Tool</b>
<b>Relevance and quality at entry</b>	1. Was the project coherent with the needs and priorities of the Lake Chad Basin area?	1.1 Was the project in conformity with the poverty reduction strategies and priorities in the 4 member countries (Chad, Niger, Nigeria and Cameroon) ? 1.2 Were the project results and outputs relevant considering the poverty reduction strategies and priorities in the 4 member countries? 1.3 Was the project in conformity with the sector policies and strategies in the 4 member countries?	1.1.1 The integrated pest management project features among the priority projects in the LCBC master plan adopted by Heads of Member States 1.1.2 Achievement of food security in the Lake Chad Basin area is the key objective of the master plan 1.1.3 Regional integration as regards cereal pest control techniques is given a prime place	- Rate of pest-related crop losses (millet / sorghum - over 50% in 2003 and 2004)  - Rate of increase of dry cereal production from 40 to 400%, depending on the country, in 2004  - Number of research, extension and plant protection structures in the 4 member countries.	-Documents of ADB, LCBC and member countries - Agricultural statistics - Project annual reports - Effective establishment of the IPM approach in the area	Secondary data Interviews	Document review Interview guide
	2. Was the project in conformity with the sector policies and strategies of the African Development Bank (AfDB)?	2.1 Were the project objectives in conformity with the sector policies and strategies of the African Development Bank (AfDB)?	2.1.1 Existence of pest control in Bank policies and strategies	- Mention of pest control in Bank policies and strategies	AfDB database	Secondary data	Document review
		2.2 Did the project contribute to the sustainable development of Lake Chad Basin countries?	2.2.1 The ADB, LCBC, the countries and the farmers are committed; -the institutional arrangements are appropriate;	- Level of stakeholder commitment -Existence of PCU and national implementation units, -Tested IPM techniques	Data base of AfDB, LCBC, member countries and farmers	Primary and secondary data Interviews	Document review Interview guide

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
			- the project is viable technically, economically and environmentally	inexpensive and environmentally friendly			
	3. Did the project meet the needs of the beneficiaries?	3.1 How were the beneficiaries involved in project planning/design and what was their specific contribution?	3.1.1 -20 village brigades (5 per country) and 6 pilot farmers per brigade involved in the project - IPM techniques adopted and applied by farmers	- Number of villages selected for the pilot project (20) - Number of pilot farmers (120), of which 24% women	Data base of AfDB, LCBC, technical structures of member countries and farmers	Primary and secondary data Interviews	Document review Interview guide
<b>Relevance and quality at entry</b>		3.2 Was the project consistent with the needs and priorities of the target beneficiaries, local partners and grassroots communities?	3.2.1 Yields and income of farmers applying IPM techniques have increased 3.2.2 Crop protection is done at a low cost, with locally produced <i>neem</i>	- Average yield for sorghum: 3726 kg/ha in 2004 against 1000 to 1500 estimated -Increased yield of sorghum on Farmer Field School plots in 2003/2004 was 163% in Cameroon, 168% in Chad and 483% in Nigeria, respectively - Increased income (CFAF 261,500 in 2008 against CFAF 130,000 estimated in 2000)	Data base of AfDB, LCBC, technical structures of member countries and farmers	Primary and secondary data Interviews	Document review Interview guide
		3.3 Was the project consistent with the efforts of local and international organizations addressing the same needs or problems?	3.3.1 The IPM techniques were welcomed by other LCBC TFP, who are applying them	Number of TFPs concerned	AfDB and LCBC data bases	Secondary data Interviews	Document review Interview guide

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
Efficiency	4. Was the project implemented in accordance with the operating plan?	4.1 Was the project design appropriate?	4.1.1 Initial project design and formulation based on farmers' initiative for integrated pest management (IPM), well suited to the actual situation of the area and the needs expressed by the beneficiaries	- Participatory approach involving farmers and all the other partners adopted (20 villages and 120 pilot farmers for the four countries)	AfDB and LCBC bases	Secondary data Interviews	Document review Interview guide
		4.2 Were planned activities implemented according to the duration and set target?	4.2.1 Activities started in 2002 instead of 2000 as initially planned	-Project action plan adopted	AfDB and LCBC bases	Secondary data Interviews	Document review Interview guide
		4.3 Were the planned resources of the AfDB and LCBC received in accordance with the Grant Agreement? If not, why? And what steps were taken?	4.3.1 The planned resources of the AfDB and LCBC were received in accordance with the Grant Agreement	- MoU implemented -Disbursement status: 99% for ADF 193% for LCBC	AfDB and LCBC bases	Secondary data	Document review
		4.4 Are the results commensurate with the financial resources mobilized?	4.4.1 All the project components were implemented	-Number of components: 3 Amount spent: EUR 1,382,785.70	AfDB and LCBC bases	Secondary data	Document review
		4.5 Did the project use resources efficiently?	4.5.1 Disbursement satisfactory; however delays in disbursements	- Grant disbursement rate: (98.77%) as at 30/11/2005.	AfDB and LCBC bases	Secondary data Interviews	Document review Interview guide
Efficiency	4.6 Did the structure responsible for project management and implementation contribute efficiently to project implementation?	4.6.1 Institutional framework well designed and all three components (research/development, training/information and	- Status of the institutional framework (project organization chart)	AfDB and LCBC bases	Secondary data Interviews	Document review Interview guide	

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
			project management) executed				
	4.7 Was there a clear definition of the roles and responsibilities between the project management and implementation units?		4.7.1 Roles and responsibilities of the PCU, implementation units, technical structures (research, extension, plant protection), extension workers, village brigades and farmers clearly defined	- Number of tasks assigned to the management and those handled by the executing agencies	AfDB and LCBC data bases	Secondary data Interviews	Document review Interview guide
	4.8 Did the project have an appropriate monitoring and evaluation system?		4.8.1 Appropriate monitoring and evaluation system put in place and operational	-Status of the mechanism	AfDB and LCBC data bases	Secondary data Interviews	Document review Interview guide
	4.9 Was the decision-making process transparent?		4.9.1 Project well conducted and appropriately evaluated jointly with all the TFPs, LCBC, the countries concerned and the population	- Number of sessions of the Project Steering Committee and the ADB Board of Directors	AfDB and LCBC data bases	Secondary data Interviews	Document review Interview guide
<b>Effectiveness</b>	5. To what extent were	5.1 To what extent were the expected results achieved?	5.1.1 Reduction by over 50% of pest-related crop losses (millet/sorghum) in 2003 and 2004, of which 60 to 100% <i>Striga hermonthica</i> attacks on sorghum  5.1.2 All three project components (research/development, training/information and project management) - Institutional support	-Rate of reduction of pest-related crop losses (millet/sorghum)  Rate of reduction of <i>Striga hermonthica</i> attacks	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
	the project objectives achieved? If not, why?		Made available to the LCBC				
		5.2 To what extent was the project implemented as planned in the project document? If not, why?	5.2.1 Project document remained unchanged.	-1 Project document	AfDB and LCBC data bases	Secondary data Interviews	Document review Interview guide
		5.3 Were project activities adequate to meet its objectives? If not, why?	5.3.1 Objectives and results recorded at this pilot phase were achieved despite project start-up difficulties. - Millet/sorghum yield: over 200%.	-Number of activities undertaken: 11 (cf. intervention logic)	AfDB and LCBC data bases Country activity and supervision reports	Secondary data Interviews	Document review Interview guide
	5.4 – What has the project completed? For which aspect did the project fail to achieve the outputs identified in the project document, and why?	5.4.1 IPM techniques introduced 5.4.2 Reduced harvest losses 5.4.3 Farmers' yields and income increased 5.4.4 IPM brochures prepared but not yet duplicated for wide dissemination	-Type of techniques -Loss rate -Level of yields and income -Number of brochures published and disseminated - Number of farmers reached	AfDB and LCBC data bases Country activity and supervision reports	Secondary data Interviews	Document review Interview guide	
	5.5 What is the quality of gender contribution and especially that of women to the achievement of the project objectives?	5.5.1 Training of 29 women out of a total of 120 pilot farmers, that is 24%, on IPM in the Farmer Field Schools 5.5.2 Participation of more than 70% of women in Farmer Field School work (20% of extension workers trained were women)	-Rate of adoption of IPM methods by women  -Rate of women's participation  -Number of women workers trained	AfDB and LCBC data bases Country activity and supervision reports	Secondary data Interviews	Document review Interview guide	

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
			5.5.3 Substantial increase in food crop production by women, thanks to the IPM method	- Share of cereals produced by women			
<b>Sustainability</b>	6. How did the project contribute to the sustainable capacity enhancement at the local, national and regional level?	6.1 How did the project put in place procedures and systems likely to support its continued implementation?	6.1.1 Rules and procedures for the procurement of goods, services and works relatively well observed, but delays noted 6.1.2 Monitoring and evaluation system put in place and functional	-Number of MoUs and agreements signed  -Number of missions undertaken	AfDB and LCBC data bases Country activity and supervision reports	Secondary data Interviews	Document review Interview guide
		6.2 Were the parties involved in the project willing to continue project activities and capable of doing so (where applicable)?	6.2.2 Commitment of LCBC, countries, TFPs. Farmers' interest 6.2.2 IPM techniques that are simple, inexpensive, ecologically sustainable and affordable to farmers	-Level of functionality of the project at LCBC level, the countries, the population - Number of functional village brigades	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide
		6.3 Are the project results likely to be sustainable? If not, why? What corrective measures should be taken?	6.3. Training of extension workers and pilot farmers on IPM techniques that are simple and affordable through a participatory approach of Farmer Field Schools  6.3.2 Involvement of national research institutions in continuing support to farmers in the phase after the project ensured	-Number of extension workers available - Number of functional village brigades - Number of Farmer Field Schools functional - Number of supervising structures operational	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide
		6.4 Are the structures or practices generated by the	6.4.1 PCU, national implementation units,	-Number of supervisory structures operational	AfDB and LCBC data	Primary and secondary data	Document review Interview guide

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
		action sustainable?	country technical supervisory structures, Farmer Field Schools, village brigades put in place and operational		bases Country activity and supervision reports	Interviews	
	7. To what extent has the project contributed to improvements or other changes in norms and practices (institutional capacity, political context, etc.) enabling member countries to use their human, financial and natural resources more effectively?	7.1 How has the achievement of the project objectives had an impact on the specific problem the project had to address and on the targeted beneficiaries?	7.1.1 Basic cereal needs of the four countries, thanks to more than 50% reduction in pest-related crop losses for millet and sorghum (partially satisfied) 7.1.2 In the Farmer Field Schools, the increased yields obtained was more than 150%, raising the millet or sorghum yield from 500 kg/ha on average to over 1500 kg/ha, representing an increase of over 1000 kg/ha.	-Quantity of cereals produced and yields obtained in the four countries before and after the project  -Increase rate	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide
		7.2 To what extent has the project caused or is it likely to cause positive or negative changes or effects, expected or not, on society?	7.2.1 IPM method increasingly adopted by farmers, as it is less costly and more environmentally friendly, instead of chemical control exclusively 7.2.2 Income from farms improved (annual income has risen from CFAF 146,600 in the pre-project situation to CFAF 408,100 with the project)	-Rate of adoption of IPM techniques - Income increase rate - Improvement of status of pilot farmers - Improvement of the living environment and conditions of farmers in the 20 villages selected by the pilot project.	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide
		7.3 Can the project act as a catalyst?	7.3.1 Ten thousand (10000) farmers instead of the 1000	-Rate of adoption of IPM compared to chemical	AfDB and LCBC data	Primary and secondary data	Document review Interview guide

EVALUATION MATRIX							
Criteria	Questions	Sub-Questions	Indicators	Measurements	Data Sources	Data Collection	Collection Tool
			<p>estimated, have already adopted the IPM techniques and practise them, of which 24% women</p> <p>7.3.2 Nearly 90% of farmers believe <i>neem</i> extracts are effective against stem borers, leaf eating caterpillars and aphids</p> <p>7.3.3 Dissemination of the knowledge acquired by the village brigades in the Farmer Field Schools among farm managers who will in turn reach out to others, triggering a ripple effect that can help spread IPM techniques throughout the Basin area and even beyond.</p>	control	bases, Country activity and supervision reports	Interviews	
		7.4 Did the project satisfy the needs of the beneficiaries? If not, why?	<p>7.4.1 Project specially targeted smallholders</p> <p>7.4.2 Increased yields and income</p>	-Rate of coverage of food and social needs;	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide
		7.5 What long-term effects should be expected from this project?	7.5.1 The project's contribution to poverty reduction through the use of IPM techniques is guaranteed.	- Level of project contribution to the balance of payments	AfDB and LCBC data bases Country activity and supervision reports	Primary and secondary data Interviews	Document review Interview guide

**PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED  
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BASIN**

**INTERVIEW GUIDE/BENEFICIARIES**

1. Did the village farmers know about IPM techniques before the project?
2. Did the village farmers know about the IPM pilot project?
3. Was the village involved in planning the project?
4. How did the village receive the IPM pilot project?
5. What does the village think about the Farmer Field School?
6. What do pilot farmers think about the training received?
7. How were pilot farmers chosen?
8. What do you think about the use of *neem* extracts?
9. What is the effectiveness of *neem* compared to synthetic pesticides?
10. What are the benefits of using *neem* extracts?
11. Comparing control methods (traditional, chemical, IPM), which is the least costly and most effective?
12. Are you willing to continue using the IPM method and *neem* extracts?
13. Where and how is the transfer of knowledge to other farmers done in the village?
14. How many farmers are there in the village?
15. How many farmers are involved in Farmer Field School Days?
16. Of this number, how many women participate?
17. What are the reasons for non-participation of other farmers?
18. What are the achievements of the brigade village?
19. What are the main constraints and difficulties of the village brigade?
20. How can the functioning of village brigades be improved?
21. How did the 2002, 2005 and 2009 crop seasons go in terms of millet and sorghum production in the village?
22. What were your constraints during these seasons?
23. What are the relations between farmers and extension workers?
24. What are the relations between extension workers and the other villagers?
25. What is the number of visits by extension worker per month?
26. What do farmers think about these visits?

27. What suggestions can you make to improve the work of extension workers?
28. Were the objectives of the IPM pilot project to meet farmers' needs?
29. Are there other projects of its kind in the village?
30. What are the basic needs of the village?
31. What solutions are proposed to meet those needs?
32. How do women like *neem* extracts and what are their expectations?

## **PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN**

### **KEY FINDINGS FROM INTERVIEWS WITH BENEFICIARIES**

In all villages visited, the farmers were unaware of IPM techniques. They discovered the techniques in 2003, through the pilot project. 50% of pilot villages (5 out of 10) reported having been involved in planning the project. In general, all villages approached welcomed it. The training provided in the Farmer Field Schools was appreciated by the pilot farmers. They properly understood several lessons taught and were able to outline them.

The transfer of knowledge to other farmers most often took place in Farmer Field Schools and at periodic meetings. Based on information collected from farmers, the participation rate varies widely across localities and villages, from 1.5% to over 75%. This wide disparity is due to the fact that villages in Nigeria are relatively densely populated compared to the number of learners.

The various occupations of other farmers (farm work, income-generating activities) and the system of rotation of members of one family in the Farmer Field School days are also among the causes of low turnout. In contrast, the women's participation rate is relatively higher compared to the number of participants. It hovers between 12.5% and 60%.

One of the techniques most appreciated by farmers is undoubtedly the use of *neem*.

Nearly 80% of all villages visited believe that *neem* is more efficient, less costly and more environmentally friendly than synthetic pesticides. In a sample of 13 villages visited, including three non-pilot villages, only the farmers of two pilot villages in Chad (Mandjafa and Klessum) and one non-pilot village in Cameroon (Mambenga) believe that *neem* is less effective than chemical insecticides, even though they acknowledge the adverse effects on humans and the environment. However, they all agreed that they derive much benefit from using *neem*, in terms of protection of their crops as well as increase in their production and income. Furthermore, comparing the IPM method to the other methods (chemical and traditional), they all state that the IPM method is the least costly and the most effective, and that they are willing to continue using it unconditionally.

The overwhelming majority of women support *neem*, which they continue to use more than four years after project closure. Few of them mentioned any supply or processing problems. In general, they expressed the wish to acquire production and processing equipment. No one raised the problem of processing. Insistently, they all requested another project of its kind.

Farmers from non-pilot villages reported having heard of *neem*, those from Mambenga had even used it during a project of the cotton company (Sodecoton), but without knowledge of IPM techniques. They however expressed interest in undertaking a similar project in their village. Moreover, *neem* extracts are used by some farmers in these villages.

## **KEY FINDINGS FROM INTERVIEWS WITH BENEFICIARIES**

The farmers of one of the pilot villages, namely Mandjafa in Chad, nevertheless raised the problem of full-scale implementation of IPM techniques in their fields. Due to lack of sufficient resources, they make limited use of inputs in their fields, notably organic manure and chemical fertilizers. According to them, a demonstration plot of 900 m<sup>2</sup> (30x30) requires approximately 15 bags of manure for an amount of CFAF 7,500. This means that for one hectare, they need at least CFAF 82,500, excluding transportation costs. Given this constraint, they have developed an original strategy, which is to allow the Arab shepherds in transhumance to pen animals in their fields in exchange for two kilogrammes of sugar.

The selection of pilot farmers is based on criteria defined at the meeting to develop experimental protocols, held in April 2003 in Maroua, Cameroon, that brought together the heads of implementation units and the Project Coordination Unit (PCU). The main criteria used in selecting these pilot farmers were as follows: (i) own a field; (ii) be a good worker; (iii) be available in the village throughout the year; (iv) be open to innovation and able to share knowledge with others, etc. The information was brought to the notice of extension workers responsible for its implementation by unit heads. The installation of the brigades was supervised by extension and plant protection experts in all the countries in May 2003.

The extension worker's role is generally described as important by the farmers, who not only request, but demand that logistics and incentives be provided them. In all villages visited, relations between the two parties were clearly satisfactory, which shows that the extension of IPM techniques was performed to the satisfaction of farmers who wish for another such project.

Except for Schehuri village which submitted an information note on the pilot project, no village had primary and secondary information. All the farmers interviewed felt that the project objectives were to meet their needs. As for the basic needs of the village, they mainly concern drilling and farm equipment. Only Klessum village in Chad requested a health centre and school. To meet these needs, farmers rely largely on aid from the State, civil society and TFPs. Few people have an operational self-reliance mechanism. Moreover, they all complain of difficulties accessing credit.

For many farmers in the area, the pilot project represented the possibility of achieving food security and improving their living conditions. Therefore, this retrospective evaluation is for many of them, the sign of the realization of the promise made towards the end of the pilot phase, namely the implementation of a broader IPM project covering the entire Basin area.

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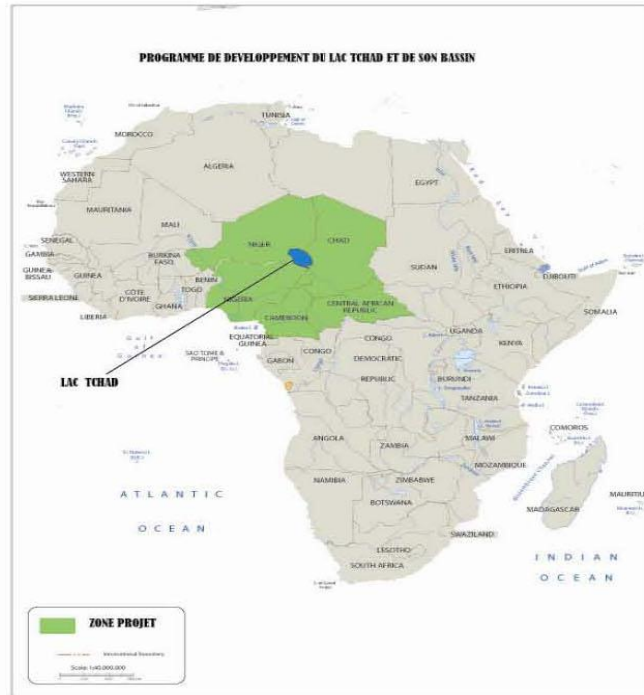
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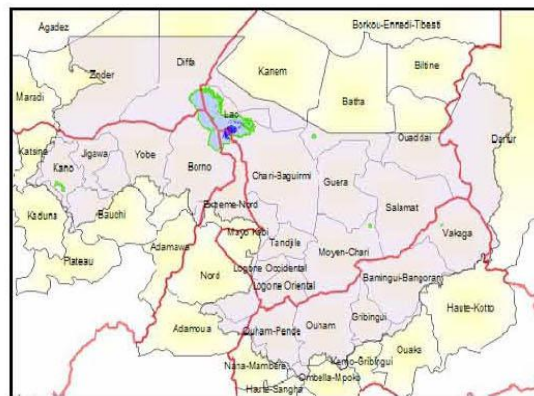
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36. Sub-regional Participatory Programme in Integrated Production and Predator Management through Farmer Field Schools for Burkina Faso, Mali and Senegal (GCP/INT/813/NET), Evaluation Mission, July – August 2004
37. Neem, Natural Insecticide: A Practical Guide, HSF-France, January 2006

## PILOT RESEARCH/DEVELOPMENT SUPPORT PROJECT ON INTEGRATED PEST MANAGEMENT FOR SUBSISTENCE FARMING IN THE LAKE CHAD BASIN

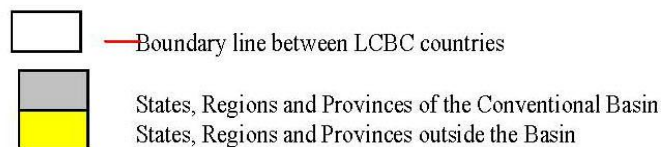
**Map of the project area**  
Site Map of the Basin in Africa



Map of the Provinces, Regions and States covered by the Basin  
in Cameroon, Niger, Nigeria, CAR and Chad



Legend:



Source: ADB, Appraisal Report of Lake Chad Basin Sustainable Development Programme  
(PRODEBALT) – ADF/BD/WP/2008/141

## LCBC

### COMPARATIVE SOCIO-ECONOMIC INDICATORS

	Year	CAR	Chad	Niger	Nigeria	Cameroon	LCBC
<b>Basic Indicators</b>							
Area ('000 Km <sup>2</sup> )		623	1 284	1 267	924	476	<b>4,573</b>
Total Population (millions)	2009	4.4	11.2	15.3	154.7	19.5	<b>205.2</b>
Urban Population (% of Total)	2009	38.7	27.1	16.6	49.1	57.6	<b>46.0</b>
Population Density (per Km <sup>2</sup> )	2009	7.1	8.7	12.1	167.5	41.1	<b>45.9</b>
GNI per Capita (US \$)	2008	410	530	330	1 160	1 150	<b>1,047.5</b>
Labor Force Participation - Total (%)	2009	44.8	40.1	32.9	30.9	38.0	<b>32.5</b>
Labor Force Participation - Female (%)	2009	45.0	48.9	31.3	36.5	41.6	<b>37.8</b>
Gender -Related Development Index Value	2005	0.368	0.370	0.355	0.456	0.524	<b>0.449</b>
Human Develop. Index (Rank among 182 countries)	2007	179	175	182	158	153	<b>n.a</b>
Popul. Living Below \$ 1 a Day (% of Population)	2004-07			65.9	64.4		<b>...</b>
<b>Demographic Indicators</b>							
Population Growth Rate - Total (%)	2009	1.9	2.6	3.9	2.3	2.2	<b>2.4</b>
Population Growth Rate - Urban (%)	2009	2.4	4.5	4.5	3.8	3.7	<b>3.8</b>
Population < 15 years (%)	2009	40.6	45.7	49.9	42.5	40.9	<b>43.1</b>
Population >= 65 years (%)	2009	3.9	2.8	2.0	3.1	3.6	<b>3.1</b>
Dependency Ratio (%)	2009	80.2	94.4	108.0	84.0	80.1	<b>85.7</b>
Sex Ratio (per 100 female)	2009	96.6	98.8	100.3	100.5	100.0	<b>100.2</b>
Female Population 15-49 years (% of total population)	2009	24.3	22.5	21.6	23.6	24.1	<b>23.4</b>
Life Expectancy at Birth - Total (years)	2009	47.4	49.0	51.9	48.2	51.4	<b>48.8</b>
Life Expectancy at Birth - Female (years)	2009	48.8	50.2	52.9	48.7	51.9	<b>49.4</b>
Crude Birth Rate (per 1,000)	2009	34.9	45.3	53.2	39.3	36.4	<b>40.2</b>
Crude Death Rate (per 1,000)	2009	16.7	16.5	14.5	16.2	14.0	<b>15.9</b>
Infant Mortality Rate (per 1,000)	2009	103.1	128.3	85.3	107.7	85.0	<b>104.7</b>
Child Mortality Rate (per 1,000)	2009	175.3	207.6	165.5	183.7	140.6	<b>179.4</b>
Total Fertility Rate (per woman)	2009	4.7	6.1	7.1	5.2	4.5	<b>5.3</b>
Maternal Mortality Rate (per 100,000)	2000-5	980.0	1099.0	648.0	1100.0	669.0	<b>899.2</b>
Women Using Contraception (%)	2006	19.1	2.8	11.2		26.1	<b>19.9</b>
<b>Health &amp; Nutrition Indicators</b>							
Physicians (per 100,000 people)	2004-06	4.5	3.4	2.9	...	18.4	<b>11.9</b>
Nurses (per 100,000 people)*	2004-06	28.8	23.8	21.2	...	43.9	<b>31.2</b>
Births attended by Trained Health Personnel (%)	2006	53.4	14.4	32.9	...	63.0	<b>51.1</b>
Access to Safe Water (% of Population)	2008	67.0	50.0	48.0	58.0	74.0	<b>58.5</b>
Access to Health Services (% of Population)	2006	61.7	...	...	...	...	<b>...</b>
Access to Sanitation (% of Population)	2008	34.0	9.0	9.0	32.0	47.0	<b>30.5</b>
Percent. of Adults (aged 15-49) Living with HIV/AIDS	2007	6.3	3.5	0.8	3.1	5.1	<b>3.2</b>
Incidence of Tuberculosis (per 100,000)	2007	345.0	299.0	174.0	311.0	192.0	<b>289.8</b>
Child Immunization Against Tuberculosis (%)	2007	90.0	72.0	83.0	53.0	81.0	<b>59.7</b>
Child Immunization Against Measles (%)	2007	99.0	77.0	67.0	86.0	74.0	<b>82.9</b>
Underweight Children (% of children under 5 years)	2006	29.3	36.7	44.4	...	18.0	<b>29.4</b>
Daily Calorie Supply per Capita	2005	1 924	1 992	2 151	2 655	2 239	<b>2,527.5</b>
Public Expenditure on Health (as % of GDP)	2006	1.3	2.6	3.2	1.1	1.0	<b>1.2</b>
<b>Education Indicators</b>							
Gross Enrolment Ratio (%)							
Primary School - Total	2008	77.4	75.5	57.8	93.1	110.9	<b>85.7</b>
Primary School - Female	2008	64.4	61.9	50.6	86.8	102.4	<b>77.4</b>
Secondary School - Total	2005	...	19.0	11.0	30.5	37.3	<b>20.1</b>
Secondary School - Female	2005	...	11.7	8.2	26.5	33.0	<b>23.4</b>
Primary School Female Teaching Staff (% of Total)	2008	12.7	13.4	44.7	48.3	44.2	<b>42.7</b>
Adult Illiteracy Rate - Total (%)	2007	...	...	69.6	28.0	...	<b>...</b>
Adult Illiteracy Rate - Male (%)	2007	...	...	55.7	19.9	...	<b>...</b>
Adult Illiteracy Rate - Female (%)	2007	...	...	83.6	35.9	...	<b>...</b>
Percentage of GDP Spent on Education	2006	1.3	1.9	3.3	...	3.9	<b>3.2</b>
<b>Environmental Indicators</b>							
Land Use (Arable Land as % of Total Land Area)	2007	3.1	3.4	11.6	40.1	12.6	<b>14.0</b>
Annual Rate of Deforestation (%)	2006	...	...	...	...	...	<b>...</b>
Annual Rate of Reforestation (%)	2006	...	...	...	...	...	<b>...</b>
Per Capita CO2 Emissions (metric tons)	2008	0.1	0.0	0.1	0.7	0.4	<b>0.6</b>

Sources : ADB Statistics Department Databases; World Bank: World Development Indicators; UNAIDS; UNSD; WHO, UNICEF, WRI, UNDP; Country Reports.

last update : July 2010

Note : n.a. : Not Applicable ; ... : Data Not Available.