

UNITED NATIONS ENVIRONMENT PROGRAMME

GLOBAL ENVIRONMENT FACILITY PDF BLOCK B REQUEST

Requesting Country:	Senegal ¹
Project Title:	Reducing reliance on agricultural pesticide use in the Senegal and Niger River basins through Integrated Production and Pest Management, and a community-based pollution prevention system
GEF Implementing Agency:	United Nations Environment Programme
Executing Agency²:	Global IPM Facility ³ , United Nations Food and Agriculture Organization, in collaboration with the CERES/Locustox Foundation, Senegal ⁴
Eligibility:	All participating countries are eligible under paragraph 9(b) of the GEF instrument.
GEF Focal Area:	International Waters
Operational Programme:	#10-Contaminant-Based Operational Programme With relevance to OP 9 on Integrated Land and Water Management and draft OP 14 on POPs
Estimated Total Project Costs:	US\$ 6-8 million for a period of 4-5 years (GEF 50%)
PDF-B Funding:	
GEF:	US\$ 372,500
Co-financing:	
FAO, GIF (in kind)	US\$ 47,500
CERES/Locustox (in kind)	US\$ 46,500
Total Co-financing:	US\$ 94,000
Total:	US\$ 466,500
Block A Grant Awarded:	No

¹ Most PDF-B activities to take place in Senegal. The other Niger and Senegal River riparian countries Bénin, Guinea, Mali, Mauritania and Niger will participate in the evaluation of this preparatory phase, and will take part in the design of the full project to which they will be partners.

² At the national level, the execution will rely on local communities.

³ The Global IPM Facility was initiated with the co-sponsorship of FAO, UNDP, UNEP and the World Bank. It is hosted by FAO.

⁴ The CERES/Locustox Foundation is a national training institution with a regional mandate (CILSS countries) for ecotoxicology, co-sponsored by FAO.

Operational Focal Points Endorsement:

République de Guinée

Mme Kadiatou N'Diaye
Directrice, Conseil National de l' Environnement
Ministère des Mines, de la Géologie et de l' Environnement
29/6/01

République Islamique de Mauritanie

Cheikh Ahmed Ould El Khalifa
Directeur, Direction de l' Environnement et de l' Aménagement Rural
Ministère du Développement Rural et de l' Environnement
9/7/01

République du Niger

M. Sala Assane Amadou
Directeur de Cabinet du Premier Ministre
President du CNEDD
22/6/01

République du Sénégal

M. Pathé Balde, pour Mme Fatimata Dia Toure
Directeur de l' Environnement et des Installations Classées
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BACKGROUND AND CONTEXT

Global significance of the natural resources to be protected through the project

1. The proposed project will adopt an ecosystem approach which will integrate and address environmental, health, and agricultural concerns in communities along the Senegal and Niger Rivers. The Senegal River is a transboundary water source that originates in Guinea, flows through Mali and forms the natural border between Mauritania and Senegal. The total area of the river basin (including parts of Guinea, Mali, Mauritania and Senegal) is 289,000 square kilometres, with roughly two million inhabitants. Because of its global significance, the delta of the Senegal River was designated as a UNESCO World Heritage site. The delta is also home to two Ramsar sites. Because of its diverse biotopes, the river valley is an important area for migratory species crossing the Sahara. In Senegal, the Senegal River Valley encompasses the country's largest irrigation scheme, and produces rice, vegetables, cotton and sugar cane. A parastatal called SAED (Société Nationale d'Aménagement et d'Exploitation des terres du Delta du Fleuve Sénégal et de la Falème) is responsible for administering the irrigation scheme, which is fed by the Senegal River.

2. The Niger River Basin resembles the Senegal River Basin in a number of ways. The Niger River is also a transboundary river originating in Guinea, flowing through Mali, Niger, forming the border with Benin and discharging into the Atlantic Ocean in Nigeria. It comprises a number of protected sites, including three Ramsar sites in the Niger River Delta near Mopti and the UNESCO World Heritage Site "W" National Park of the Niger in Niger, which is also a Ramsar site. In addition, numerous temporary wetlands are situated in the Niger River basin, some of which have recently been proposed as Ramsar sites. These sites are increasingly being exploited for market gardening, and pesticide use is becoming a threat to their biological resources. The Niger River Basin includes important agricultural zones, such as the CMDT (Compagnie Malienne de Développement du Textile) zone in Mali, responsible for over 500,000 ha of cotton production per year, the 70,000 ha rice irrigation system managed by the Office du Niger and irrigated rice schemes such as the more than 7,000 ha of irrigated rice schemes managed by ONAHA (Office National d'Aménagements Hydro-agricoles) in former floodplains of the Niger in the Republic of Niger.

Pesticide use in participating countries: POPs and other persistent and toxic pesticides

3. In many West African countries, pesticide misuse and localised overuse cause serious damage to humans and the environment. Monitoring of occupational health effects and pesticide poisoning is poor or absent. Statistics and records on pesticide use are hard to come by or simply not available. Because of a lack of research, the actual impact of pesticides on the environment and human health is largely unknown.

4. To obtain a better idea of the scope of problems caused by intensive agricultural production, particularly with regard to the pollution of aquatic resources, the Dakar-based CERES/Locustox Foundation in collaboration with the Global IPM Facility (GIF) at FAO carried out a pesticide risk assessment in the SAED zone in the Senegal River Valley. The study was carried out from November 2000 to March 2001 (the detailed technical report can be found

in annex I). It revealed the use of persistent and toxic pesticides (among others the organochlorine dicofol, giving rise to DDE as metabolite⁵; and lindane), and banned persistent organic pollutants pesticides (e.g. dieldrin) on vegetables, and until recently, on sugar cane. It also confirmed regular or widespread use of a number of organophosphates during locust or grasshopper outbreaks, and the use of WHO class Ib and II pesticides such as carbofuran, endosulfan, dichlorvos, methamidophos, methomyl and omethoate, DDVP and triazophos. All of these highly toxic substances are reportedly widely being used in SAED, predominantly carbofuran and endosulfan. Use of these agrochemicals poses an immediate threat to the flora, fauna and human health. Beyond these threats, risks to the aquatic environment also come from the regular, and sometimes intensive, use of bird control pesticides such as fenthion and cyanophos. Finally, FAO's Obsolete Disposal Project confirmed that throughout the Senegal River area, there are at least 19 known obsolete stocks, including large quantities of dieldrin, HCH, endrin, chlorophacinone, fenitrothion, fenthion, malathion, dicrotophos and ethyl-parathion. In 2001, farmers from around the OCLALAV premises, a former organisation for locust and bird control, were reported to have purchased dieldrin for use on vegetables from the obsolete disposal storage facility.⁶ As recently as 1999, newspapers reported sales of obsolete stocks and banned substances to farmers, including lindane, aldicarb, parathion, cypermethrin and endosulfan on black markets.⁷ Absence of properly functioning control mechanisms on the quality of substances used and a lack of reliable crop protection information available to farmers has proven to encourage the widespread use of illegal and obsolete substances.

5. Farmers interviewed in the SAED zone confirmed that spraying is a calendar-based routine without any verification of pest infestation at the field level. They also stated that access to information on risks related to pesticide use and alternative pest management strategies is lacking, perpetuating the chemical orientation. This means that farmers are effectively trapped in a production system that relies on expensive pesticide applications with little scope to reduce reliance on them.

6. There are strong indications that the problems identified in the Senegal River Valley are common among many West African countries. Population growth, a lack of availability of clean irrigation and safe drinking water and further intensification of agricultural production make these countries vulnerable to further degradation of their fragile ecosystems. Throughout the area, widespread misuse and overuse of pesticides, particularly on cotton and vegetables, is being reported. A study commissioned by the CILSS (Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel) in 2000 concluded that in Mali, West Africa's largest cotton producer, hardly any research had been conducted on agro-chemical pollution of water resources. This while pesticide use on cotton, for example, has almost doubled over the past ten years. The only two water quality studies in Mali's cotton zone, carried out in 1992-1994, found residues of dimethoate, chlopyrifos, cypermethrin and atrazine in wells and surface water.

⁵ DDT is an impurity of dicofol (according to specification < 0.1 %). In the field, DDE-poisoning related effects were demonstrated (US EPA, 1998). DDE is found as a metabolite of dicofol (Riseborough et al, 1986).

⁶ Journal le Matin No 1225, 30 January 2001.

⁷ Des produits prohibés autorisés dans nos marchés. In: Sénégal Quotidien No 1445, 31 January 1999.

Differences between the proposed GEF intervention and “standard” Global IPM Facility-supported IPPM programmes - Impact on future IPPM programmes

7. A key strategy promoted by FAO to reduce farmers' reliance on agro-chemicals is Integrated Production and Pest Management (IPPM). The most widely used approach to promote IPPM in Africa is through the so-called farmer field schools (FFS), which are made up of 25 farmers. The FFS model helps farmers to discover and learn about field ecology and integrated crop management. On the basis of this knowledge, farmers become more independent and confident decision-makers – experts in their own fields. The training is “hands on” and is carried out almost entirely in the field. A corner stone of the FFS methodology is Agro-ecosystems Analysis (AESA) which involves regular observations of the crop. The four major principles of the IPPM methodology are: i) grow a healthy crop; ii) observe fields weekly; iii) conserve natural enemies of crop pests; and iv) understand ecology and become expert in one’s own field.

8. In an FFS, farmers gather on a weekly basis throughout the entire growing season. Technically, the field schools focus primarily on enhancing production and pest management skills. The possibilities for mainstreaming environmental concerns by initiating programmes aimed at monitoring and evaluating the impact of agricultural production are currently limited due to a lack of technical capacities among farmers and extensionists and funding requirements. Furthermore, though the typical focus of IPPM Programmes is on high production areas characterised by an elevated use of pesticides, addressing the impact of agricultural production in areas adjacent to watercourses has not yet been a focus of the Global IPM Facility.

9. Typically, field schools address the environmental impact of regular agricultural production (by comparing farmers’ practices with IPPM practices) and aim primarily at reducing excessive and costly pesticide use. Field schools have not yet, however, attempted to measure and monitor the environmental impact of agricultural production. Finally, field schools are independently functioning self-sustaining units. This means that interaction among different groups is not strictly necessary, although pilot experiences in this field have been positive.

The proposed GEF project differs from the regular IPPM/field school approach in three ways:

- It will aim at helping communities understand and address broader environmental issues, particularly those related to pesticide use and water quality, building upon the farmer field school model;
- It will focus on linking different communities to facilitate the exchange of experiences and data especially regarding impact of upstream production patterns on the environment and health of communities working and living downstream;
- It will demonstrate the ability of farmer communities to themselves assess the impact of agricultural development on the environment⁸, both within their communities and basinwide.

10. Thus, through the GEF project the IPPM/field school model will become more comprehensive and forward looking, helping farmers to jointly develop cleaner, integrated

⁸ Experience in Asia and Africa shows that farmers who have participated in IPPM programmes demonstrate strongly heightened environmental awareness.

production strategies, taking into account the long term effects of their land use and agricultural input use decisions on their own community and on communities living downstream.

11. The GEF project will help strengthen the IPPM/field school model by spurring the 'vertical growth' of IPPM (e.g., new linkages among farmer communities, consideration of the environmental dimensions of pesticide use and IPPM). It is envisaged that farmer communities involved in Facility activities throughout Africa will start to broadly use monitoring tools developed and tested under the GEF project and start discussing changes needed in agricultural production to meet a growing demand for food and diversified food supplies in a sustainable manner. Environmental aspects, particularly ecotoxicological and health risks, will be internalised in farmer decision-making processes and become a key element of field schools organised in river basins elsewhere in Africa. Besides focusing strongly on inter-community linkages, the GEF project will also actively support exchanges of information and experiences on pesticide issues among communities and policy makers.

Complementary activities and partnerships for execution

12. Since its establishment in 1998, the FAO-based Global IPM Facility has supported African IPPM Programmes. These programmes initially focused on irrigated rice but gradually included vegetables, plantains and, more recently, cotton. In Southern Africa, the Facility currently supports IPPM programmes in Zimbabwe (cotton and vegetable production, with special attention to productivity and soils), Zambia (maize and conservation tillage and horticultural crops), Malawi (community study groups on vegetables), and Mozambique (cowpea research). In Eastern Africa, the Facility supports a series of regional and national activities in Kenya, Uganda and Tanzania, focusing primarily on banana IPM, cotton-based systems and vegetables.

13. In West Africa, the Global IPM Facility supported its first African IPM programme through the Ghana IPM programme. It has developed IPM programmes in rice, vegetable, yams and plantain and collaborates with CABI (Centre for Agriculture and Biosciences International) on cocoa IPM programmes. In other West African countries, IPM programmes are operational on rice (Mali), vegetables (Senegal) and Cowpea (in Ghana and Benin). The proposed GEF project will complement these and planned farmer participatory training programmes.

14. The GEF project will build upon approved IPPM pipeline activities such as the US\$ 2 million IPPM training programme for Mali, Burkina Faso and Senegal (starting date 1 July 2001). This sub-regional IPPM programme aims at developing regional technical capacities, promoting experience and information sharing, and raising awareness amongst the general public and decision makers. In concrete terms, it is envisaged that farmer field school groups funded under the regional programme will become clusters in the pesticide monitoring network set up under the GEF project (see also par. 23). Thus, GEF funding will be used to enable existing farmer' groups to set up and carry out pesticide monitoring tasks.

15. Partners for the GEF project will be WWF (World Wildlife Fund), IUCN (The World Conservation Union) and Wetlands International, all of which are currently supporting nature conservation programmes in the wetlands of the Senegal River Delta. One of the pilot sites to be selected for inclusion in the PDF B will be a community which recently started working near

Podor with the Senegalese NGO ENDA Tiers Monde (International NGO for Environmental and Development Action in the Third World). The objective of the approach promoted by ENDA is to develop three community-based, integrated pilot projects on environmental management, including health and social aspects.

16. The GEF project will also be associated with the ongoing CILSS/FAO Pesticide Management Programme (currently operational in six CILSS countries), the Regional Office of the Pesticide Action Network in Africa, based in Dakar, and an NRI (Natural Resources Institute) project on bird control strategies. The GEF project will benefit from a series of national socio-economic studies on pesticide use conducted by the Pesticide Management Programme, in collaboration with the University of Hanover/GTZ Pesticide Policy Project and the Global IPM Facility. One of the studies recently finalised was carried out in Mali; a new national pesticide policy study will be initiated in Senegal in October 2001. Finally, OMVS (Organisation pour la Mise en Valeur du Fleuve Sénégal) will be an indispensable partner to promote several of the regional aspects such as information sharing and collecting baseline data.

17. A number of Land Degradation and International Waters GEF projects are either under implementation or in preparation in the two River Basins (including the Mauritania/Senegal land degradation project, and Niger River Basin international waters project). The proposed activities will be coordinated with existing GEF interventions of relevance in the region, and in particular the outputs of the PDF-B such as pollution data, pesticides policy, and work on indicators, will be shared as inputs to the on-going TDA/SAP processes.

GEF programming context

18. The GEF programming context is Operational Programme number 10 – the Contaminant-based Operational Programme, and more specifically that component dealing with “*global contaminants*”. The Operational Programme states that “*The GEF [...] may support the agreed incremental cost of processes and measures that demonstrate prevention or reduction of releases in recipient countries*” (paragraph 10.15). In addition, the proposed project is consistent with the provisions of the “*Draft Elements of an Operational Program for Reducing and Eliminating Releases of Persistent Organic Pollutants into the Environment*” submitted to the GEF Council of November 2000 which states that “*assistance will be provided to promote the access to, and transfer of, alternative practices, including integrated pest and vector management*” (paragraph 20).

SUMMARY DESCRIPTION OF PROPOSED PROJECT

Rationale and objectives

19. There is an urgent need to address the use of persistent and toxic pesticides, particularly POPs and other banned pesticides in the Senegal River Valley. A comparison of current pesticide use with 1984/85 reveals that in the past 15 years, pesticide use per hectare on sugarcane in the SAED zone has doubled. In the rice producing area (about 12,000 ha), the increase in pesticide use per ha was four to five fold, while acreage of rice has doubled in the same period. This

means that the total pesticide load on rice in the Senegal Valley has increased eight to ten times in 15 years. The limited available quantitative data on horticulture show gross misuse and overuse of extremely harmful substances including some POPs and other persistent toxic substances. This poses an immediate and serious threat to the aquatic environment and to human health. The risks associated with these 'regular' use of pesticides on vegetables, rice and other crops tend to be aggravated by the regular, and sometimes intensive, use of bird control pesticides. Moreover, poor planning and a lack of awareness on the danger of agro-chemicals combined with subsidised pesticide donations have led to the accumulation of several obsolete stocks in the Senegal River area. Pollution caused by all of the above mentioned activities (rice, vegetables and sugar cane production) poses a serious threat to the quality of transboundary waters. Risks will increase with further intensification and expansion of agriculture and the planned introduction in the Senegal River Valley of new cropping systems such as cotton. At the same time, reductions in national extension systems have led to an increased reliance of farmers on crop protection information being provided by representatives of agro-chemical companies.

20. In order to address the current situation, farmers and farming communities need to have access to information on risks related to pesticide use and alternative pest management strategies. To better understand the impact of current unsustainable production practices, monitoring tools need to be developed allowing farmers to evaluate results, and share those and good practices among communities located across the river basin. Having these tools in their hands, farmers can optimise decision making processes on land use and the choice of agricultural inputs, relying to a great extent on locally generated knowledge and information.

21. Therefore, the overall objective of the full project is to protect human health and the environment from excessive use of pesticides through implementation of an Integrated Production and Pest Management programme and a community-based environmental monitoring and pollution prevention system.

22. The PDF-B phase will test new participatory methodologies to monitor pesticide flows and raise awareness on pesticide and pesticide policy issues. It will be carried out in Senegal, but involve other riparian countries from the Senegal and Niger Rivers. Based on the initial experiences acquired and tested under the PDF-B, a full-fledged, four- to five year GEF project will be developed. Besides aiming at expanding the community pesticide monitoring system, the full project will also train farmers in IPPM through farmer field schools which will form the basis for the monitoring components.

23. The proposed GEF project will make an important contribution towards the realisation of the POPs Convention which was signed already by Benin, Guinea, Mali and Senegal on 23 May of this year. In particular, the project will reduce the use for agricultural purposes in the participating countries of POPs (such as dieldrin), but also of compounds which are likely to be formally identified as POPs in the future (e.g. lindane, a POPs under the UN-ECE LRTAP POPs protocol; or endosulfan which was not included in the initial list of 12 POPs, but was the subject of much discussion). It will also help the countries meet the IPM-related objectives of Chapter 14 (sustainable agriculture) of UNCED Agenda 21 and the agricultural sections of the Convention on Biodiversity. It will reduce dependence on agro-chemicals, particularly POPs, PTS and other

highly toxic substances, improve plant protection and production methods, and avoid unnecessary contamination of the environment while ensuring yield levels.

The main components of the full project will be:

24. **Component 1: The establishment of a pollution monitoring and prevention system:** The monitoring system (outlined in detail in annex II) to be put in place with support of the GEF will cover approximately 13 clusters⁹ of five community groups along the Senegal and Niger Rivers including a total of 1625 farmers (25 per community group, five groups per cluster). A total of six community clusters will thus cover the Senegal River, while the Niger River will include seven (see matrix below). Communities to be included are those situated in intensive agricultural areas such as the SAED zone in Senegal (including upstream areas not yet included in the PDF-B), the cotton-producing CMDT zone and the rice-parameters of the Office du Niger in Mali, and the vegetable producing areas Kokoro and Namga, as a bird sanctuary unrivalled and designated as a Ramsar site, in Niger. At this stage, it is envisaged to solely focus on Sahelian countries and thus not to include Nigeria. A separate project could be developed for Nigeria, which population outnumbers the combined population of all Sahelian countries.

Proposed sites community monitoring and pollution prevention system (full GEF project)

Country	Community clusters Senegal River		Community clusters Niger River			
	Senegal	Pilot site SAED Rice & vegetables	SAED Bakel/ Matam Rice & vegetables	-	-	-
Guinea	Bafing Cotton	-	-	-	-	-
Mali	Kayes Cotton & vegetables	-	CMDT Koutiala Cotton & vegetables	CMDT Dioila Cotton & vegetables	Office du Niger Niono Rice & vegetables	Office Riz Mopti Rice & vegetables
Mauritania	Bogué	Kaedi	-	-	-	-
Niger	-	-	ONAHA Rice & vegetables	Kokoro Rice & vegetables	-	-
Benin	-	-	Malanville	-	-	-

25. **Component 2: The establishment of IPPM training activities:** The full project will include a 'preventive', participatory training and capacity development component for farmers on IPPM. Thus, community groups included in the full GEF project will be trained to enhance skills on production and pest management, creating the foundation for the pesticide monitoring component of the programme. GEF funding will be used to organise complementary vegetable, rice and cotton¹⁰ IPPM training for extensionists and farmers in Mauritania, Niger, Benin and

⁹ One cluster will include 5 community groups situated along the river at a maximum distance of 250 kilometres. Each community group equals a farmer field school group.

¹⁰ Vegetables and cotton are known in West Africa as highly pesticide intensive crops.

Guinea, in other words in those countries not included in the sub-regional vegetables, cotton and rice IPPM programme covering Mali, Burkina Faso and Senegal. Technical and organisational support will be sought from other IPPM Programmes including the regional IPPM programme in Senegal, Mali and Burkina Faso which will fund all in-country field school activities. All training activities will be organised drawing upon existing capacities, training facilities and technical institutes collaborating with the Global IPM Facility in the sub-region.

26. The IPPM training will initially focus on the 65 core groups from the 13 community clusters participating in the monitoring system. To maximise environmental benefits and minimise costs, adjacent communities will be asked to form an additional 195 groups (three per community group), comprising 4875 farmers. Thus, in and around each community group, 100 farmers will be trained so that the total number of farmers targeted will amount to 6500 (in 260 field schools). In particular the vegetable training activities will focus on women, which are primarily responsible for vegetable production. An effort will be made to ensure women's participation in IPPM training on the other crops, which are typically being dealt with by men. A total of 130 extensionists, each of which will be assisting 50 farmers a week on a season-long basis, will facilitate the 260 farmer field schools. The project will cost-share the participation of the 130 extensionists in Global IPM Facility-organised cotton, vegetables and rice IPPM Training of Trainers in the sub-region (Mali, Senegal, Burkina Faso). The IPPM training component will allow farmers to practice and explore alternatives to agro-chemicals, creating awareness on pesticide use and environmental impact of pesticides, thus drastically reducing the use of harmful agro-chemicals

27. ***Component 3: Demonstration, experience sharing and information dissemination.*** On the basis of a series of workshops, local case studies of farmer practices, field level pesticide application records, and analyses of field data carried out during the PDF-B, pesticide and production issues will be discussed within and among farmer communities. This will lead to an increased awareness at the community level on risks of pesticide intensive production and the use of specific agrochemicals. Through the PDF-B, practical tools will be developed to demonstrate, at the field level, risks of certain agro-chemicals and their impact on the aquatic environment, and health of pesticide applicators. Information will be shared among farmer communities, with a particular regard for impact of upstream agricultural activities on communities living downstream. The positive impacts expected from the project in terms of reduction of pesticide use and maintaining of yield will be shared with the other African countries, thus strengthening the replicability potential of the project.

28. ***Component 4: Institutional strengthening and policy/awareness activities.*** Field-level training and awareness activities will be complemented with a series of policy and awareness activities to be carried out at the national and regional levels. These will include a policy workshop, a pesticide policy discussion forum and policy studies (based on the model of the Mali pesticide policy study executed by the University of Hanover/GTZ pesticide policy project and the FAO-CILSS Pesticide Management project in collaboration with the Global IPM Facility). These policy studies will help reveal trends in pesticide use, estimate costs of pesticide use to the environment and society and identify policy level constraints to cleaner agricultural production and IPPM (e.g., subsidies on pesticides, absence of policies promoting IPPM at the farmers' level).

Indication of Incremental Costs and project financing

29. The full GEF project will achieve substantial national and regional benefits from an environmental, health and economic perspective (yield increases and reduction of production costs due to reduced pesticide use), and therefore the full project must have a significant amount of co-financing for its implementation. The global environmental benefits will stem particularly from the improvements of the aquatic, riverine and marine environment at the regional level, hence, the regional activities (building linkages among communities and developing the monitoring system) would probably be considered as incremental. The full project is expected to cost US\$ 6-8 million, of which approximately 50% would be requested from the GEF; detailed cost estimates to be made based on the results of the PDF-B activities.

Justification for PDF-B grant

30. In view of the importance of the problems caused by the intensive use of agro-chemicals, SAED has requested FAO to assist in providing farmers with tools and skills to make agricultural production cleaner and more sustainable. A GEF-funded farmer-led community monitoring and pollution prevention system would reduce the agricultural pollution of water resources in the Senegal River Valley. In view of the need to address similar problems in other West African countries, particularly the Niger River Basin countries Guinea, Senegal, Mali, Mauritania¹¹, Niger and Benin, it is proposed to carry out a PDF-B in the SAED zone to develop, test and evaluate a community-based approach. Based on the results of the initial experiences, the one-year PDF-B preparatory phase will be followed by a full-fledged, four- to five-year GEF project including all of the aforementioned countries, and will also include a 'preventive', participatory training and capacity development component for farmers on IPPM.

PDF-B OBJECTIVES

31. The immediate objectives of the PDF-B are to:
- i) Raise awareness on pesticide use and alternative production and pest management techniques within and among farmer communities in Senegal;
 - ii) Create a pilot network among farmers in the Senegal River to develop, test and demonstrate a community monitoring system of pesticide flows and pollution in the Senegal River Valley;
 - iii) Assist communities in the development of good practices for cleaner agricultural production;
 - iv) Document agricultural practices and trends in pesticide use;
 - v) Share results of the PDF-B with farmers, local politicians and decision-makers of riparian countries in order to ensure their involvement in the preparations of the full GEF project.

⁶ Guinea, Senegal, Mali, Mauritania also being riparian of the Senegal River.

DESCRIPTION OF PROPOSED PDF-B ACTIVITIES

32. One cluster of five farmer communities will be set up in the SAED/Senegal River Valley to form a pilot network of farmers who share experiences and information on pesticide pollution, poisoning cases, and alternative non-chemical production and pest management strategies. Case studies will be conducted locally to document agricultural practices including pesticide use. The one-year PDF-B preparatory phase will be completed with a participatory evaluation to be carried out by the communities themselves, with technical assistance from CERES/Locustox and the Global IPM Facility. Results of the PDF-B will be discussed at the national policy workshop before being presented to farmers and decision-makers from the other Senegal River riparian countries, Guinea, Mali and Mauritania. In addition to the aforementioned countries, the Niger River Basin riparian countries Niger and Benin will be invited to review and discuss results of the PDF-B and to start developing an outline for a community monitoring system to be put in place all along the two rivers. Based on these PDF-B activities, a GEF project brief will be prepared and endorsed by the PDF-B Steering Committee which will include representatives of all riparian countries.

Specifically, the following set of activities will be carried out:

A1: Coordination and management

33. A Steering Committee will be established to guide and oversee PDF-B activities and agree on the main directions of the full project. The Steering Committee will include UNEP-GEF, ENDA, SAED, OMVS (representing Senegal, Mali and Mauritania), representatives from Bénin and Niger, and be led by CERES/Locustox and the Global IPM Facility. Two Steering Committee meetings will be convened, one upon the start of the PDF-B, and one following the inter-country consultations (the final activity of the PDF-B). The two meetings will respectively:

- i) Approve the draft workplan, TORs (case studies, short-term consultancies, etc.) and endorse timetable and detailed project activities;
- ii) Review initial project outputs and project progress and agree upon the outline for the full-fledged GEF project brief.

34. CERES/Locustox and the Global IPM Facility will coordinate project activities and provide technical support and the main staff inputs for the project, in collaboration with the partners mentioned in paragraph 42.

A2: Setting-up and testing a pesticide monitoring system

35. *Identification of one cluster of five farmer communities:* To the extent possible and in order to maximise potential synergies, communities which are already collaborating with ENDA/CERES/LOCUSTOX and/or participate in the SAED IPM training programme will be included. Furthermore, the selected communities will be evenly distributed over the Dagana and Podor zones in the Senegal River Valley (administered by the SAED). The up- and downstream communities will comprise small-scale rice and vegetable farmers, the predominant crops grown in the Senegal River Valley.

36. To assist the five pilot communities in assessing and monitoring pesticide flows in the Valley, a pesticide monitoring system will be developed. Farmer training modules will focus on maintaining on-farm pesticide application records, collecting data on pollution of the river and poisoning cases of humans and animals (fish and birds), and developing indicators for aquatic pollution. Based on experiences of CERES/Locustox with standard laboratory procedures for toxicity testing and methods which have been developed for field observation of ecological effects, CERES/Locustox will develop practical pesticide monitoring tools to be used by the communities themselves (see annex D). Chemical laboratory analysis including GC and HPLC will be carried out by CERES/Locustox to validate field findings by community groups.

A3: Assessment of agricultural practices and trends in pesticides use, development of a set of best practices, and awareness raising

37. *Conduct of local participatory case studies:* To document agricultural practices and trends in pesticide use (e.g. chemical bird control strategies), local participatory case studies will be carried out. Farmer groups will exchange data and experiences obtained through the case studies and study alternatives to chemically intensive pest management. A summary description of findings will be presented in a background document including details on existing IPM practices and policies and the status of IPM and biocontrol. Additional information will be provided through an upcoming pesticide policy study in Senegal funded by the Global IPM Facility, the FAO-CILSS Pesticide Management Project and the GTZ/University of Hanover Pesticide Policy Project (tentative starting date October 2001). The experience gained through a similar pesticide policy study conducted in Mali will also be incorporated and discussed in the full GEF project.

38. *Development of a set of good practices for cleaner agricultural production:* CERES/Locustox and the Global IPM Facility will develop a set of IPPM-based best practices focusing on, among others, cultural practices and non-chemical pest management. The objective will be to provide farmers with a tool to improve their rice and vegetables production in a sustainable manner.

39. *Organisation of ten workshops with the five farmer communities:* The objective of these workshops is to discuss pesticide issues, raise awareness on risks and develop the strategy for implementation of the PDF-B and contribute to the preparation of the full GEF project. Each workshop will be organised with CERES/Locustox assistance and take place in the field, hosted by the communities. For each community, one preparatory workshop will be held at the beginning of the PDF-B phase and one concluding workshop will be held at the end of the project to obtain community inputs in the development of the full GEF project.

A4: Strengthening and establishment of local partnerships to carry out PDF-B and project activities

40. Collaborative partnerships will be established with local and international NGOs (ENDA, WWF, IUCN, Wetlands International) and other relevant actors intervening in Senegal River Valley. The objective is to build partnerships with a range of relevant environmental and social

projects and programmes which are intervening in the SAED zone. ENDA works with impoverished communities throughout the SAED; the other above-mentioned organisations focus on environmental preservation of the Djoudj national Birds Sanctuary located in the Senegal River delta.

A5: Participatory evaluation of the PDF-B results and development of a GEF project brief

41. *Participatory evaluation of the PDF-B:* By the end of the PDF-B phase, a participatory evaluation will be carried out by the communities with the aim to assess results of the PDF-B. The evaluation will be forward-looking to provide input to the formulation of the full GEF project.

42. *Organisation of a National Pesticide Policy Workshop/Discussion Forum:* CERES/Locustox and the Global IPM Facility will organise a 3-day national policy workshop for farmers and decision-makers to discuss results of the PDF-B (based on data generated through the local case studies, community workshops and the participatory evaluation of the PDF-B). The workshop will share field findings and establish linkages among decision-makers, technical institutes and NGOs working on these issues.

43. *Organisation of a study tour/meeting for farmers and decision-makers from Guinea, Mali, Mauritania, Niger and Benin:* A study tour to Senegal will be organised to enable the riparian countries of the Senegal and Niger River Basins to review and discuss results of the PDF-B phase with the five pilot communities, policy makers and other PDF-B phase partner institutions. Based on the PDF-B results, an outline for a project strategy for the full GEF project will be devised with CERES/Locustox/Facility assistance to be endorsed by all participating countries.

44. *Preparation of a GEF project brief:* Based on the agreed-upon project strategy outline (which will be endorsed by the PDF-B Steering Committee), the Global IPM Facility will prepare a draft project document for the follow-up GEF project.

OUTPUTS OF THE PDF –B

45. **The expected outputs from the PDF-B are as follows:**

- i) Pesticide monitoring system (including a communication and research station) set up, tested and adapted for widespread use by communities;
- ii) Data collected on pollution of the Senegal river and poisoning cases of humans and animals;
- iii) Set of indicators developed to measure aquatic pollution;
- iv) Five farmer community groups identified and trained in the SAED zone;
- v) Data and experiences exchanged among farmer communities;
- vi) Local participatory case studies documenting agricultural practices and trends in pesticide use conducted;
- vii) Laboratory analysis of field samples conducted;
- viii) An initial set of best practices for cleaner agricultural production developed;

- ix) Ten community workshops organised (2 per community group);
- x) Partnerships with local and International NGOs ENDA, WWF, IUCN, Wetlands International and other relevant actors built;
- xi) A participatory evaluation carried out by the five communities;
- xii) A National Pesticide Policy Workshop held with support from the FAO/CILLS Pesticide Management Project;
- xiii) A study tour/meeting organised for farmers and decision-makers from Guinea, Mali, Mauritania, Niger and Benin;
- xiv) A full GEF project brief including detailed cost estimates.

STAKEHOLDERS PARTICIPATION

46. Major participants and stakeholders of the PDF-B phase are:
- Community groups (IPPM farmer field school groups);
 - ENDA Tiers Monde and CERES/Locustox/GIF running farmer field schools;
 - CERES/Locustox and the University of St Louis, to run the risk information centre;
 - Health care centres based in the Senegal River basin;
 - SAED, responsible for the infrastructure and training and for the development and management of the GIS tools;
 - Local partners are farmer's associations (e.g. Malick Gueye), women's associations (Ouro Madiou) and associations of young farmers (e.g. Udjak at Podor). All of these actors have a long-standing history and experience in health care, education, environmental management and improved production methods (e.g. IPPM).

ELIGIBILITY

47. All participating countries are eligible under paragraph 9(b) of the instrument for the restructured GEF.

NATIONAL LEVEL SUPPORT

48. Through the Ministry of Agriculture, the Government of Senegal has requested FAO assistance in promoting IPPM strategies in order to reduce reliance on harmful and costly agro-chemicals. The CERES/Locustox Foundation and the Global IPM Facility in Dakar have conducted a four-month regional vegetable IPPM Training of Trainers (TOT). A total of 31 extensionists/training specialists from Senegal, Mali, Burkina Faso and Niger have attended the TOT. All salaries were covered by the respective Governments, which are expected to cost-share follow-up farmer training activities upon return of the extensionists to their duty stations. The parastatal SAED sent four agents to the TOT and has confirmed its intention to initiate IPPM farmer-training activities in the wet season in 2001.

ITEMS TO BE FINANCED THROUGH GEF PDF BLOCK B GRANT

TABLE 1 COST TABLE - FRAMEWORK BUDGET BY ACTIVITY (US\$)

Activity	GEF	FAO/GIF (staff time + int. missions)	CERES/ Locustox (staff time)	Total
<i>Activity 1: Coordination and management (total)</i>	60,000	20,000	7,500	87,500
<i>Activity 2: Pesticide monitoring system (total)</i>	185,000	-	15,000	165,000
Activity 3: Workshops communities	25,000	-	5,000	30,000
Activity 3: Local participatory case studies	35,000	5,000	7,500	47,500
<i>Activity 3: Total: Trends and best practices</i>	60,000	5,000	12,500	77,500
Activity 5: Participatory Evaluation	12,500	5,000	2,500	20,000
Activity 5: National Pesticide Policy Workshop	5,000	2,500	1,500	9,000
Activity 5: Study Tour 20 persons from 5 countries	35,000	10,000	5,000	50,000
Activity 5: Development of GEF project brief	15,000	5,000	2,500	22,500
<i>Activity 5 Total: Evaluation of PDF-B and brief</i>	67,500	22,500	11,500	101,500
TOTAL (US\$)	372,500	47,500	46,500	466,500

49. The total costs of the PDF-B amount to US\$ 466,500. Of this amount, US\$ 94,000 will be covered by the Global IPM Facility and CERES/Locustox, primarily to cover staff input and national and international missions to be carried out in the context of the PDF-B. The Government of Senegal and the irrigation authority, SAED, are expected to make staff (extensionists, researchers, etc.) and facilities (e.g., meeting rooms) available to the project.

50. In preparation of the PDF-B proposal CERES/Locustox/GIF already invested US\$ 30,000 by conducting a pesticide risk assessment study in the Senegal River Valley (see annex I). In addition, a desk study was carried out to by a Mali-based consultant to review available studies and pesticide data in Mali and Senegal. Moreover, a joint mission was fielded in January 2001 to verify research findings and discuss the project with SAED staff, farmers and other stakeholders. CERES/Locustox/GIF will continue to provide staff time as an in-kind contribution to the project and cover international staff travel.

EXPECTED DATE OF PDF COMPLETION

Table 2: Preliminary Workplan and Timetable for PDF-B Activities (12 months from signature of project document)

Activity	1	2	3	4	5	6	7	8	9	10	11	12
Identify five farmer communities in SAED Zone	x											
Organise ten community workshops (2 x 5)		x				x						
Set up, test and adapt pesticide monitoring system for widespread use by communities	x	x	x	x	x	x	x	x	x	x	x	
Collect data on pollution of the river, poisoning cases of humans and animals		x	x	x	x	x						
Validate field findings with laboratory research								x	x	x		
Develop set of indicators to measure aquatic pollution				x	x	x						
Conduct local participatory case studies to document agricultural practices and trends in pesticide use			x	x	x	x	x					
Exchange data and experiences among farmer communities						x	x	x	x	x		
Build partnerships with local and International NGOs ENDA, WWF, IUCN, Wetlands International and other relevant actors	x	x	x	x	x	x						
Carry out a participatory evaluation										x	x	
Develop initial set of best practices for cleaner agricultural production						x	x	x	x	x		
Hold a National Pesticide Policy Workshop									x			
Organise a study tour/meeting for farmers and decision-makers from Guinea, Mali, Mauritania, Niger and Benin										x		
Formulate full GEF project brief											x	x

Annex I: Pesticide Risk Assessment in the SAED zone, Senegal Valley

Annex II: CERES/Locustox Experience in Pollution Monitoring

Outside South Africa, CERES/Locustox is the only ecotoxicological research and training institute on the continent. As a Senegalese foundation, CERES/Locustox is independent and works with partners from the private sector, government and international agencies. Its training division has been working with farmer groups (“Comités Villageois”) since 1994. CERES/Locustox has a fully equipped analytical chemistry laboratory with a highly qualified staff. Equipment and procedures are in the last stage of international certification (final pre-audit).

The institute has worked on the development of indicators for aquatic pollution by pesticides in the Sahel since 1989. A number of indicators (insects, shrimps, a few zooplankton species, a fish) have been selected for monitoring purposes. Selection criteria are: abundance, ecological role, sensitivity and amenity (easy to recognise and handle). Standard laboratory procedures for toxicity testing have been developed for laboratory based research, according to OECD and ASTM guidelines. The regional authority for pesticide registration has adopted the protocols. Furthermore, methods have been developed for field observation of ecological effects, using these organisms both in sampling programmes and in a sentinel set-up (caged organisms exposed under field conditions, along with controls).

Community-based monitoring

In essence, the monitoring system will allow farmer communities to study and monitor changes in water quality of the river basin caused by human interventions, particularly land-based activities. This will allow for the application of mitigating measures when unacceptable conditions are being observed. The field indicators require little equipment and training. The number can be extended when the principles for selection and the techniques are known. Indices for water quality have to be developed by the communities themselves, because they reflect specific requirements of the user.

The existing extension and development network of ENDA Tiers Monde, which also collaborates closely with WHO, will be the starting point for the establishment of the causal relationship throughout the Senegal River Valley between ecosystem changes and health conditions of inhabitants. The various relationships between water quality and health will be the subject of participative research in Farmers Field School groups. The result will be, on one hand improved and less polluting cultural methods and on the other hand, tools to monitor the quality of the environment (essentially biological indices of water quality).

Monitoring data will be analysed locally by CERES/Locustox trained persons. The results will be shared through the existing telephone network (via e-mail or orally) to the other communities and to a central communication and research station.

The communication and research station will have the following tasks:

- i) Ensure communication among local, national and international stakeholders;
- ii) Initiate, monitor and report research;
- iii) Facilitate and organise training courses;

- iv) Ensure a full information flow among participants;
- v) Predict toxicant concentrations and potential biological effects downstream of point emission sources.

An alert system will be installed to mitigate the effects of point source discharges and of environmental disasters. Regularly updated GIS-based information will be made available permanently through the internet to decision makers and other stakeholders, indicating areas of specific risk, ecologically sensitive areas, health risks, etc. This will also ensure the continuous feedback to those who provided the baseline information.