LIST OF ANNEXES:

Annex A: Incremental cost analysis

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

1. Overview

The **Project Development Objective.** To protect transboundary waters in the Niger and Senegal River Basins through elimination of POPs pesticide-use and substantial reduction and elimination of other toxic pesticides used in agriculture; while augmenting agricultural productivity and net economic benefits to farmers.

The **Project Purpose (immediate objective).** To demonstrate best practices for contaminant prevention and increased agricultural productivity through participatory farmer-education approaches.

The principal project **outcomes** and **results** will be: (i) Stakeholder awareness is raised through establishment of baselines on pesticide use and farm-level production statistics as well as through policy studies on pesticide use and current pesticide legislation at national and regional levels. Partnerships developed with government structures, NGOs and Farmer Organizations (FOs) at local, national and regional levels; (ii) Stakeholders are alerted to the type and level of threat to humans and environment from pesticide-contaminated waters through the first high-quality assessment of the two principal rivers and associated irrigation and drainage systems; (iii) Toxic pesticide use is drastically curtailed, POPs pesticide-use is eliminated, and agricultural productivity and profitability are substantially increased in all three cropping systems (rice, vegetables, cotton) through participatory training and adoption of Best Practices for agriculture. Community-level pesticide-monitoring systems in place and examples of successful self-financed FFS seen in each country; and (iv) Communities sharing the same river-basin hydrological resources communicate the results of Best Practices and contaminant reduction activities through inter-community communication and exchange networks.

The project will substantially reduce the on-the-ground use of chemical pesticides and eliminate the use of POPs pesticides (black-market dieldrin), and create mechanisms and capacity to inform and to demonstrate alternative agricultural methods for broader dissemination of improved-productivity and sustainable-farming practices in the sub-region. The project will provide needed feedback from the field level to national and regional structures charged with pesticide legislation and create community-based pesticide monitoring systems. Outputs and outcomes from the project will be disseminated to other sub-regions in Africa and to other continents through the FAO Global IPM Facility's hub of activities world-wide.

The GEF Alternative will achieve these objectives and results at a total **incremental cost** of US$ *9.31 million*, with a proposed **GEF contribution** of US$ 4.48 million (including Block B resources) and **co-financing** of US$ 4.83 million from the following sources: (i) FAO: $ 369,350 (PDF-B) and $ 391,427 in-kind; (ii) (Bilateral—Netherlands redirected): $ 2.8 million; Swedish government redirected: $267,000, and (iii) Governments of the six participating countries: $999,734.

2. Current Threats to Human Health and Environment

The use of agricultural pesticides by small-holder farmers in the valleys of the Senegal and Niger Rivers give rise to serious human and environmental health risks. The PDF-B water samples from three sites along the Senegal River show that communities are drinking and bathing in water that would be unacceptable in Europe and North America. Results show a POPs insecticide (dieldrin) as the fourth most

frequently detected pesticide during this 10-month sampling effort. Together with market survey data showing dieldrin present on the black market, ecotoxicologists suggest dieldrin is still being actively used. While the overall pesticide-use data from the PDF-B suggest risks exist to human health, use of simulation models point to even higher risks for the aquatic biota, with probable negative outcomes for food chains and high-biodiversity sites of the riparian countries. Nineteen pesticides were detected at levels above acceptable limits, and, of these, ***40% were detected at levels greater than 100 times the Dutch Maximum Tolerable Risk (MTR) level*** (a measure of risk associated with aquatic biota). The aquatic groups at greatest risk are the aquatic insects, fish and crustaceans. The active compounds responsible for this potential ecological impact in the irrigation systems include dieldrin, dichlorvos, ethion, monocrotophos, lindane, deltamethrin and endosulfan. The recent developments of a locust plague since 2004 have caused an additional influx of donor-supplied pesticides that, if we are to draw lessons from history, could well find their way into the hands of farmers across the sub-region. These locust pesticides are oil-based, highly concentrated ULV formulations not intended for use by farmers and pose an additional threat to farming communities and riparian habitats along the course of these two major rivers. The water samples analysed over the course of the PDF-B provide a useful baseline prior to the subsequent locust-control activities in the region.

Several **barriers** impede the adoption of approaches that would lead to improved environmental and human health conditions and a more productive and sustainable use of agricultural resources. These barriers are not likely to be addressed simply through government decree or changes in import regulations. These main barriers represent forces driving continued high-intensity chemical use, and include; (i) a fundamental lack of education within rural communities, including a lack awareness of negative externalities associated with pesticide use in terms of the negative effects on basic ecosystem services (clean water, pollination and natural pest control) leading to negative consequences for agricultural productivity and profitability, as well as human and environmental health, ii) an absence of national capacity for environmental monitoring and enforcement, iii) lack of awareness of economically and environmentally attractive alternatives to current agricultural production models, and (iv) a long-established presence of a commercial agro-chemical industry (local and imported), bringing commercial pressure to bear for continued sales and use.

3. Baseline Situation and Rationale for GEF Funding

Baseline Benefits and Rationale for GEF Funding. The activities foreseen in the baseline scenario will mostly produce limited, uncertain and unevenly distributed national benefits through continued promotion of conventional agricultural technologies (see list of major baseline programs in **Table 1** below). Baseline trends are towards increases in inputs of pesticides and, to a lesser extent, chemical fertilizers, with subsequent continued deterioration in terrestrial and aquatic biodiversity, continuing loss of soil fertility and increasing incidents of human and animal poisonings. In most areas yields have stagnated and, along the Senegal River Basin, farmers are abandoning rice production as a response to poor market conditions and slight profits to which high pesticide costs contribute. The baseline scenario's contribution to improved water-quality monitoring has, until recently, been nil. With the recent locust control campaign there is now a limited (6 month) effort by international donors, in partnership with CERES/Locustox, to monitor pesticides used against locusts on non-target species (termites, ants, birds) and water. This current effort benefited from the PDF-B studies, which were done prior to the locust outbreak and therefore constitutes a baseline estimate of water quality along selected points on the Senegal River.

The proposed project represents an essential step in providing assistance to the countries to drastically reduce use of agricultural pesticides and associated dispersal into the environment (including some remaining POPs substances—dieldrin—still found in black markets). The project is complementary to initiatives already developed in the region, especially the aforementioned IPPM Programme in West

Africa, but also complementary to conventional agricultural research and crop protection and extension activities. The project will facilitate the development of ecologically-sound and economically beneficial agricultural production systems that will provide greater benefits to farmers, local communities and countries. To a limited extent the project will have global environmental benefits through elimination of dieldrin (a POPs pesticide), protection of aquatic ecosystems and conservation of important regional refugia for biological diversity, including stop-over points for European migratory birds.

A host of factors contribute to the health risks faced by local populations, including principally low educational levels of the populations; lack of awareness of risks to environmental and human health associated with pesticide use; lack of access to alternative, clean water sources; lack of protective measures; irresponsible packaging of pesticide formulations without hazard labelling and the practice of buying cheap pesticides of questionable and probably fraudulent origin (ENDA-Pronat et al. 2001).

Reversing this situation will require investments in the development of appropriate strategies that take into account global environmental values and institutional frameworks, including on-the-ground interventions associated with environmentally sound agronomic alternatives, while incorporating global environmental concerns into the actions of public and private actors. It will also require the development and adoption of methods and practices that help smallholders and communities to monitor and evaluate pesticide-use activities. Results will be demonstrated and benefits shown to local as well as national, regional and global stakeholders. In light of the river basins' transboundary nature, their rich bio-physical features (high species richness in the largest floodplain zone in Africa, including multiple Ramsar sites) the governments of the six participating countries have expressed their interest in securing assistance from the GEF.

GEF resources would be used to undertake additional activities to capture benefits for local, as well as a regional and global nature. The programmes listed in the table below comprise the baseline scenario. Given the transboundary impacts, the urgent need to remove the above-mentioned barriers to the use of best practices, and the negative externalities associated with the use of agricultural pesticides, the project would provide national, regional and global benefits.

Baseline costs. The existing baseline investment comprises: a) information and awareness raising activities (in the form of conventional extension activities), estimated at $16,126,000; b) the (currently limited) assessments of freshwater contaminants, estimated at $1,096,000; c) testing and adapting alternative agronomic and pest control methods (again, the baseline being mostly in the form of conventional research, including research on pesticides, and extension services and associated infrastructure, except for innovative work being done by some NGOs) estimated at $79,200,000; developing community networks (currently based on conventional extension methods except for the Netherlands funded IPPM program), estimated at $2,400,000; and support for project coordination and management of $100,000.

Table 1. Baseline Initiatives Related to Project Components

Baseline Projects and Programmes	Main Sources of Funding	Project Components			
		Awareness Raising and Establishing Baselines	Assessments of Freshwater Contaminants	Developing Best Practices for Contaminant Prevention	Developing Community Networks
Regional Programmes					
IPPM Programme in West Africa (redirected as co-financing)	Dutch government	X		X	X
Locust Environmental M&E	Swedish government		X		
CILSS and Humid-country Regional Pesticide Registration Committees interventions	Industry fees; multiple foreign assistance donors; national CILSS states	X	X		
National Programmes					
Mauritania: Regular programmes of "Crop Protection" and "Rural Extension"	Government Mauritania	X		X	
Senegal: Crop Protection Service Programme SAED Programme (rural extension on irrigation in the Senegal River) ENDA Tiers Monde (NGO)'s Plant Protection programme	Government Senegal; and multiple foreign assistance donors	X		X	 X X
Mali: - Regular programmes of Rural Extension : *Direction Nationale de l'Appui au Monde Rural* - DNAMR) and Crop Protection Service - Extension programme of the Office du Niger (irrigated rice & vegetables) - Malian Cotton and Textile Company (CMDT)	Government of Mali private sector	X X		X X	
Guinea - Regular programmes of Rural Extension and Crop Protection - Pesticides program	Government of Guinea & Japanese government	X	X	X	
Niger Crop Protection Service Programme *Benin: Rural Extension programme*	Government of Niger Government of Benin	X X		X X	

4. GEF Alternative Scenario

The project is designed to build in a complementary way on the baseline activities throughout the sub-region, covering two international river basins, to substantially reduce the use of moderately toxic and highly toxic chemicals for agricultural pest control, resulting in local, regional and global benefits. The project will assist countries to meet their obligations under the Stockholm Convention on Persistent Organic Pollutants. The **alternative scenario** consists of the implementation of actions needed **to remove barriers to the promotion of sustainable agricultural best-practices** throughout the six countries of the sub-region. This would result in, besides increased direct economic benefits to farmers, substantially reduced use of hazardous pesticides, which pose high risks to the environment and human health in the international basins of the Senegal and Niger Rivers. The project will substantially increase knowledge and raise awareness in the agricultural sector at community, inter-prefecture, national and regional levels, with the end result of promoting a major shift in farming practices towards more sustainable, productive and profitable methods that will result in major reductions in the use of chemicals for pest control and significant increases production levels, profit and knowledge for farmers. In addition, the project will generate local and regional capacity, lessons-learned and training curricula that will be replicable in other areas of the region and globally.

Global Benefits and Incremental Costs. The global benefits comprise: substantial reductions in the use of agricultural pesticides; assisting the participating West African countries to accelerate compliance with the goals of the Stockholm Convention; substantially reduced contaminant loadings on the transboundary Senegal and Niger Rivers; reduced degradation of soils and reduced contamination of foodstuffs, both agricultural and fisheries, derived from the sub-region and reduced anthropogenic stress on indigenous organisms in the two drainage basins, thereby reducing threats to biodiversity and improving human health. These benefits are reflected in the assignments of GEF alternative cost to project components in Table 2 below (Incremental Cost Matrix). A brief description of specific objectives, benefits and incremental cost associated with each project component are summarized below.

Component 1- Awareness Raising and Establishing Baselines: The activities under this component are designed to increase awareness within the 30 project sites and among national stakeholders of the risks posed by pesticides to the environment and to human health. The approach used here is to provide an appreciation of local effects and adverse impacts on the health and livelihoods of the communities in the sub-region as well as awareness of the existence of feasible alternative agronomic methods reduce or eliminate toxic loads and increase yields and profitability. National-level pesticide socio-economic studies will provide support to national and regional policy initiatives. Links to the CILSS *Comité Sahelien des Pesticides* (CSP) for Senegal, Mauritania, Mali and Niger, and the *Comité Phytosanitaire des Pays de la zone Humide de l'Afrique de l'Ouest et du Centre* (CPH/AOC) for Benin and Guinea, will provide needed feedback from the community level to these regional pesticide review and registration services. The proposed incremental cost is US $1,512,006 with GEF contribution of US $805,076. Incremental co-financing costs represent counterpart government contributions of an estimated $ 250,000 and contributions from existing FAO led initiatives (re-directed baseline for Netherlands IPPM project) in the sub-region totalling an estimated $456,930.

Component 2 - Assessments of Freshwater Contaminants: This component will provide high-end scientific water-quality detection of toxic compounds in aquatic systems from the CERES/Locustox laboratory in Dakar, in collaboration with existing laboratories in those member countries that have established competencies to assist in the sampling and analytical work and with strong partnership with Oregon State University, who will lead the introduction and training for new field and laboratory techniques. New, so-called "passive sampling devices" (PSD) will be used to sample surface waters from the target communities from the six countries and the samples (light-weight, resistant plastic) will be shipped to the Dakar Locustox laboratory. Analytical results will be used together with baseline

survey information related to community water use and contact, to calculate quantitative Human Health Risk (HHRA) estimates to be used further in simulation models coupled with satellite imagery to estimate short, medium and long-distance (transboundary) transport and fate of the chemical pollutants. The results formulated into reports and training materials appropriate for audiences at several levels (community, national and international). This component thus constitutes the first of two core project activities and is intended to provide what will be the first serious quantitative look at the risks posed by agro-chemicals to poor rural communities in West Africa. The outcomes will provide a measure by which the second core set of activities—Farmer Field Schools—will in part be evaluated for its ability to reduce the quantity and impact of agrochemical toxins in the environment. The estimated incremental cost is US $ 2,246,248, with GEF contributions of US $1,140,269. Incremental co-financing costs represent counterpart government contributions of an estimated $100,000 and contributions from existing FAO led initiatives (re-directed baseline for Netherlands IPPM and Swedish environmental impact projects) in the sub-region totalling an estimated $1,105,980.

Component 3 - Developing Good Practices for Agricultural Production: The incremental costs are aimed to extend demonstrations of the effectiveness and benefits of alternative agronomic systems, including pest control, to a target of 30 "clusters" of rural communities along the two river basins and to establish community-based pesticide monitoring systems. A "cluster" is defined to be a group of communities (villages and towns) that share the same water resources in fairly close proximity. The incremental nature of the GEF Farmer Field Schools relates to the emphasis and focus on an ecological view of farming in riparian habitats, with the goal of raising awareness among communities of the multiple free benefits derived from largely unknown or under-appreciated ecosystem services (clean water, aquatic foodwebs leading to consumable aquatic resources, natural pest control, pollination, etc.). The GEF increment also relates to an ecosystem approach of motivating changes in behaviour of multiple villages who share common hydrological resources (whereas prior FFS initiatives target a scattering of villages with no ecosystem-based strategy). Direct farmer involvement in hands-on learning through small-group based experimentation has proven to be the most effective way by which local communities can best appreciate the benefits of, and make the shift to alternative production methods. This component thus constitutes the second of two core project activities and is intended to foster the broader adoption of alternative agricultural practices throughout the sub-region. The estimated incremental project cost is US $ 2,726,005, with GEF contribution of US $ 1,265,566. Incremental co-financing costs represent counterpart government contributions of an estimated $250,000 and contributions from existing FAO led initiatives (re-directed baseline for Netherlands IPPM project) in the sub-region totalling an estimated $1,460,440.

Component 4 - Developing Community Networks: This component has the purpose of disseminating the expertise and awareness gained by target communities in regard to both the existence and risks due to agrochemicals in water, as well as the existence and benefits of alternative agronomic practices to members of neighbouring (up-stream/down-stream) communities. Community exchange will explore the existence and importance of the "free" ecosystem services provided by shared hydrological resources (clean water, fish, birds and a multitude of consumable aquatic resources). In order to capture a substantial environmental benefit, all communities sharing the same immediate catchment resources must adopt low-toxic-load practices. Once accomplished, further exchanges beyond the immediate catchment areas will help motivate "upstream-downstream" communities further along the paths of the two rivers. There have been only a very few activities involving exchanges of farmers between countries (during the Netherlands-funded IPPM project with exchanges between cotton-growing districts of Burkina Faso and Mali, among others); however, the outcomes have been encouraging. The estimated incremental cost is US $ 1,132,005 of which US $ 505,076 is GEF contriubtion. Incremental co-financing costs represent counterpart government contributions of an estimated $250,000 and contributions from existing FAO led initiatives (re-directed baseline for Netherlands IPPM project) in the sub-region totalling an estimated US $376,929.

Component 5 - Project Coordination and Management: The estimated incremental cost of coordination and management is US$ 947,225, of which US$ 389,344 is requested from the GEF to meet these costs. Incremental co-financing costs represent counterpart government contributions of an estimated $149,683 and contributions from existing FAO led initiatives (re-directed baseline for Netherlands IPPM project) in the sub-region totalling an estimated US $408,198. This represents contemporary costs of project coordination in the region.

Incremental Cost Matrix (US $)

Component	Category	Amount	Domestic Benefits	Global Benefits
Component 1 Awareness Raising and Establishing Baselines	Baseline	$16,126,000	Increased literacy, facilitating the feasibility and implementation of complementary information and awareness raising programmes	Limited awareness of risks associated with pesticide use, though not considering broader environmental issues related to pesticide use and water quality
	Alternative	$17,638,006	As above plus improved public and farmer education in environmental and human health risks associated with pesticides. Greater public commitment to the sustainable agricultural practices.	Improved community appreciation of the hazards associated with the use of chemical pesticides and associated risks to human health, environmental quality, land degradation and biodiversity. Enhanced public acceptance and commitment to the process of reducing POPs use and releases to the environment and the aims of the Stockholm Convention.
	Increment	$1,512,006	*Note: GEF contribution of $ 805,076*	
Component 2 Assessments of Freshwater Contaminants	Baseline	$1,096,000	Limited monitoring (one year, 2 countries) of pesticide contamination in vegetation and target species (termites, ants, birds) under the locust control programme	
	Alternative	$3,342,248	As above plus expanded water-quality monitoring to include 6 countries over the four-year duration of the project and modelling of impacts on humans and aquatic environment	Demonstrating to governments the potential long-term value and necessity of establishing monitoring systems for freshwater resources.
	Increment	$2,246,248	*Note: GEF contribution of $ 1,140,269*	
Component 3 Developing Best Practices for Agriculture and Contaminant Prevention	Baseline	$79,200,000	Costs for conventional government crop protection and rural extension services in the sub-region. Continuing trends toward conventional, high input/low-knowledge methods, which pay little attention to farmer education. New initiatives in IPPM training, although without inclusion of human and environmental health components related to pesticide use, and without focus on capturing entire complement of communities associated with the same water catchment area.	
	Alternative	$81,926,005	As above plus identification and proving of sustainable farming methods under local conditions	Identification of farming methods and development of participatory (FFS)

			and with local farmer and community involvement. Selection of improved-yield farming methods for broader national application within the sub-region. National cadres of farmer trainers available for even wider demonstration and dissemination of alternative procedures for agriculture in the sub-region. Knowledge of and experience with community level monitoring for surveillance and compliance purposes that has potentially broader application.	curricula on new topics (water, environment, pesticides, health, SRI, aquaculture) for wider dissemination through FAO's global network. Reduced environmental dissemination of pesticides in the agricultural sector of the sub-region. Reduced contamination of transboundary water resources. Increased public commitment to achieving the goals of the Stockholm Convention.
	Increment	$2,726,005	*Note: GEF contribution of $1,265,566*	
Component 4 Developing Community Networks	Baseline	2,400,000	Networks developing from multiple efforts in the sub-region to support Farmers Organisations.	Growing examples of positive negotiating and advocacy power of organized groups of farmers
	Alternative	$3,532,005	As above plus improved consultation among communities and countries in the sub-region. Enhanced capacity and greatly improved popular commitment to reduced chemical-use and to sustainable farming practices.	Lessons to learn on establishment of consultative mechanisms established for accelerated reduction of toxic pesticides from farming systems in developing countries.
	Increment	$1,132,005	*Note: GEF contribution of $ 505,076*	
Component 5 Project Coordination and Management	Baseline	$100,000	Very preliminary activities in support to the preparation of National Implementation Plans for POPs	Limited contribution to comply with the Stockholm Convention provisions
	Alternative	$1,047,225	Improved capacity for project management at national and regional levels. Improved experience and expertise of national agencies involved in chemicals management activities and the preparation of National Implementation Plans (NIP) for POPs.	Experience in practical applications of measures for reducing pesticide use in developing regions of the world. Experience in community consultation activities and networks. Increased outreach and involvement of civil society in implementing management programmes to reduce the use of POPs and its release to international water bodies
	Increment	$947,225	*Note: GEF contribution of $389,344*	
Totals	Baseline	$98,922,000		
	Alternative	$108,227,340		
	Increment	$8,563,490	*Note: GEF contribution of $**4,105,330***	
PDF-B	Increment	$741,850	*Note: GEF contribution $372,500*	
Total Increment		**$9,305,340**	*Note: GEF contribution of **$4,477,830***	

Annex B: Logframe matrix

Project Planning Matrix (PPM)	**Project title: "Regional** (Benin, Guinea, Mali, Mauritania, Niger, Senegal): **Reducing Dependence on POPS and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management"**	**Phase: 05/2008 – 04/2012**

Objectives	**Objectively Verifiable Indicators**	**Means of Verification**	**Critical Assumptions & Risks**
Development objective: To protect transboundary waters in the Niger and Senegal River Basins through elimination of POPs pesticide-use and substantial reduction and elimination of other toxic pesticides used in agriculture; while augmenting agricultural productivity and net economic benefits to farmers			
Project Purpose (immediate objective): To demonstrate best practices for contaminant prevention and increased agricultural productivity through participatory farmer-education approaches.	By end of project measurable outcomes will be documented within the broader communities, specifically: • Pesticide use reduced overall by at least 50% and POPs use entirely eliminated • Yields of all target crops in participating communities up by at least 20% overall average • Net income of participating farmers increased by at least 40% average • Contaminant loads in irrigation and drainage systems reduced • Community-based monitoring systems for pesticide use developed and used by all 30 target communities by 2012 • Evidence of development of self-financed FFS • National policy studies completed by the mid-term report and serve to generate at least two policy recommendations in the four countries for which studies do not yet exist.	• Project monitoring and evaluation • Independent Impact Studies (University of Hanover) • Reports from CERES/Locustox on pesticide loads in water along the two river basin systems • Other project reports documenting adaptation, and adoption of project methods, yields and profitability	
Outcome 1: <u>Awareness Raising and Establishing Community Baselines</u> Stakeholder awareness is raised through establishment of baselines on	1.1 Appropriate government structures, NGOs and Farmers Organizations fully engaged in conducting participatory training for farmers in sustainable best practices by 2012;; 1.2 Overall picture of riverine contaminant levels, types and data on farmer pesticide practices provided by project feedback to appropriate national structures and regional pesticide	1.1 Project reports; 1.2 Correspondence, reports;	Partnerships agreed to by governments and regional structures;

pesticide use and farm-level production statistics as well as through policy studies on pesticide use and current legislation at national and regional levels. Partnerships developed with government structures, NGOs and Farmer Organizations (FOs) at local, national and regional levels	regulation structures (CILSS CSP and CPH/AOC); 1.3 Baselines established for 30 communities and results discussed. Data serves also as baseline for evaluation of project outcomes at mid-term and end of project (M&E); 1.4 National policy studies completed by the mid-term report and serve to generate at least two policy recommendations in the four countries for which studies do not yet exist.	1.3 Surveys available and used by M&E and independent impact study; 1.4 Study reports, workshops conducted and recommendations submitted ;	
Outcome 2: <u>Assessments of Freshwater Contaminants</u> Stakeholders are alerted to the type and level of threat to humans and environment from pesticide-contaminated waters through the first high-quality assessment of the two principal rivers and associated irrigation and drainage systems	2.1 A clear picture of contaminant levels along the Senegal and Niger rivers provided by water samples in at least 30 locations in six countries; 2.2 Overall project progress and outcomes provided to governments and others from project database including geo-referenced data (GIS) ; 2.3 Relative risks to farmers and aquatic environment from exposure to pesticides estimated from at least three simple empirically based modeling approaches; 2.4 Novel curriculum suitable for use in Farmer Field Schools in sub-region and beyond derived from contaminant analysis and modeling efforts;	2.1 CERES/Locustox sample reports; 2.2 GIS project database; 2.3 Modeling outputs and consultant reports; 2.4 Curriculum available;	Continued solvency of the CERES/Locustox Foundation
Outcome 3: <u>Developing Best Practices</u>; Toxic pesticide use is drastically curtailed, POPs pesticide-use is eliminated, and agricultural productivity and profitability are substantially increased in all three cropping systems (rice, vegetables, cotton) through participatory training and adoption of Best Practices for agriculture. Community-level pesticide-monitoring systems in place and examples of successful self-financed FFS seen in each country.	3.1 Farmer Field School curricula expanded to include modules on ecosystem services, ecological functioning, community-based mapping and contamination risks to hydrological systems and aquatic environments. Also expanded to include new modules on SRI and irrigated aquaculture by 2012; 3.2 Regional capacity for participatory training augmented by total of 150 “technician” trainers and 300 farmer trainers by 2012; 3.3 Lessons learned and curriculum developed during the course of the project shared across all six countries by 2012; 3.4 Substantial participation by women in FFS assured: at least 50% in market gardening, 30% in rice and 20% in cotton by 2012; 3.5 Community-based monitoring systems for pesticide use developed and used by all 30 target communities by 2012; 3.6 At least two new FFS conducted by local farmer-facilitators in neighbouring communities by 2012. At least 3 self-financed FFS successfully up-and-running in each country by 2012.	3.1 curriculum available; 3.2 National project reports and M&E; 3.3 National project reports and M&E; 3.4 National project reports and M&E; 3.5 National project reports and M&E; 3.6 National project reports and M&E;	Limitations of capacity at a national level pose a certain risk in some countries.
Outcome 4: <u>Developing Networks</u>;	4.1 Communities disseminate experiences and knowledge gained	4.1 National project reports and M&E;	

Communities sharing the same river-basin hydrological resources communicate the results of Best Practices and contaminant reduction activities through inter-community communication and exchange networks	during project to neighbouring communities in the form of at least one "open door" (inter-community meeting) per location; 4.2 Networks of IPPM farmer facilitators maintain quality and timeliness of information to farmers through exchanges at local, provincial, national and subregional levels.	4.2 National project reports and M&E;	

ACTIVITES	

Outcome 1. Awareness Raising and Establishing Baselines

1.1 Conduct consultation and planning meetings at all levels:
- 1.1.1 Conduct first regional planning meeting with Regional Technical Steering Committee (RTSC) to review details of project start-up plan;
- 1.1.2 Conduct 6 National PSC meetings;
- 1.1.3 Conduct site visits to meet with local governments, communities and other local stakeholders to inform them of the project;

1.2 Meet with CILSS CSP and CPH/AOC structures to discuss information exchanges

1.3 Conduct baseline community surveys at 5 project sites in 6 countries:
- 1.3.1 Establish survey partners with local appropriate community-based organizations and seek community members to participate as additional surveyors ;
- 1.3.2 Conduct joint training for survey and agree on survey form and content;
- 1.3.3 Conduct survey and compile results;
- 1.3.4 Conduct water quality tests to detect pesticide levels in collaboration with Locustox and ENDA;
- 1.3.5 Bring overall results back to the communities for review and validation

1.4 National policy studies completed and national workshops held to discuss outcomes:
- 1.4.1 Determine and hire local and international consultants to carry out studies;
- 1.4.2 Develop TOR for study;
- 1.4.3 Present and modify study TOR with National Project Steering Committee (NTSC);
- 1.4.4 Consultants to carry out policy study;
- 1.4.5 Study finalized and presented to NTSC and pesticide policy working group (PPWG);
- 1.4.6 PPWG formulates and presents brief set of policy recommendations to the governments, using study as supporting document

Outcome 2. Assessments of fresh-water contaminants

2.1 Sites specified for monitoring contamination in the Niger and Senegal Basins:
- 2.1.1 Sampling plan devised together with NCUs, RCU, FAO and CERES/Locustox staff;
- 2.1.2 Sampling consultant visits general target areas and meet with appropriate government services to gather water-flow and chemical-use data;
- 2.1.3 NCU and consultant presents sampling plan to NTSC for approval;

2.2 Water samples taken and analysed in CERES/Locustox laboratory:
- 2.2.1 National teams trained on sampling methods by CERES/Locustox staff members in country-level workshops;
- 2.2.2 Samples taken from field, conserved and sent do CERES/Locustox;

2.2.3 Samples analysed and results entered into project database;
2.3 At least three simple empirically based modelling approaches explored as means to estimate relative risks to farmers and aquatic biota using results from sample survey
2.4 Results translated into curriculum suitable for use in Farmer Field Schools for discussion of risks to humans and threats to ecosystems;

Outcome 3. Developing Best Practices

3.1 Hold first regional curriculum-development workshop:
3.1.1 Present and review existing curricula for the sub-region;
3.1.2 Create subject-matter sub-groups to address each of the following new topics:
3.1.2.1 ***Pesticide toxicity to humans and the aquatic environment***;
3.1.2.2 Economic implications of pesticide use;
3.1.2.3 System of Rice Intensification (SRI);
3.1.2.4 Irrigated Aquaculture;
3.1.2.5 Water-borne and vector-borne Diseases;
3.1.2.6 Development of Community-based Pesticide-monitoring system
3.2 Conduct two full-season "*Training-of-Trainers*" (TOT) programmes in year one for participants from each country, for rice (Mali) and for vegetables (Senegal);
3.3 Conduct three full-season TOT programmes in year two for participants from each country, for rice (Mali), for cotton (Mali) and one for vegetables (Senegal);
3.4 Conduct Farmer Field Schools in each country;
3.5 Develop with target communities, through FFS alumni and village leaders, monitoring systems for pesticide used;
3.6 Conduct second curriculum development workshop in year 3 to share lessons learned and curriculum developed during the first two years of the project;

Outcome 4. Developing networks

4.1 Develop networks among villages in the same water-use areas (same, shared river, irrigation and drainage systems):
4.1.1 Conduct "Open door" days at the end of each FFS, in which neighbouring communities are invited to witness and discuss outcomes of FFS training, including the nature of toxic risks from pesticides, the existence and increased benefits from alternative methods, and establishment of community-based monitoring systems;
4.1.2 Farmer-Trainers (FT) to work with Technician-Trainers (TT) in neighbouring villages in new FFS aimed at expanding scope of training to eventually include entirety of water-use area;
4.1.3 Annual "Open door" meetings to be held at larger administrative levels for benefit of prefecture and department-level local government and communities;
4.1.4 Representatives elected from target water-use areas meet to discuss possible outcomes of project on larger scales of the river basin;
4.1.5 Some cross-country based exchanges, depending on strategic analysis of greatest likely outcome (most likely in cotton sector)
4.2 Develop networks among facilitators at local, provincial and regional levels
4.2.1 Local workshops held at each level, beginning with the local levels, with representatives chosen to attend workshops next level up;
4.2.2 Newsletter developed for benefit of facilitators and farming communities

Annex C: STAP Review

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

(a) STAP – INDEPENDENT TECHNICAL REVIEW AND RESPONSE OF THE PROJECT TEAM

The project team is grateful to the STAP reviewer for comments to strengthen the contents and presentation of this proposal. Presented below are the responses and/or actions taken, where required, taken in response to the STAP comments (in italic following the STAP comments).

Reviewer: Prof Henk Bouwman

It is with pleasure that I submit this evaluation. I followed the Focal Area-Specific Annotations (International Waters) as Terms Of Reference.

Key issues

Scientific and technical soundness of the project

1. Assess scientific basis of the project: is sufficient information and knowledge available on the dynamics, functioning and structure of the ecosystems covered?

The number of years that the institutional proponents of this project have been active in this region, as well as their close and inherent linkage with the FAO, provides them with probably the best basis of existing data, information and experience in hydrology, geography, agriculture and sociology to execute the project. Although there are likely to be gaps in knowledge and understanding of the two riverine systems, it is unlikely to be a major hurdle.

2. Appropriateness of approach to collect relevant information on sections of society and economy and on the different aspects of the environment, water management and ecosystem.

The Project Brief (PB) covers six countries, and therefore does not contain detailed information on the methodology that will be used for baseline community surveys (#55 and Annex D). It seems presumed that the same methodology will be used as presented in Annex D. It is however, conceivable that there might inherently be differences in how information will be collected in each country, but it would perhaps be appropriate to try and standardize the information gathering per catchment. From experience, as baseline community survey is normally the first field activity (Component 1.3), there seems to be little time available in the first year. Inception of project this size inevitably experience delays in the first year, reducing the time available. Since 1.3 apparently includes ACE tests, this might indeed be a bit ambitious, especially when considering report-back to communities in Component 1.3.5.

Response by the project team*: The team notes this is a valid concern, but feels we are (1) We will be working with a regional partner, ENDA Tiers Monde, who was responsible for the baseline surveys in Senegal during the PDF-B and who has a long history of similar work with communities in the sub-region; (2) the training of survey personnel is not a lengthy process; we have scheduled 9 months to conduct the work. The first FFS will take place during the same period, but these will be Field Schools attached to the Training-of-Trainers and limited in number and located in only Mali and Senegal. The baseline survey work in these TOT-associated FFS will take place as part of TOT training. We agree that it will be desirable to standardize the survey methods as much as possible, however leaving room for modification (learning from new experiences that arise during the course of the work). The sample size per location will be 100 farmers, or 500 farmers per country. The ACE testing will of course be a much smaller subset of this, the size to be decided on during early meetings with all stakeholders*

involved. The report-back to the communities, as with the PDF-B, will be at the end of the training for any particular group as part of an overall reflection by the communities on changes resulting from their involvement in the project (hence the term "baseline"). The report back should not, therefore, inflict a time constraint.

Nowhere in the PB could I find indications of target number of interviews for Component 1.3. This presumably is dependant on the conditions in the five different project sites, but It seems appropriate to provide some estimates in this regard.

***Response by the project team**: As stated above, the target is 100 farmers per community, as per the PDF-B*

It is also not clear how Components 1.3 and 1.4 will interact, since 1.4 recruits consultants in each country in the second year (2007) to do the studies, while surveys are already planned for the first year (2007) – therefore, who will do 1.3?

***Response by the project team**: Some confusion exists here as 1.4 refers to policy studies and not baseline surveys. The consultants for 1.4 are not the same as those in 1.3*

3. Does the project fully determine which sectoral changes are needed to achieve the goals of the OPs?

It seems appropriately addressed, taking the complexity of executing this project in six different countries into account (#53).

***Response by the project team**: Agreed*

4. Has the issue of inter-comparability of data been addressed?

The inter-comparability of data is addressed for at least the pesticide analysis, since this will be done by one laboratory. The other data gathering activities seem to assume comparability, but experience again has taught me that complete comparability might not be achievable, and a measure of variation between countries could be allowed. However, specific components of comparable data gathering should be aimed for, especially at the beginning, placing a question mark again over the ambitious activities planned for the first year.

***Response by the project team**: Agreed. The baseline data will seek to establish a minimum set of measurable indicators. Additional types of questions will be allowed for as each community will raise some different issues. The variation in this regard is part of the result sought (e.g., what are the range of issues and scope of pre-existing knowledge regarding contaminant pollution and existing alternative practices across all communities).*

The gathering of base-line data, against which the impact of the project will be measured, might need longer time than anticipated, since training is already anticipated in the first year (Component 2.2), which overlaps with Component 3.1.

***Response by the project team**: Addressed above: first year's training of farmers is only in the context of a limited number of FFS attached to TOTs*

Presumably, the RPCU, together with the NPCUs will manage comparability, and this task could be included in #76, and referred to in #55.

***Response by the project team**: Agreed*

The development of a community-based pesticide-monitoring system will probably also need a measure of guidance from a regional level, to achieve comparability in philosophy, application, training and monitoring, to achieve some form of comparability.

***Response by the project team**: Agreed, although again we will be seeking creative ideas from the communities themselves and some measure of variation must be allowed for—these will be <u>their</u> monitoring systems.*

5. Analysis of the interlinkages between water-related environmental issues and root causes behind different environmental problems.

This has been done adequately, and is based on a good history and body of knowledge acquired over the years (such as in Annexes E and F, as well as in a number of reports). This project therefore does not need to assume a problem, but already has data to describe its extent.

***Response by the project team**: Agreed, although some questions still stand, such as the degree to which dieldrin contamination in water is due to recent applications compared with an amount due to leaching from prior depositions or leakage into river systems from obsolete stocks. To partition this will be a challenge. The experts agree there is strong evidence for recent applications having taken place. More broadly speaking, the root-cause analysis is a technique we intend to introduce, in an appropriate form, to the communities.*

6. Are the tools and methodologies for TDA and SAP clearly stated in the project?

As the PB format does not specify this explicitly, but rather implicitly, it is difficult to judge. Annex J addresses the Root Cause Analysis, and as far as I can judge, this is complete and sufficient. The transboundary issues are recognised, and although it might be implicit in the design, a stronger statement(s) on how these will be addressed could be included. Since it is likely that indications for transboundary transport of pesticides via the two rivers will be identified, the means of communicating these findings, as well as analysis of the implications thereof would also be appropriate. The possible role of the CSP and this project in this matter could perhaps be mentioned? (perhaps in # 33, 89, 90, 91 and or somewhere in Component 4 or 5 in)

***Response by the project team**: Acknowledged. Changes made in paragraph 19,*

7. Does the project determine what type of measures is needed to ensure that the ecological carrying capacity is not exceeded?

The aim of the project is the eventual reduction in dependence on agro-chemicals. Although it could mean a reduction in the amounts (mass or volumes) of pesticides used, there might be three additional implications that need to be considered:

- More toxic pesticides could be used, which means less need to be applied, but the overall toxicity applied could remain the same or even increase.

***Response by the project team**: The stated objective is to reduce total volume and toxicity of chemicals used. The argument for less amounts needed of more toxic pesticides doesn't come into the picture given that good non-toxic alternatives to virtually any situation have been proven to exist. Besides elimination of all POPs pesticides, the stated goal is to dramatically reduce or eliminate pesticide use of WHO category Ia, Ib and II.*

- Alternative Best Practices might have its own inherent impacts, such as the need to clear more lands or require more irrigation, and therefore impact on water quantities, or even quality, and may therefore not be "Best" practices.

***Response by the project team**: Acknowledged as theoretically possible, but again experience shows that "real" best practices do exist. For rice culture, "biologically intensifying" production means farmers will likely use less water. As they should be gaining substantial yield increases we might even see a drop off in the amount of land cultivated as farmers may wish to reduce their scales of production to meet market realities.*

- The training of farmers to better apply pesticides might actually increase the demand for pesticides. This was the experience in South Africa, with farmer training in the safe use of pesticides.

These, and possible other (even unintended) impacts need to be anticipated, measured where appropriate, and documented as part of each national activity.

***Response by the project team**: The so-called "safe-use" campaigns are a promotion of umbrella groups for the pesticide industry, notably Crop Life International; therefore it's not surprising to see that pesticide use could increase under their programs. However the GEF programme is not a "safe-use" program, rather a move towards drastic reduction or elimination of as many types of highly toxic synthetic pesticides as possible. The only pesticides anticipated to be used/promoted would be non-toxic biologicals (neem extract, Bacillus thuriengensis, metarhizium, etc.). We will not be promoting, for example, highly toxic biologicals (e.g., tobacco extracts) as these are equivalently dangerous for the handler, if not the environment.*

Again, experience in many other areas of the world has shown the feasibility of real reductions in chemical use.

8. Assessment of adequacy of the scope of the project.

This is an ambitious project, and needs to be, to address the needs of the region and reduce the impact of misuse. I am still concerned with the timetable (Annex H), especially the activities planned for in the first year. Extension of some of the activities into 2007 should be anticipated (such as 1.3 and 2.2, and by implication ors such as 3.2).

***Response by the project team**: Agreed and modifications to time table have been made (extension into 2007 for 1.3). As noted above, however, the first TOTS will be held regionally in two countries that already have capacity and experience in doing such training (3.2). The training of teams to take water samples in all 6 countries is more subject to possible uncertainties, although Locustox is currently undertaking similar regional sampling work as part of a short-term (6 month) environmental analysis of pesticide residues from recent locust-control campaigns. They also have prior experience with these same countries for analysis of export vegetables and fruits. The sampling procedures are straight forward.*

The putting together of the National structures is a time consuming task, as it seems that many people will be involved. Nowhere (that I could see) is an indication or estimation given on the number of people directly involved, at the project sites.

***Response by the project team**: First note that the "30 sites" will comprise more than one village each. Each site will be defined based on the hydrological construction of irrigation perimeters such that the communities involved share the same water resources. The number of villages will therefore vary somewhat depending on the size of the perimeter, although efforts will be made to ensure that small-to-moderate perimeters are chosen. The composition of on-site teams in the field will revolve principally around three activities: i) initial diagnostic surveys—including the NGO surveyors and cooperating community members who will be trained in survey techniques (2 per village), ii) training—which will involve 150 technician trainers (TT) (government, parastatal, NGO, Farmer Organizations) and 300 farmer trainers (FT). Each site therefore will have 5 TT and 10 FT and a total potential of 40 Field Schools over the four years of the project. This is an ample number to assure all*

villages are engaged and multiple cropping seasons (e.g., rice and then vegetable seasons), and iii) Monitoring and evaluation—which will entail periodic visits by senior trainers (focal points) and PCU personnel.

9. Are the proposed technologies adequate to the regional socio-economic profile?

Yes.

***Response by the project team**: Agreed*

10. Could the proposed technologies pose environmental threats?

The proposed project is most likely to reduce the level of threat, but care should be taken as mentioned in 7. Another possibility would be the improvement of the production capacity of some sites during good years, but this capacity might still be limited during drought years. This does however, not take away or reduce the need for this project.

***Response by the project team**:* Agreed

- Question related to the use of technology

11. To what extent will technological innovations be used to support the project?

No development of new Best Practices seem to be envisaged, but the innovation is the combination of Farmer Field Schools with training, IPM and a community-based pesticide-monitoring system. Lastly is a new aspect worked into the PB, but seems not to be included in the Logframe (Annex B, unless 4.1.1 is meant), nor as a key performance indicator in Annex L. Since this is quite an innovation, I suggest its inclusion in both, and possibly elsewhere, where appropriate. Although this is an innovation, I could find little indication as to which level of organization will look after it, or provide guidance. This component might place a burden on the National groups, if they do not have the training or capacity.

***Response by the project team**: The village-level pesticide monitoring sub-component is now taken into account in 3.5. As stated, it will be a broadly collaborative effort to design methods appropriate for each location. This is indeed a new (innovative) sub-component whose feasibility has yet to be proven. We are confident, however, that if the process of design is correct (i.e., a sufficient balance of external and internal expertise, along with a strong community participatory framework) that solutions will be found. Openness and the capacity to share information on successes and failures (in the spirit of adaptive management) at all spatial scales will ensure additional efficiency. Other innovative training components will include a locust biology and crop protection training component (added since the STAP review) and an SRI (System of Rice Intensification) component, which is new for the FFS curriculum. Otherwise, no single element is in itself entirely "innovative" as all have been tried before in our experience. What is unique is the combination of techniques, which is really what is being tested here.*

- Questions related to institutional arrangements

12. Assess institutional arrangements: the role of existing scientific institutions in the development and sustainability of regional mechanism is of paramount importance.

The institutions identified seem adequate, but it is likely that more will be need to be included, including NGO's (#53). This places a heavy organisational duty on the project managers at regional and national levels, and could take a significant amount of time to arrange.

***Response by the project team**: Agreed, but experience in the sub-region gives us already a good list of potential partners. Experience also shows that good projects attract good partners and the overall effect is self-reinforcing.*

- Other questions

1. Is choice of demonstration sites representative and appropriate?

I am not able to judge from the materials at hand, but criteria for selection, or at least reasons for selection should be carefully documented, and presented in appropriate reports. The indicators for each should therefore be appropriate for each site.

***Response by the project team**: The general site selections were made towards the end of the PDF-B phase by national technical working groups from each country. The specific villages chosen and detailed plan of action will depend on a closer look at the hydrological opportunities and constraints. While technical people will be engaged to assist, the community members of the FFS will be given training and tasked to conduct water-flow mapping exercises as part of the late FFS or post-FFS activities. The IPPM/FFS programmes have lengthy experience with community mapping exercises, and curricula exist to aid in the training.*

2. Have any problems been overlooked?

- Again, time in the first year might not be enough for all the envisaged activities.

***Response by the project team**: Already noted*

- There might be educational materials already available through Crop Life or even AVCASA in South Africa, that could be incorporated into the curricula.

***Response by the project team**: The FAO Global Facility is hub for a wide range of FFS-based curricula, and FAO is currently working on expanding this library in collaboration with Wageningen University in The Netherlands.*

- Criteria for appointments (or rules of conduct) at various levels should be drawn up, as conflict of interest might develop if committee members would also be recipients of grants through this project.

***Response by the project team**: Terms of reference for National and Regional Tecnhical Steering Committees have already been drafted (Bamako validation workshop, March 7-8, 2005). Committee members would not be in line for grants and will be entitled to no more than standard FAO transportation and DSA allowances for meetings.*

3. Have issues of conflict been addressed?

See point 2 above.

Identification of the global environmental benefits

1. Does the project address issues that will result in global environmental benefits?

Yes, and adequately described.

***Response by the project team**: Agreed*

2. Are any negative environmental effects anticipated?

See comments above.

How does the project fit within the context of the goals of GEF

1. Does the project fit within the overall strategic thrust of the GEF- funded IW activities to meet the incremental costs of: (a) assisting groups of countries to better understand the environmental concerns of their IWs and work collaboratively to address them; (b) build the capacity of existing institutions; and (c) implement measures that address the priority transboundary environmental concerns?

Yes on all accounts

***Response by the project team**: Agreed*

Regional context

1. With few exceptions IWs projects are multi-country regional projects. Assess the regional scope of the project.

The project addresses the shared concerns of six countries, on a catchment basis, and covers a vast region. The number of people depending on, or the estimated hectares under cultivation associated with the two rivers is not mentioned, and could perhaps be included in the PB.

***Response by the project team**: Acknowledged and adjustments made to main brief. Also, country reports with statistics on land use will be found on-line at www.enda.sn.*

Replicability of the project

1. Is there scope for replication of some of the approaches in other international water bodies?

Replication is possible but it is difficult to judge at this stage. The assessment at the end of the project will be a much better opportunity for this.

***Response by the project team**: Agreed, although the question has received additional attention since the PB was submitted for STAP review and good arguments exist for high likelihood for replicability (see sections on replicability in PB and Executive Summary.*

Sustainability of the project

Sustainability is addressed in the project and all aspects seem to be covered and anticipated. Again a more detailed assessment would only become clearer later on in the project, as there are many factors involved, and the major ones have been identified. The crucial aspect is the willing adoption of alternative best practices and pesticide monitoring by the farmers, which will only happen if these are proven to be advantageous.

The major players have all been identified, and should be assumed to be supportive of this project. The arrangements for this project are also likely to stimulate collaboration and networking. There is already evidence from the PB, that such an effect is already happening through the PDF-B.

***Response by the project team**: Agreed, and the sustainability question has received additional attention since the PB was submitted for STAP review.*

Secondary issues

Linkages to other focal areas

There are considerable linkages to the Stockholm Convention, Biodiversity, SAICM and many others that have been identified. No doubt, more could become apparent later.

Linkages to other programmes and action plans at regional or subregional levels

1. Have all relevant conventions been considered and taken into account in the project?

Yes, and more would probably become apparent. The project proponents are well placed in this regard.

***Response by the project team**: agreed*

2. Is the proposed activity consistent with existing national plans?

I have no information on individual countries, but since most are signatories to the various conventions, and this PB is consistent with the various conventions, it follows that national concerns are being addressed. The endorsement letters from the individual countries will provide better proof of this.

***Response by the project team**: The project is in line with multiple National Strategic Action Plans, e.g., soil-fertility action plan (Mali), national biodiversity action plans (all countries) and of course the NIPs. The "environmental friendly" and farmer-centric aspects of this project puts it in line to support most recent action plans.*

Other beneficial or damaging environmental effects

See above

Degree of involvement of Stakeholders in the project

1. Because of the area-wide interventions, community involvement and stakeholder participation are especially important in OP 9. Are the national and regional institutions likely to be able to contribute to the achievement of the objectives identified?

Yes, and clearly so.

***Response by the project team**: Agreed*

2. Are all countries which have a stake in the IW body subject of the intervention by the project involved in it?

No, only Nigeria is not on the list. Since the question as to why Nigeria is not included could possibly arise during the project, and a statement on why it is not included, or how the findings of the project will be communicated, would be appropriate.

***Response by the project team**: It was decided early on in the PDF-B planning stage, together with GEFSEC, that the population size and complexity of working in Nigeria warranted a separate project. Also, language differences were an issue. Adding Nigeria would have made this an overly ambitious project.*

Capacity building aspects

Capacity building is an important component in international waters projects. Institution building plays a crucial role, and specific capacity-strengthening measures are required to assist countries in finding the appropriate institutional and organizational matters.

***Response by the project team**: Agreed. The project aims at capacity building at several levels, but principally at the field level (farmers and trainers or facilitators). Farmers' Organizations will play a critical role and as noted in the PB, the recent movements towards decentralized and semi-privatized service-support programs like the PASAOP offer an excellent opportunity for the project to be sustainable and replicable (scale up).*

Innovativeness of the project

The combination of activities, the scope of the project and the development of a community-based pesticide-monitoring system provide the innovativeness of this project. The success will also allow assessment of its replicability elsewhere.

***Response by the project team**: Agreed*

Comments specific to the PB

Annex B, p 3. The outcomes of 1 and 2 are identical and should be corrected.
***Response by the project team**: Acknowledged and corrected*

(b) **WORLD BANK COMMENTS AND RESPONSE BY PROJECT TEAM**

The project team is grateful to the World Bank reviewer for comments to strengthen the contents and presentation of this proposal. Presented below are the responses and/or actions taken, where required, taken in response to the comments (in italic following the WB comments).

Reviewer:

1. Development of Community-Based Pesticide Monitoring Systems. There is insufficient documentation that communities will have capacity and incentive to sustain these monitoring systems post-project.

   ***Response by the project team**: The lack of documentation is a correct observation as this is, to our knowledge, the first time such a community-based pesticide monitoring system (CBPMS) will be attempted. The development of the capacity to do such monitoring is one of the objectives of the training and does not pose significant logistical or social challenges. The pre-training village "diagnostics" are participatory appraisals, coordinated by ENDA and tested during the PDF-B will be included in the full project. A new element was added to these appraisals in that community members were trained as part of the diagnostic team; hence, helping to build capacity for self-survey and record-keeping within the community. The motivation for carrying out the exercise and eventually the longer-term post-project maintenance of a CBPMS will depend on the degree to which the threats posed by pesticides are both understood to be a substantial and yet easily avoidable by communities and especially their leaders. If the project demonstrates the value of a CBPMS approach, integration and expansion to other regions can take place through adoption of the training by government structures and local NGOs working with grassroots organisations, including local Farmer Organizations."*

2. There is conflicting discussion (and evidence) in the text that larger, i.e. industrial farms, are responsible for use of more dangerous pesticides and for a disproportionally higher percentage of pesticide use per acreage, yet Farmers Organizations and communities are targeted rather than commercial agriculture.

   ***Response by the project team**: The team feels that the reviewer was misled by our the use of the term "industrial" with regard to agricultural systems along the Senegal River (paragraph #3 of the brief). In fact there is neither conflicting discussion nor conflicting data. In the six countries the vast majority of farming is done by small-holder family farms, or in the form of a union of small-holders who group together to gain access to credit, (e.g., the GIE system Groupement d'Interêt Economique in Senegal). The use of the term "industrial" was in reference to this arrangement, developed in the early 1980s, in which these groups of small farmers rent the use of large-scale equipment (tractors and combine harvesters) to prepare the plots and then to harvest the crop. After soil preparation the farmers broadcast seed (yet another sub-optimal method) and weed by hand like many small-scale farmers. The term also refers to the unquestioned use of chemical pesticides as a "necessity" for "modern" production. Actual large-scale industrial farming is rare and even these most often are based on the purchase of harvests from the fields of small farmers (e.g., the SOCAS factory along the Senegal river, which produces tomatoes for export). Small-holder farmers are without question the principal users of pesticides, both by number and by total volume of chemical, and therefore the appropriate target for this project.*

3. Similarly, there seem to be greater returns to strengthening national import policies, import monitoring and enforcement to curtail entry of pesticides, rather than community-level targeting once pesticides have entered the country/region. Why is there not a combined policy and change-in-use approach promoted here as a PDO?

   ***Response by the project team**: The team does not agree with the first part of the reviewer's statement. Pesticides are imported based on the demand expressed by the country. These pesticides are not illegal to import and working to create barriers to their importation, in the face of continued demand by farming communities, would not be successful. Furthermore, pesticides recommended or obliged by credit agreements for use in one crop (e.g., cotton) many times find their way into use in other crops (e.g., vegetables) where they are wholly inappropriate. Only education at the farmer level will be able to address these abuses. The strategy of the project is to first demonstrate the high health risks, the negative economic returns and the existence of better alternatives to pesticide use and thereby turn off flow by turning off the demand from the base.*

   With regard to a "combined policy and change-in-use approach", note that one of the expected outputs of Component #1 includes policy studies, workshops and recommendations to governments: "National policy studies completed by the mid-term report and serve to generate at least two policy recommendations in the four countries for which studies do not yet exist." The outcomes and recommendations of the policy studies will also be transmitted to the Regional PSC and the two regional pesticide-registration authorities, who will also be in a position to discuss strategies and to carry lessons-learned to the respective national policy levels.

4. Per these three comments above, Two recent GEF/IW projects under preparation targeting commercial agriculture to refer to are East Asia Livestock Waste Management Project (with FAO involved) and Serbia and Montenegro River Enterprise Nutrient Pollution Reduction Project. Both target livestock waste, but otherwise motivate targeting of commercial entities with financial incentives and have better outcome-oriented monitoring of water quality.

***Response by the project team**: The team will study the two GEF/IW projects noted by the reviewer, but based on the above discussion the team believes that targeting commercial entities and employing financial incentives are clearly not the most effective targets and tools for the stated aims of this project. This does not preclude the possibility that significant industrial pollution might not be found, especially in the neighbourhood of the largest cities along the two rivers. While redressing the sources of these potential problems is beyond the purview of this project, the water-quality analyses might well trigger national and international action along these lines.*

5. Outcome One Design and Stakeholder Involvement. Some explicit mention of involvement of the Ministries of Agriculture in these countries should be here. The Ministries of Environment are the endorsers, but the Ministries of Agriculture usually are responsible for the subsidization, import, and distribution of agro-chemicals. Changes in working relationships should be through Ministry of Agricultural extension agents through to Farmers and Farmers Organizations, as facilitated by the Ministries of Environment (see Annex K).

   ***Response by the project team**: Acknowledged and the text changed to reflect, explicitly, what is implicitly understood by all parties.*

6. The key indicators seem optimistic and the logframe (Annex B and Annex I, Table 2) does not give year-by-year targets for many of these KPIs.

   ***Response by the project team**: The reviewer does not specify which of the key indicators seem optimistic. The indicators for reductions in pesticide use and increases in yields and net income are based on four years of experience with the sub-regional IPPM programme in West Africa, and supported by 15 years of similar work in a dozen countries in Asia and now the Caribbean. In fact these figures used for the key indicators were toned down to be rather more conservative than what the evidence would suggest. Targets for trainers-trained and farmers-trained were based on substantial experience in the region and are not felt to be particularly ambitious in number (recognizing this is a pilot or demonstration effort and not meant to substitute for a fully institutionalized national effort).*

   For year-to-year targets please see indications in Table 2 of the M&E (Annex I in full brief).

7. Under "Sustainability" in the Executive Summary, National monitoring capacities for water quality Section (and in para 59, Project Document. There are both national and regional guidelines for monitoring, compiling, and reporting on water quality. There is a recent Water Quality study focusing on harmonizing capacities across the Niger River Basin countries underway as facilitated by the Niger Basin Authority and financed alongside the Niger River Basin GEF project. The results of this study should feed into this component.

   ***Response by the project team**: The team gratefully acknowledges this important suggestion and will seek out the findings of this study. The NBA is of course, along with OMVS, one of the more important stakeholders and every effort will be made to establish and maintain good lines of communication.*

8. Under "Sustainability" in the Project Document, there is no discussion of how use of and support to CERES/Locustox will contribute to post-project sustainability in lieu of working with and increasing capacity of national-level water quality monitoring institutions.

   ***Response by the project team**: This point was the subject of discussion during the two stakeholders meetings and the countries have agreed that, for the sake of quality and conformity in the results, use of CERES/Locustox as the principal laboratory would be acceptable. This is the sole laboratory in the sub-region with the necessary equipment, training and internationally accepted level of certification (see Annex E). It was agreed*

among the stakeholders that the goal of the project was not to build similar capacities in all the countries, but if the results of the project should illuminate similarly high levels of chemical contamination in the waters of the respective countries, that this result could then be used to leverage governmental and inter-governmental support for building such capacity. In other words the idea of building national capacity in every country was felt to be premature given that the need was not yet proven to exist and the transformation of national laboratories to an equivalent level will involve expensive equipment and substantial training.

9. The important, and recent, role of pesticides in locust control is mentioned in the Project Document but not in the Executive Summary. The institutional specificities of locust control v-a-v agricultural production in each country has not been elucidated. Often pesticides related to locust control enter countries under different policies than do agricultural-use pesticides, and sometimes a Ministry other than Ministry of Agriculture has the chapeau for locust control.

   ***Response by the project team**: The first suggestion is noted and the executive summary has been so modified. The team feels that the institutional specifics of how pesticides enter the countries is not of particular relevance, given that our target is communities and farmer education. What is important is that, since the submission of this project document for review, the locust populations have proven unlikely to reappear in the Sahel in significant numbers. While good news, this fact nevertheless leaves some 1.2 million litres of highly concentrated ULV pesticides sitting in these West African countries, with the majority (900,000 L) sitting in Senegal. History has shown that stockpiling these chemicals in warehouses does not ensure their being kept out of the hands of farmers. Furthermore, in the past these formulations included substantial amounts of Emulsifiable Concentrates and dusts (formulations farmers are familiar with handling), whereas current locust formulations are almost entirely ULV for use in aircraft. This latter formulation is oil-based and extremely concentrated and therefore has a high dermal as well as oral toxicity. The high dermal toxicity is not something farmers are used to dealing with. Interest in co-financing for the project has recently been expressed by USAID/FAO using redirected finances originally slated for locust operations in the sub-region. To address the issue the project will develop a new curriculum that specifically deals with the nature and threat of ULV pesticides, the biology and ecology of locusts and recommended actions in the event of locusts being found in the vicinity of crops.*

10. With regards to Core Commitments and Linkages, there is expository text explaining the Niger, Senegal, and Futa-Djallon GEF/IW projects, but there is not given any explanation of specific points of possible engagements between project objectives. In the Consultation Section between IAs, formal contacts should be initiated directly with these GEF Project Management Units, as they are actively under implementation. As the PMUs are close to or sit within existing regional institutions, ties then to other non-GEF projects as well as post-project capacities will be more evident.

    ***Response by the project team**: The team acknowledges the valuable suggestion and the appropriate changes have been made to the text. These suggestions will be noted in the first meetings of the regional and national PMUs*

11. Farmer Field Schools (para. 63, Project Document, and Annex L). The distinction should be made everywhere that the project refers to self-financing FFSs. There are also state-supported Farmer Field Schools elsewhere in Africa, with financial support for them by regional and national financing mechanisms is waning rather than growing.

    ***Response by the project team**: The team acknowledges this observation and reference is being made elsewhere in the text. However, it is the intention that only a certain fraction of FFS will follow this model as the first experiment in the sub-region, especially during the early part of the project implementation. While the team acknowledges the clear benefit of a*

scenario in which "extension" is entirely decentralized and self-financed through farmer organizations, we feel it is premature to depend heavily on this approach without first testing. In this regard the self-financing mechanisms will take advantage of initiatives in large part financed by the World Bank (e.g., ANCAR in Senegal and the PASAOP in Mali and Senegal), which are themselves experimental.

The team is puzzled by the statement of the reviewer that national and regional support for FFS elsewhere in Africa is waning. FAO's experience has been quite the contrary; the FFS approach in Africa has only just started in most places during the last five years and FAO is receiving increasing demand for FFS programs to be established in Africa and elsewhere (most recently in Madagascar and the Western Indian Ocean). More generally it seems clear that the paradigm for extension has fundamentally shifted away from the more conventional forms of the past and towards some form of participatory, decentralized farmer education approach of which the FFS model is just one of several. Such participatory models are proving highly flexible and variations are being seen in which they are being adapted for use for a larger diversity of crops, fisheries, livestock, soil-fertility and zero-till farming systems, and more radically, for situations related to HIV/AIDS and recovery of agriculture in post-conflict areas. Conventional extension approaches have been around for at least four decades and have benefited from billions of dollars in loans and grants while generally criticized for not being effective. This next generation of extension methodologies should be given an adequate opportunity to prove themselves.

(c) **GEF SECRETARIAT COMMENTS AT WORK PROGRAM ENTRY AND RESPONSE OF THE PROJECT TEAM**

Program Designation and Conformity: The full project proposal will expand on what is possibly the main objective of the project: introduce environmental components (protection of freshwater ecosystem services and resources) into the regular work of the IPM Facility, presently essentially focused on the elimination of chemical pesticides while maintaining/increasing productivity.

The presence of high levels of dieldrin in the project area waterways most probably reflects current usage of dieldrin. The proposal is therefore eligible under POPs OP14, Strategic Priority #3: Demonstration of technologies and practices. The proposal has strong relevance to OP10.

Response by the project team: *Agreed*

Project Design: The Executive Summary could provide a stronger rationale for the intervention by referring to pesticides monitoring undertaken during the PDF-B. Furthermore, the rationale section should provide background on the type of agriculture addressed in the demonstration areas (also in response to concern raised by WB), as well as a brief overview of successes and failures of IPPM in West Africa so far (thereby addressing the question "why the need for this project?"). Finally, it would be useful to provide the reader with some grasp for the magnitude of the demonstration / total cultivated land in the region. We are told of demonstrations involving 30 communities in the region. What percent of the communities / cultivated areas are we targeting. In this regard, I note that Annex G showing site maps for the demonstration areas only shows maps for Niger, Guinea and Benin).

Response by the project team: *Acknowledged and adjustments have been made to the Executive Summary.*

Component 1 will produce "policy recommendations'. To whom? How do we ensure that these are acted on?

Response by the project team: *The partner countries are undergoing a process of decentralization and a movement towards private or semi-private agricultural support services in which local communities are being increasingly charged with the decision-making power to manage their agricultural resources and given the financial resources to realize this goal. This move towards decentralization is increasingly reflected in various national strategies and action plans, which are being formulated along sectoral lines (soils, water, biodiversity, etc.). Even though this political changes are only in their infancy, this movement towards decentralization can already be seen in the "common framework of political harmonization" expressed in the CEDEAO (Communauté économique des Etats de l'Afrique de l'Ouest). This change in policy has been mirrored by an explosion of increasingly dynamic and powerful producer organizations, which are potentially at the base of influencing the content and direction of this new political atmosphere, from the "bottom-up". As was expressed in the PDF-B stakeholders' meetings, the governments, in principle, would like to see feedback and proposals coming up from the base and being made by these communities. The communities and local Farmers' Organizations involved in the GEF project are in a position, therefore, to make their wishes known to the national and regional political structures as no other time in the history of the sub-region. In short, if the project proves itself of substantial value to a significant and growing number of local communities and farmer-based groups, those communities will be in a position to make their approval for changes known to higher political structures, with some likelihood of being listened to.*

Note that the brief refers to country background reports prepared during the PDF-B and available on file at FAO. Such documentation should be part of the bibliography for the proposal and available on line on someone's website.

Response by the project team: *Acknowledged. A website will be set up in collaboration with ENDA Tiers Monde, one of the principal partners, where the country reports can be found (go to www.enda.sn and look for reference to the GEF project).*

Replicability: The full project proposal will indicate IPM's commitment to permanently integrate environmental components into its regular work.

Response by the project team: *Acknowledged and reflected in the document in the context of dissemination at a global level through FAO Global IPM Facility's network of activities and partners world-wide. Given the participatory and diverse nature of the network, the extent to which the lessons-learned and especially the novel curricula developed during the programme are actually integrated into other programmes will depend entirely on the nature and quality of the outputs and outcomes.*

The project includes provisions for replication locally and nationally. It is not at all clear how UNEP and FAO will seek to promote potential positive outcomes of the project internationally.

Response by the project team: Acknowledged and the following text was added to the Executive Summary:
"Finally, local national and international awareness will be raised as project results are presented over the course of the project and afterwards, in the form of newsletters, professional publications and presentations presented in a diversity of national and international forums. A website will be set up in conjunction with either the executing agency or one of the regional partners."

Monitoring and Evaluation: The full proposal will include provisions for establishing indicators of environmental status, and for monitoring project performance. The proposal includes in annex a draft M&E plan that appears appropriate at this stage. It should be referred to in the Executive Summary.

Response by the project team: *Agreed and modifications made*

Financing Plan: Budget and co-financing appears adequate. Documentation of expression of interest from co-financiers is expected at this stage.

Response by the project team: *Agreed and letters have been received*

In the Executive Summary, need to have a discussion of "Cost- Effectiveness".

Response by the project team: *Acknowledged and additions have been made to the Executive Summary*

Core Commitments and Linkages: The proposal builds on the considerable experience of the GIF in promoting IPPM in the region and globally. Conversely, the Global IPM Facility can act as a sounding board for the global dissemination of lessons learned during the project.

Response by the project team: *Agreed*

Consultation, Coordination, Collaboration between IAs, and IAs and EAs, if appropriate:
Collaboration will be sought with the regional IW projects under implementation or preparation in the region. In addition, collaboration should be sought with UNIDO where UNIDO is the lead NIP agency, as well as with the ASP units at the national level - particularly regarding the prevention component of the ASP.

Response by the project team: *Acknowledged and this suggestion will be transmitted to the regional and national PMUs*

General Comments: The proposal will both provide evidence of and raise awareness of the risk of POPs and toxic chemicals based agricultural production and will promote and demonstrate the efficacy of alternative Integrated Pest and Production Management through demonstrations in some of the poorest rural areas in the world.

Response by the project team: *Agreed*

Annex D: **RESULTS AND ANALYSIS OF COMMUNITY SURVEYS OF AGRICULTURAL PRACTICES, PESTICIDE USE AND HUMAN HEALTH RISKS IN THE VILLAGES OF THE PDF-B PHASE OF THE GEF PROJECT**

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

SUMMARY

Methodology

1. The collection of base data on agricultural practices and the health of the population of five villages was one of the activities undertaken; this permitted the situation in the five locations of the PDF-B phase to be assessed. The surveys in the communities were undertaken by technicians and health workers who work in these localities.

2. The choice of methodology to collect data by survey constitutes an important step which preceded the training of the community interviewers and the collection of data. The choice of the villages under study was dictated by the desire to have a good representation of different types of agricultural practice regardless of their proximity to the river.

3. In each location, 100 producers were surveyed. The names of the producers who were to be surveyed on agricultural practices and health were selected at random from the list of registered producers in each village. These producers belong as a group to a farm worker organisation (GIE, OP).

In a complementary activity to these interviews, focus group discussions were organised in each village with groups of 15 to 20 women as well as men. The entire survey was undertaken by interviewers who were trained following selection by the communities concerned.

Results

4. The study which preceded the project covered the sites of Pont-Gendarme, Boundoum, Ouro Madiou, Aéré Lao and Galoya; they are located in the departments of Dagana and of Podor (region of the Senegal River). The purpose of the survey was to collect baseline information on agricultural practices, use of pesticides and their effect on human health; this information must complete that obtained from the community diagnostics organised before the launch of the PDF-B phase with the same producers.

5. The results have already shown that the producers have a low level of education; 78% of those surveyed had not received any instruction while 17% have received primary level and none had gone beyond secondary level (fig. 1). This information was critical to the information and training strategy to be adopted during the project and in the longer term.

6. Agriculture is the principal economic activity in the different sites and employs almost 81% of the population. Cattle breeding and non-agricultural activities are the other important activities identified by 18.8% and 13.6% of the producers respectively.

7. The most important agricultural problems identified are as follows:

   50.4% of the producers identified birds as the most significant pests in rice production and their activities are most important at the end of the growing cycle. Insects and mites are the principal pests for fruit and vegetable crops such as tomatoes, okra and onions. The attacks on these crops occur at different stages of their growth. These results contrast markedly with the use of pesticides; for even if any chemical product is not used by the producers against birds,

almost 80.2% of the producers resort to chemical methods to protect their crops from pests. This confirms the result of the community diagnostic that pesticides are routinely used by producers.

8. Acquiring pesticides: The acquisition of phytosanitary products is done by an intermediary of the farm workers organisation or the federation who acquires from firms specialising in the manufacture and/or distribution of the phytosanitary products. The firms supply almost 44% of the pesticide product. Certain producers, however, make individual purchases from retailers and the majority affirm that they do not know the precise nature of the product bought and are reliant on the advice of the vendor. This method of acquiring phytosanitary products encourages the use of forbidden pesticides such as POPs and other dangerous chemicals. **The producers primarily buy from itinerant merchants at weekly markets.**

Exposure and Risks

9. Producers who buy through informal channels encourage the use of dangerous pesticides or a mixture of pesticides whose effects on human health and the environment are unknown. Consequently the study has permitted the determination of the most toxic products and those most widely used (dieldrin).

10. Men are the principal appliers of pesticides in the fields (75%); fears with respect to the use of pesticides have been expressed by the majority of producers (70.4%) and these relate to health risks. **Most alarmingly, 76.9% of the producers use drainage water as drinking water and health problems related to the use of this water have been identified by 60.6% of the producers**.

11. Health problems associated with the application of pesticides and the absence of protective clothing have been frequently noted. The people surveyed are also aware of the negative effects on the environment; **fish mortality is one of the environmental consequences most frequently mentioned**. Many of the producers affirm that they use pesticides reluctantly and consider that GIPD can be an alternative approach.

12. Human health risks are confirmed by numerous problems encountered with pesticides; **86% of the producers say that they have experienced cases of toxic exposure**. This situation can be attributed to the absence of a programme of information and prevention in the villages.

13. The riverine population are exposed to other types of illnesses. According to the populations questioned, malaria is the most frequent, followed by respiratory ailements and shistosomiasis (fig. 3a).

14. The surveys conducted among health workers in the region (fig. 4A) show that 86% of the health workers consider pesticides pose health problems in their locality. There is essentially no accident prevention programme associated with the use of pesticides.

15. This is corroborated by the result that shows **93% of health workers state they cannot provide support in accidents involving pesticides** and there are no pamphlets available to them in the event of pesticide problems (fig. 4B).

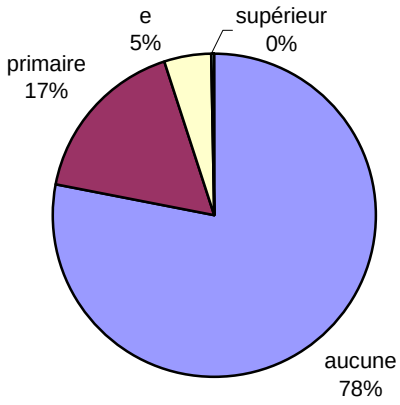


Fig 1: level of farmer education

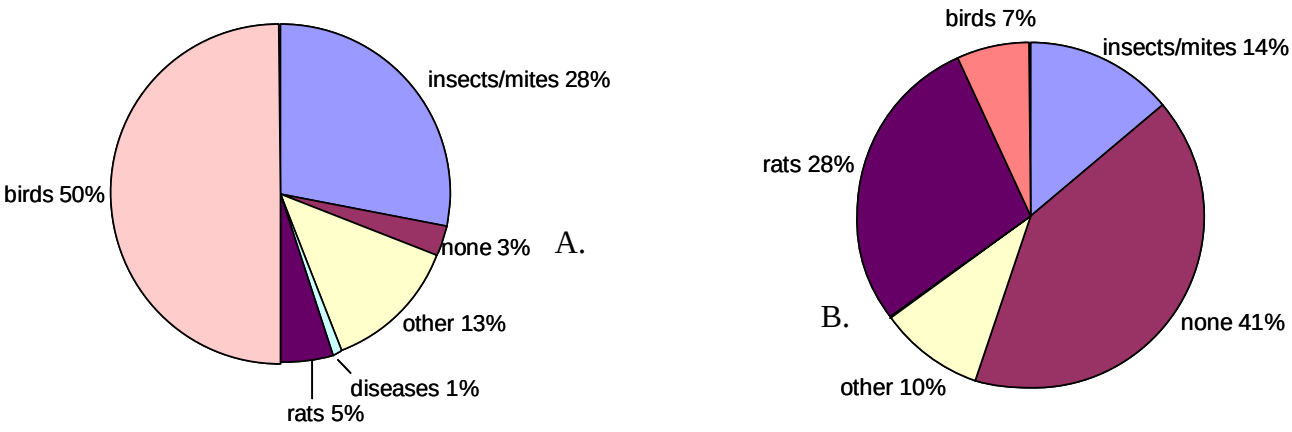
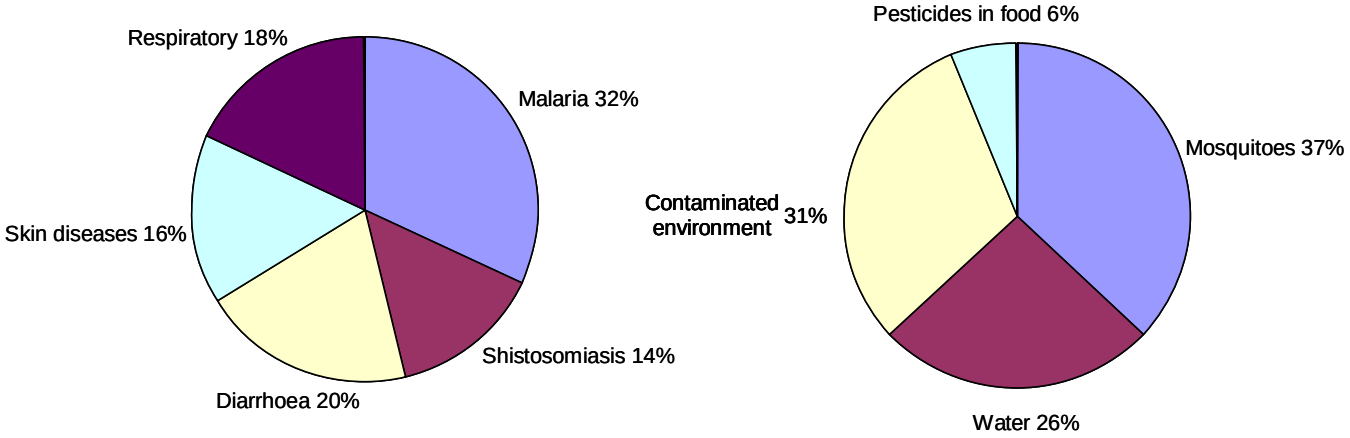
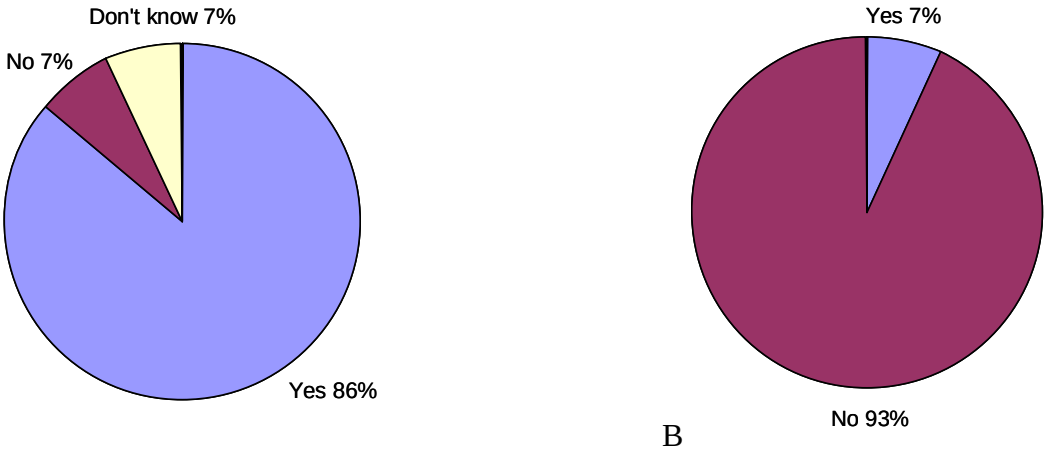


Fig 2 : Farmer estimation of (A) principal crop pests, and (B) pests of stored grains



A. B.

Fig 3 : Farmer estimation of (A)frequencies of diseases, and (B) principal causes of diseases



A. B

Fig 4 : Health-worker estimation of (A) whether pesticides are an important source of health problems in their communities, and (B) whether medical information is available regarding steps to take in case of intoxication by pesticides

Annex E: RESULTS AND ANALYSIS OF PESTICIDE RESIDUES FROM SELECTED SITES ON THE SENEGAL RIVER

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

This document is the result of the work of many people and several institutions. It was supported under the GEF PDF-B project. The work was carried out by CERES/Locustox[10]. Initial analysis was carried out by Dr. Wim Mullié, while working as an expert for FAO, based at CERES/ Locustox. After the departure of Dr. Mullié, the document was sent to Dr. Joost Lahr of Alterra[11] in The Netherlands, who conducted additional analyses and put it in its current form.

INTRODUCTION

During 2003 a pilot study was conducted for the GEF/UNEP/FAO PDF-B project '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'. The pilot study was carried out in the Senegal River Valley in Northern Senegal by CERES/Locustox in collaboration with the other partners. The area is characterized by large irrigation schemes where rice, vegetables, cotton and sugarcane are produced. The irrigation systems, fed by the Senegal River, is administered by the SAED (Société Nationale d'Aménagement et d'Exploitation des terres du Delta du Fleuve Sénégal et de la Falème).
Five villages in the area were selected for a first series of investigations. At three of them pesticides were monitored in the surrounding surface waters from April 2003 to February 2004. The three villages were Boundoum, Pont Gendarme and Ouro Madiou. Ouro Madiou, situated in the more central part of the river in Senegal, was chosen because one of the partners in the project, the West-African NGO ENDA-Tiers Monde, was already working in the area. The two other sites were situated in the more western Delta area. These sites were suggested by the SAED because they felt the Delta was where the water would be most contaminated.
The principal objective of the pesticide monitoring study was testing and demonstration of methods for a future community-based pesticide monitoring system.

Materials & methods

Sampling & pesticide analysis

Water samples were taken for analysis of pesticide residues in the months of April, July, August, September and December 2003, and in February 2004, at several locations in the irrigation systems in the vicinity of the three villages. Both irrigation channels and drains were sampled. A summary of the samples taken is given in Table 1. During the first three months, irrigation channels were under-represented. Starting from September, the number of samples taken in irrigation channels was increased at all three localities.

[10] CERES/Locustox, FAO BP3300, Dakar Senegal

[11] Alterra, Wageningen UR, Centre for Ecosystem Studies
P.O. Box 47, 6700 AA Wageningen, The Netherlands http://www.alterra.wur.nl/UK/Home.htm

Table 1: Water samples taken from irrigation systems for pesticide residue analysis near three villages in Northern Senegal.

	Month											
	April 2003		July 2003		August 2003		September 2003		December 2003		February 2004	
Village	Irrig.	Drain	Irrig.	Drain	Irrig.	Drain	Irrig.	Drain	Irrig.	Drain	Irrig.	Drain
Pont Gendarme	1	4	1	4	1	4	3	4	1	4	1	4
Boundoum	1	2	1	2	1	2	2	3	2	3	3	3
Ouro Madiou	1	2	1	2	1	2	3	3	3	3	3	3
TOTAL	3	8	3	8	3	8	8	10	6	10	7	10
No. pesticides analyzed	34-35*		34		34		34		36**		36**	

* carbosulfan at Ouro Madiou

** 2,4-D & carbofuran were added later

The samples were taken using Teflon coated sampling devices with a maximum depth of 100 cm. Per locality, several subsamples were collected until a combined volume of 10 L was reached. Of this quantity, final samples were transferred to 1.5 or 2.0 L glass jars that were wrapped in aluminium foil. The jars were subsequently stored in ice in the field and kept in refrigerators after arrival at the laboratory. Extraction and analyses were performed shortly after taking the samples.
Pesticide analysis was done using chromatographic techniques such as GC/ECD, GC/TSD, GC/MS, HPLC/UV and HPLC/Fluorescence according to the NF EN ISO 6468 protocol used at the CERES/Locustox laboratory for residue analysis. The pesticides that were analyzed during the study are shown in Annex 1. Total water concentrations of the compounds that occurred above the limit of quantification were expressed in microgram active ingredient per litre (in short: µg/L). The limit of quantification or l.o.q. is the lowest level of the compound that can be accurately and precisely measured. In December 2003 and February 2004 lower l.o.q.'s were obtained through an extra effort (Annex 1).

Environmental Quality Standards

As a first step to assess the quality of the waters that were sampled, water concentrations of pesticides detected above the limit of quantification (l.o.q.) were compared to two types of Environmental Quality Standards (EQS) commonly used for surface waters. Water quality standards have not yet been established for Senegal.

The following standards have been applied:

- For drinking water for people, the European Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption (European Community, 1998). According to this Directive, residues of individual pesticides in surface waters, intended for the production of drinking water, should not exceed 0.1 µg/l. Certain organochlorines, such as dieldrin, should not exceed 0.03 µg/l. Total residues of all pesticides combined should not exceed 0.5 µg/l at any one station. These threshold levels are referred to as Drinking Water Standards (DWSs).
- To protect the ecological functions of surface waters, The Netherlands have adopted a system of Maximum Tolerable Risk limits (MTRs) for individual pesticides (NW4, 2000; Beek & Oudendijk, 2003). MTRs are the maximum concentrations of a given substance in surface water that theoretically protect 95% of the aquatic species potentially inhabiting the aquatic ecosystem. The rationale behind this will not be explained here, but it is the domain of

probabilistic environmental risk assessment, based on the concept of species sensitivity distributions (SSDs; e.g. Aldenberg & Slob, 1993; Aldenberg & Jaworska, 2000).

Further Ecological Risk Assessment

In order to assess the possible ecological consequences of the pesticide levels measured during the study, a more elaborate ecological risk analysis was performed. It was assumed that the aquatic community in water bodies receiving input of pesticides from use in adjacent fields and irrigation systems, will be most affected by peak concentrations that occur from time to time. Most pesticides are acutely toxic and it may take days, weeks or even months before the aquatic community fully recovers from such impacts, also in (sub)tropical systems such as in Senegal (Mullié et al., 1991; Lahr & Banister, 1997; Lahr et al., 2000).

The highest concentrations of the herbicides and insecticides measured in this study were therefore subjected to analysis using the PERPEST model (Van den Brink et al., 2002; Van Nes & Van den Brink, 2003). PERPEST is a model that predicts the ecological effects of pesticides in freshwater ecosystems. The model simultaneously predicts the effects of a particular concentration of a pesticide on various aquatic community endpoints such as community metabolism (primary production an/or respiration) and the structure of populations of plankton and aquatic macroinvertebrates. In contrast to most effect models, PERPEST is based on empirical data extracted from the literature, not on extensive (mathematical) modelling. The model is based on case-based reasoning, a technique that solves 'new' problems (the effect of a certain pesticide) by using past experience (the results of published field and semi-field studies with various pesticides). The program searches for analogous situations in its database, based on similarities between characteristics of the pesticide of interest and the pesticides used in the published experiments, e.g. type of pesticide, mode of action, concentration, etc. Predicted effects are classified according to their magnitude and duration. The output of the model is a series of predictions showing the probabilities of the classes of effects on the various ecological groups.

Peak concentrations of 3 herbicides and 13 insecticides encountered in the irrigation and drainage systems in Northern Senegal were entered in the PERPEST module. Where necessary, aquatic toxicity data (mostly EC50 values for the water flea Daphnia magna in the case of insecticides, EC50's for algae such as Selenastrum capricornutum for herbicides) were manually added to PERPEST from one of the following sources: Tomlin (2002), Worthing (1987), De Zwart (2002) and the on-line ECOTOX database (USEPA, 2005). PERPEST then calculated the probability of three classes of possible effects (in an extended mode 5 classes can be calculated):

- *No effect* - No consistent adverse effects and/or no clear causality.
- *Slight effect* - Confined responses of sensitive endpoints (partial reductions), effects on single sampling dates only and/or effects of very short duration.
- *Clear effect* – Convincing and/or severe reductions in sensitive endpoints.

The PERPEST database does not contain information on studies with fungicides. This group of substances could therefore not be evaluated with the model.

Results

Pesticide residues

The samples from Boundoum, Pont Gendarme and Ouro Madiou were analyzed for 34 to 36 pesticides during each sampling period (Table 1). The common names of these pesticides are given in Annex 1 to this report, together with their respective l.o.q., DWS and MTR (the latter two values only when the pesticide was detected).

During the study 19 substances were at least once detected above l.o.q. Figure 1 provides an overview of these compounds and of their detection frequency (the total number of water samples taken during the study was 84). The most common pesticides in the irrigation systems around the villages were the herbicides pendimethalin and ametryn, the organophosphate insecticides methamidophos, dichlorvos and, rather surprisingly, the organochlorine insecticide dieldrin, a pesticide that has not been produced

since the 1980s. Each of these compounds was detected more than 10 times during the whole study. Many other pesticides were detected more sporadically, i.e., less than 5 times (Figure 1).

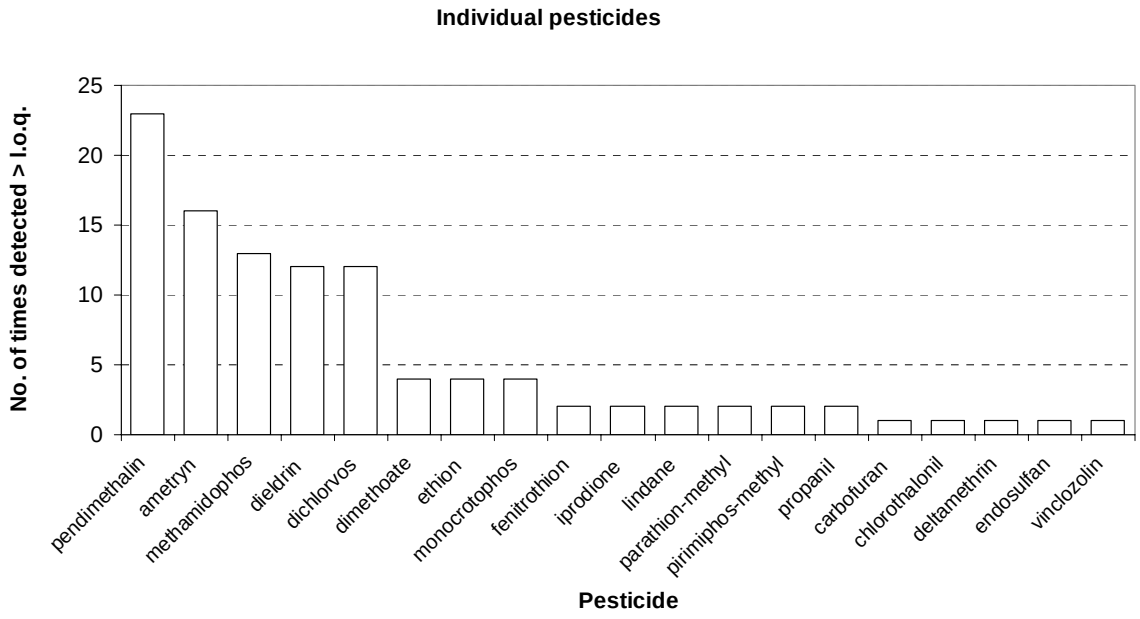


Figure 1: Frequency of pesticides detected above the limit of quantification (l.o.q.) during a 10 month study of irrigation systems near three villages in Northern Senegal. The total number of samples taken during the study was 84 (see Table 1).

Figure 2 shows the frequency of the different types of pesticides during the six sampling periods. The peak of pesticide presence in the irrigation systems was during the month of August, at the beginning of the rainy season. The number of pesticides detected in December 2003 and February 2004 may be somewhat biased because the detection limits for these samples were reduced at that time. This increases the probability of detecting a pesticide. Not a single pesticide was detected in April. This corresponds with a time when only few crops are grown in the fields. On most occasions more insecticides than herbicides were detected. Fungicides were only encountered from September onwards, but the number of detections was very low (Figure 3).

The difference between the number of pesticides detected in irrigation systems (water flow towards the fields) and drains (used water from the fields) is visualized in Figure 3. It can be seen that many parts of the irrigation system, mostly canals, did also contain various types of pesticides. In fact, the three irrigation stations where no pesticides were found coincided with the only three sites that were sampled just once during the whole study (In September near Boundoum and in December near Pont Gendarme). Fungicides seem to be somewhat more frequent in irrigation systems.

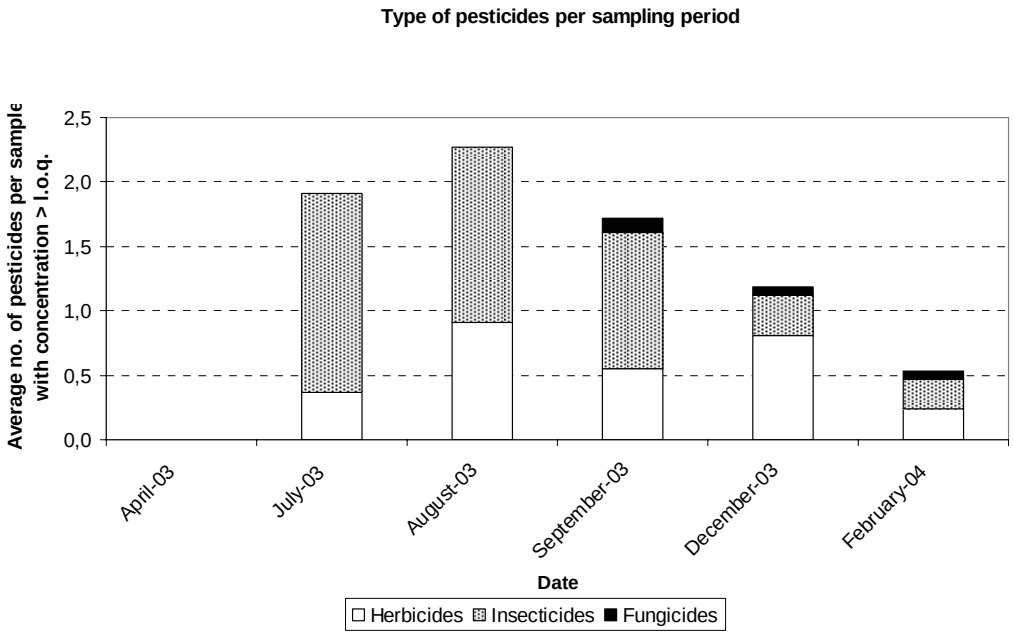


Figure 2: Frequency of pesticides detected above the limit of quantification (l.o.q.) near three villages in Northern Senegal during different sampling periods. The frequency of detection is expressed as the average number per sample to correct for different numbers of samples that were taken during different sampling periods (number of samples per sampling period were derived from Table 1).

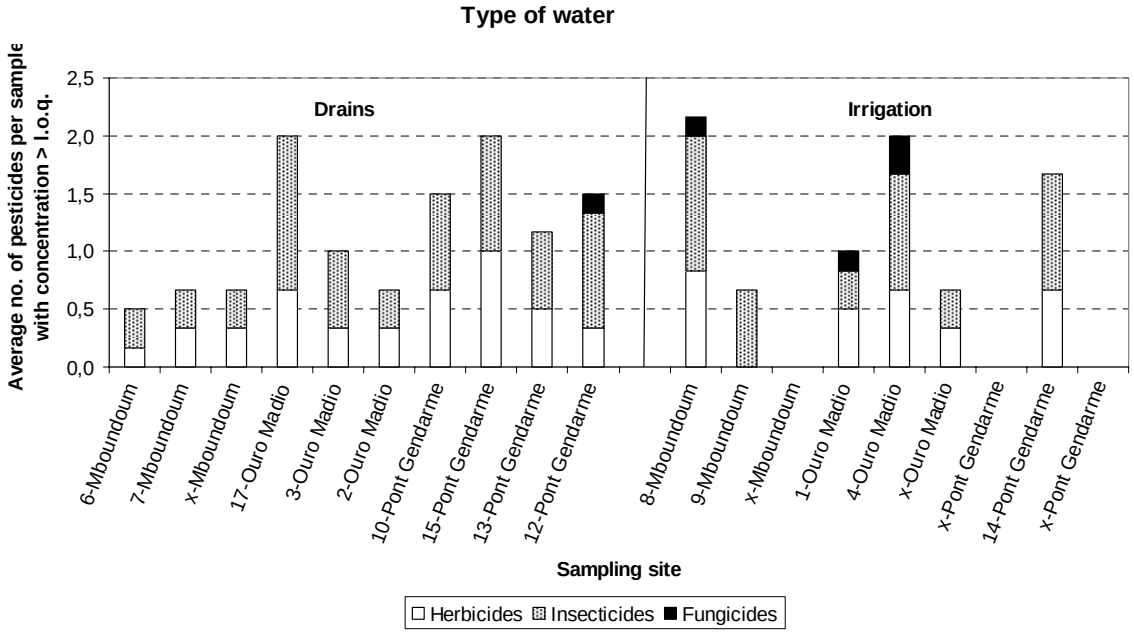


Figure 3: Frequency of pesticides detected above the limit of quantification (l.o.q.) in irrigation waters and drains near three villages in Northern Senegal. The frequency of detection is expressed as the average number per sample to correct for different numbers of samples that were taken at different sampling stations.

Environmental Quality Standards

In Figure 4 it can be seen that at almost 90% of the occasions that a pesticide was detected, the Drinking Water Standard was exceeded. This is perhaps not surprising when it is considered that the

limits of quantification of many pesticides that were analyzed were close to the DWS values themselves (see Annex 1). At 80% of the occasions the DWS was exceeded less than 10 times. Endosulfan and parathion-methyl did not exceed the DWS at all. Pendimethalin concentrations were under the DWS for this herbicide almost half the number of times it was found (23 times during the whole study). The other pesticides that were found (see Figure 1) exceeded the DWS on all occasions.

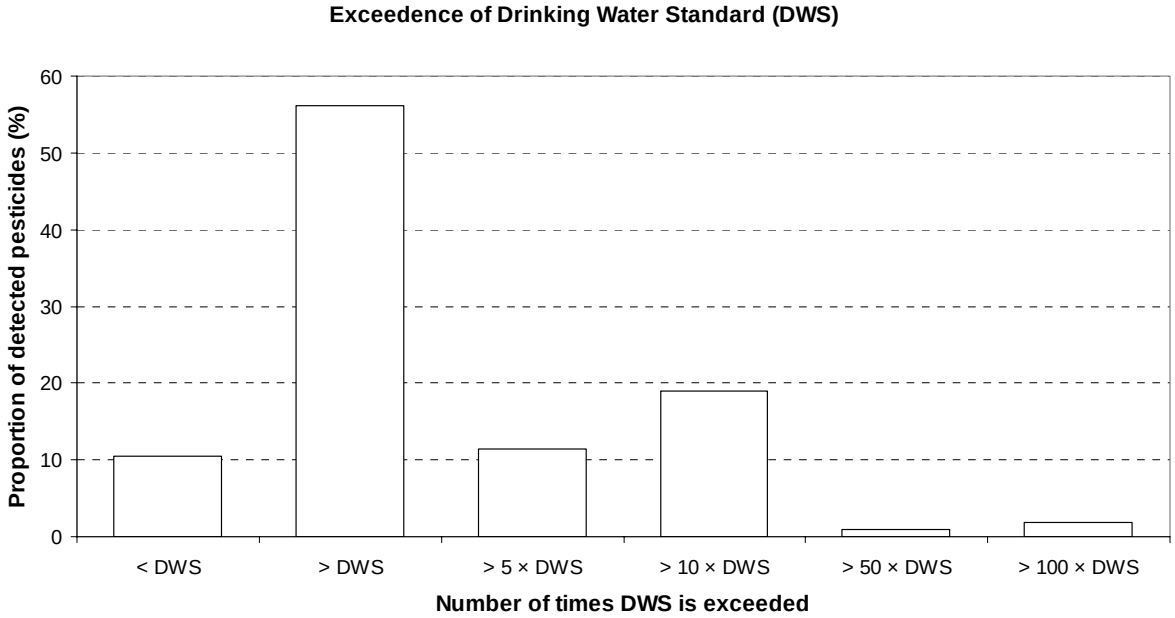


Figure 4: Frequency distribution of detected pesticides according to the number of times their total concentrations in surface water exceeded the respective European Drinking Water Standard (DWS) for each substance. All data of the study were combined.

Figure 5 represents a similar graph for Maximum Tolerable Risk levels for surface waters. The MTR was exceeded for almost 90% of the occasions at which a pesticide was detected. In 40% of the cases, concentrations of the pesticides were greater than 100 times the MTR value. Such concentrations may potentially cause ecological effects in aquatic systems.

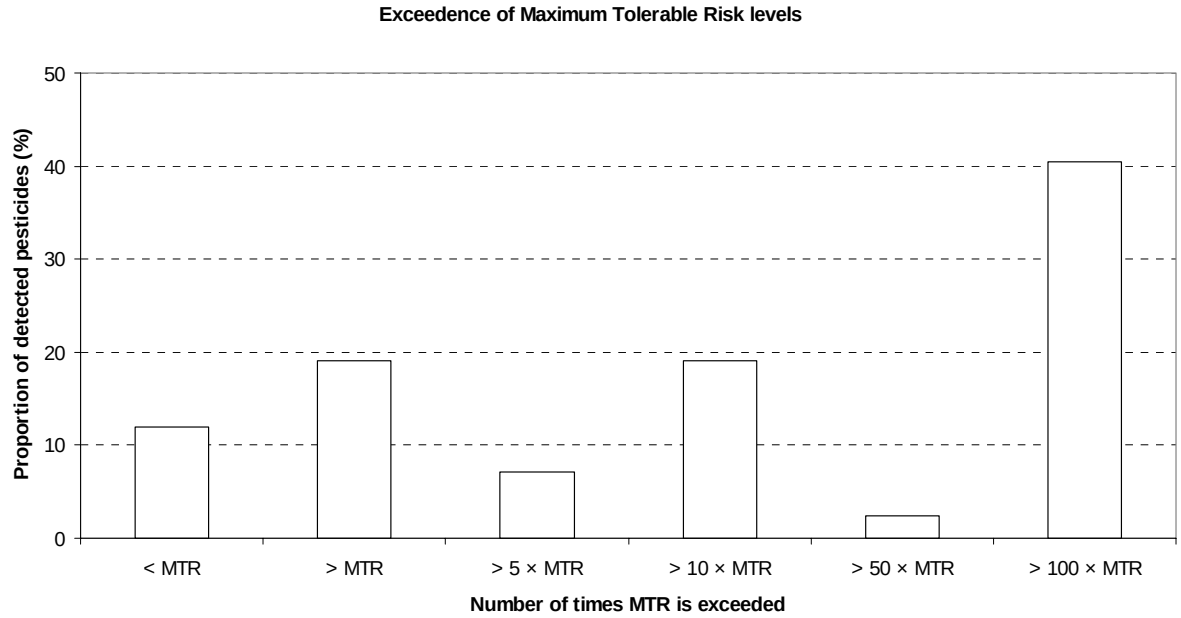


Figure 5: Frequency distribution of detected pesticides according to the number of times their total concentrations in surface water exceeded the respective Dutch Maximum Tolerable Risk level (MTR) for each substance. All data of the study were combined.

PERPEST analysis

Analysis with PERPEST of the potential ecological effects of the measured peak concentrations of herbicides on the aquatic fauna in the irrigation systems showed high probabilities (> 50%) of clear effects occurring at various endpoints (Table 2). Effects on community metabolism (i.e., primary production and/or respiration), phytoplankton, periphyton and macrophytes are typical for direct herbicidal action. In addition effects on these groups may also provoke secondary effects in other groups, for instance lack of food sources (phytoplankton) for the zooplankton, macroinvertebrate and fish communities. These possible indirect affects may also occur at the peak levels of the 3 herbicides that were found during this monitoring study (Table 2).

The probabilities of effects by at least 7 of the detected insecticides were even greater, often more than 75% (Table 3). The groups that are most at risk of the peak insecticide concentrations observed in the waters surrounding the villages were aquatic insects, fish and micro- and macrocrustaceans. These groups are often sensitive to insecticides. The active compounds responsible for this potential ecological impact in the irrigation systems include dieldrin, dichlorvos, ethion, monocrotophos, lindane, deltamethrin and endosulfan. Measured peak concentrations of methamidophos, fenitrothion, parathion-methyl and carbofuran seemed relatively safe for the aquatic ecosystem. The peak concentration of dimethoate was too far out of the range of the experimental concentrations in the PERPEST database to allow proper risk estimations.

Table 2. Predicted probability of clear effects on different ecological groups occurring at peak concentrations of herbicides in irrigation systems in northern Senegal according to the PERPEST model.

Pesticide	Highest concentration measured (µg/L)	Location & date	Probability of clear effects							
			Community metabolism	Fish & tadpoles	Macro-crustaceans & insects	Macrophytes	Molluscs	Periphyton	Phyto-plankton	Zoo-plankton
Pendimethalin	9.48	E02TH, July '03	°			°		***	*	**
Ametryn	1.00	E06OU, Aug '03	**	**	***	*	°	*	**	**
Propanil	1.52	E09MB, Aug '03	**	*	*	**	°	**	**	*

° probability = 0 ** probability > 25% **** probability > 75%
* probability > 0 *** probability > 50%

Table 3. Predicted probability of clear effects on different ecological groups occurring at peak concentrations of insecticides in irrigation systems in northern Senegal according to the PERPEST model. See Table 2 for an explanation of the symbols.

Pesticide	Highest concentration measured (µg/L)	Location & date	Probability of clear effects							
			Algae & Macrophytes	Community metabolism	Fish	Insects	Macro-crustaceans	Micro-crustaceans	Other macro-invertebrates	Rotifers
Methamidophos	1.50	E06OU, Aug '03	°	°				°		°
Dieldrin	3.04	E02TH, Aug '03	*	°	***	****	***	**	*	**
Dichlorvos	0.24	E06OU, Sep '03	*	*	**	****	***	****	**	*
Dimethoate	0.20	4 locs., Sep '03								
Ethion	2.61	E06OU, July '03	**	*	***	****	****	****	***	*
Monocrotophos	0.43	2 locs., Aug/Sep '03	*	*	*	***	**	***	*	*
Fenitrothion	0.19	E09MB, Aug/Sep '03	°	°	°	°	°	°	°	°
Lindane	13.79	E11AB. July '03	***	°	***	****	****	****	*	***
Parathion-methyl	0.022	2 locs., Aug/Sep '03	°	°	°	°	°	°	°	°
Pirimiphos-methyl	0.23	E01PG, July '03	*	*	*	**	*	**	*	*
Carbofuran	0.59	E07OU, Feb '04	°	°	°	°	°	°	°	°
Deltamethrin	0.10	E13OU, Feb '04	*	°	**	****	****	****	*	**
Endosulfan	0.063	E01PG, Dec '03	***	°	**	****	**	****	*	*

Discussion

Residue analysis showed that detectable quantities of pesticides enter villages in Northern Senegal through irrigation channels and drains. The greatest numbers of pesticides are found during the months of July, August and September. This period coincides with the rainy season. The rice crop is grown from July to November, and the vegetable season begins in September/October.

It was expected that the irrigation waters would contain less pesticides than the drains that carry the drainage water from irrigated fields back to larger water bodies and the Segal River itself. However, it was demonstrated that on average the irrigation waters contained detectable levels of pesticides almost as often as the drains. This could imply that irrigation and drainage water get mixed somewhere in these systems. The pumping station in Ouro Madiou, for instance, is a so-called mixed pumping station, used both for pumping out drain water and letting in irrigation water. This allows for mixing of the two water types resulting in cross-contamination. But this was the only location where mixing was known to take place. It was also observed that some irrigation and drainage channels during the rainy season became so full of water that the fields drained back into these channels, instead of into drainage channels. The residue analysis results may also indicate that much of the water used for irrigation near the three villages is already contaminated by pesticides from upstream irrigation systems. The whole Senegal River system may be full of pesticide residues during particular periods of the year.

An old Persistant Organochlorine Pesticide (POP), dieldrin, was detected at high levels on 12 occasions. Since it seems unlikely that this compound still remains detectable in these quantities after it has been banned worldwide for such a long time, these results may indicate that these residues were caused by recent use of dieldrin in the area. This is quite alarming. WHO class Ib and II pesticides such as dichlorvos, methamidophos, carbofuran and endosulfan were also found in the surface waters in the area.

Furthermore, it is of interest to notice that the water at the cattle watering place at Pont Gendarme contained lindane. It is possible that treatment of cattle with lindane against ecto-parasites is responsible for the relatively high concentrations of this active ingredient found at this sampling station.

In interviews with farmers, many of the pesticides detected in surface waters during he study were not declared as being used. The interviews also showed that knowledge on pesticides by these farmers is very poor indeed.

When pesticides were detected, 90% of the measured concentrations exceeded the European Drinking Water Standard of the compounds. It is not known if these concentrations would really lead to severe adverse effects on human health when used directly for drinking water. However, according to these European standards, most of the water in the area should be considered unsafe for drinking, although the quality may considerably vary with time and season. The DWS values apply to the production of drinking water from raw water. This means that these criteria should be even more rigorously applied to the situation in Senegal, since raw water is often used as drinking water and treatment rarely takes place at all (the situation in Boundoum and some other villages is a positive exception to this rule).

Because of the large margin by which MTR values are exceeded, it seems very likely that ecological damage caused by pesticides occurs in the waters near the villages. This is confirmed by the results of the PERPEST analysis. Peak concentrations of both herbicides and insecticides have a high probability of provoking clear ecological effects on, e.g., phytoplankton, primary production, zooplankton, aquatic insects, crustaceans and sometimes even on fish. These analyses may be considered ‘worst case’ because measured peak concentrations were used as input. However, peak concentrations may be largely responsible for the effects in the field because most of the pesticides used are acutely toxic and may act almost instantly. And since the sampling frequency is not very high, actual maximum concentrations that occur in the sampling area may be higher than the ‘peak’ concentrations that were measured. Furthermore, the PERPEST analysis was based only on the assessment of individual pesticides. It was shown that many pesticides may be found in surface waters in the area at the same time. These may act jointly, but this combined action was not accounted for.

It is beyond doubt that peak concentrations of pesticides potentially pose acute risks for aquatic fauna and it is probable that periodically mass mortality occurs. The highest risks are posed by the insecticides that occur in the area. These will mostly affect aquatic insects and crustaceans. During the sampling in April 2003 in the main irrigation channel of Boundoum, fish mortality was observed as well. Since no pesticide residues were detected in April, it remains to be seen if this was due to pesticides or other factors. It should be kept in mind that many potentially toxic pesticides were not measured by the laboratory.

Two species of macro-crustaceans, the shrimps *Caridina africana* and *Palaemonetes africanus*, were frequently captured during sampling, and their presence or absence could be indicative for water quality, and more in particular, for pesticide contamination (also see Lahr & Banister, 1997). However, interpretation of these data was difficult. The species were present where high levels of pesticide seemed to occur and vice versa. Their presence or absence can therefore not be explained by pesticide residues only. There must be other environmental factors that need to be considered.

CONCLUSIONS

A number of conclusions can be drawn from this study :

- Out of 84 surface water samples taken around three villages in the irrigation zone in Northern Senegal from April 2003 to February 2004, pesticides were detected above the limit of quantification 105 times. The number of pesticides detected was the greatest during the months of July, August and September, i.e., during the rainy season. Not a single compound was detected in April.
- Pesticides were almost just as often encountered in irrigation waters as in drains. Mixed pumping stations, as in Ouro Madiou, cause cross contamination of irrigation water with pesticide residues, but flooding of drains during the rainy season and pollution from other irrigated areas may also contribute to the pesticide contamination in the irrigation waters.
- High residue levels of the banned Persistent Organic Pollutant (POP) dieldrin were regularly detected in samples from Pont Gendarme and the main drain of Ouro Madiou, but not in Boundoum. These residues may originate from illegal use of this compound. Given the persistence and toxicity of dieldrin, this is a quite alarming result. Residues of other hazardous insecticides such as endosulfan and lindane were also found during the study. It is believed that the source of lindane contamination is the treatment of cattle with lindane against parasites, followed by drenching near the villages.
- Compared to European standards for drinking water, neither irrigation water nor drain water has the required quality. When pesticides were detected in the waters near the villages, 90% of the measured concentrations exceeded the Drinking Water Standard. It can therefore not be excluded that the water is unsafe to drink.
- Ninety percent of the pesticide concentrations also exeeceded the Dutch Maximum Tolerable Risk levels for ecological effects. Moreover, modelling revealed that most peak concentrations of herbicides and insecticides measured at the sampling stations can cause clear ecological damage to key elements of aquatic communities. It is therefore highly likely that ecological functioning and aquatic communities in many irrigation channels and drains are impaired during certain periods of time following exposure to pesticides. Some predicted acute effects on fish and aquatic invertebrates were confirmed in the field by visual observations.
- Taking both the potential negative impact on the human population and the aquatic ecosystems into consideration, the water quality in the irrigated areas of the Senegal River Valley could strongly benefit from reductions of the use of toxic pesticides in the area.

RECOMMENDATIONS

Based on the pilot study, a number of recommendations were derived for future pesticide monitoring programmes combined with a village-based approach:

- ***Spatial scale.*** The water quality in irrigation canals and drains in large streaming irrigation systems such as in the pilot study area is strongly influenced by contamination that may emanate from elsewhere. Pesticides detected in the surface water near villages do therefore not necessarily originate from (agricultural) activities by the villagers themselves, but can be the result of pesticide use by neighbouring communities and upstream villages. Therefore, a follow-up pesticide monitoring should be organized at the *scale of catchments or entire perimeters* instead of at the village level only. This provides a logical basis for inter-village communication when different villages or settlements share the same aquatic resources. For this approach more detailed information would be needed on the *hydrological features* of the irrigation systems.
- ***Temporal frequency***. More frequent sampling would provide much more insight into the temporal trends of pesticide contamination. More frequent observations on residues can probably more easily be linked to actual pesticide use in the irrigated fields. As this would yield large numbers of samples, the number of sampling sites could be reduced by focussing on the most strategic sites (see next remark), and/or sampling certain sites less frequently than others.
- ***Strategic placement of sample sites.*** The availability of more hydrological information would a strategic choice of sampling stations, e.g., at places where multiple drains coincide, and in this way assess pesticide contamination of a whole perimeter. The proper location of monitoring sites could also facilitate a *mass balance* analysis, i.e., the assessment of the amount of pesticides that enters and leaves the irrigation systems. Such analyses can be used to estimate to what extent the water quality at downstream sites would benefit from reductions in pesticide use in up-stream perimeters.
- ***River sampling.*** Given the high levels of pesticide contamination in the three sampling areas, it would be worthwile to regularly monitor pesticide concentrations at a few strategic sites in the main branch of the Senegal River itself, as a measure of overall water quality in the system.
- ***Combined impact analysis.*** The combined impact of the pesticides measured during the pilot study was not estimated. Usually it is assumed that effects of pesticides with a similar mode of action are additive. The total impact of several pesticides together is undoubtedly larger than that of each individual active ingredient. The PERPEST model for ecological effect estimation will soon be extended with a module on *combination toxicity* (Paul J. van den Brink, Alterra, personal communication).
- ***Rice fields as filters for pesticides***. Results indicated that pesticide concentrations in the irrigation canals prior to entering fields were occasionally higher than concentrations of the same pesticides found in the drains that left the fields. This suggests that fields may act as *self cleaning entities* in which pesticides are removed from the water either by adsorption to soils, degradation or evaporation. It is well established that wetlands may enhance cleaning of pollutants. Artificial marshes are sometimes created for this purpose. *These processes should be studied in more detail for West-African irrigation systems.* Untreated fields can potentially be used by farmers to strip irrigation waters of certain toxic pesticides.
- ***Early-warning system***. It is questionable if an *early-warning system* for pesticide contamination near communities based on residue analyses by specialized laboratories is feasible. Most pesticides will occur only very briefly after use and then disappear again from the irrigation systems. By the time pesticide samples are taken and the results are reported to the village communities, the pesticides that were detected may have disappeared. A warning issued would thus come too late. It seems more realistic to develop a general approach for the reduction of pesticide use. This could be facilitated if a risk model could be applied to the declarations of actual pesticide use by the farmers. The risks estimated in this way can be directly linked to pesticide use by the communities and can probably be more easily visualized for farmers than the more abstract pesticide concentrations.

Annex 1: Pesticides analyzed, limit of quantification (l.o.q.), European Drinking Water Standard (DWS) and Dutch Maximum Tolerable Risk limits (MTR).

Pesticide	Limit of quantitation (l.o.q.) (µg/L) Apr-Sept 2003	Limit of quantitation (l.o.q.) (µg/L) Dec 2003 & Feb 2004	No. times detected at concentration > l.o.q.	DWS (if detected) (µg/L)	MTR (if detected) (µg/L)
2,4-D*	-	0.1	0		
Acephate	2.0	0.1	0		
Ametryn	0.2	0.05	16	0.1	-
Atrazine	0.1	0.03	0		
Carbosulfan**	0.2	0.2	0		
Carbofuran*	-	0.1	1	0.1	0.91
Chlorpyrifos	0.1	0.02	0		
Diazinon	1.0	0.01	0		
Dichlorvos	0.1	0.02	12	0.1	0.0007
Dimethoate	0.2	0.02	4	0.1	23
Ethion	0.1	0.01	4	0.1	-
Fenitrothion	0.1	0.01	2	0.1	0.009
Fonofos	0.2	0.02	0		
Malathion	0.2	0.02	0		
Methamidophos	0.2	0.02	13	0.1	-
Monocroptophos	0.2	0.02	4	0.1	-
Oxadiazon	1.0	0.1	0		
Parathion-methyl	0.02	0.02	2	0.1	0.011
Phosalone	1.0	0.1	0		
Pirimiphos-methyl	0.2	0.02	2	0.1	*0.002*
Propanil	1.5	0.15	2	0.1	*0.2*
Chlorothalonil	0.2	0.03	1	0.1	*0.2*
DDT	0.2	0.02	0		
Dicofol	1.0	0.1	0		
Dieldrin	0.2	0.02	12	0.03	0.039
Endosulfan	0.2	0.02	1	0.1	0.02
Iprodione	5.0	0.1	2	0.1	-
Lindane	0.2	0.02	2	0.1	0.92
Pendimethalin	1.0	0.02	23	0.1	-
Trifluralin	0.2	0.02	0		
Vinclozolin	0.2	0.02	1	0.1	*40*
Cyfluthrin	2.0	0.05	0		
Cypermethrin	5.0	0.1	0		
Deltamethrin	5.0	0.1	1	0.1	0.0004
Lambdacyhalothrin	1.0	0.1	0		
Permethrin	5.0	0.1	0		
Tralomethrin	5.0	0.1	0		

* only in December 2003 & February 2004
** only at Ouro Madiou in April 2003

CERES/Locustox

The following are specific details with regard to the analytic capabilities of CERES/Locustox, followed by details of international certification.

Laboratory procedures and major equipment

Standards on methods of analysis in force in the laboratory **CERES/Locustox as of January 2005**			
Type of analyses	**Reference Normes**	**Validated procedure**	**Problem of application**
Method of analysis of dithiocarbamates for the analysis of xmanèbe, thiram, zinèbe, etc.	NF EN 12396	yes	Not
Method of analysis carbendazime, for the analysis of bénomyl, thiabendazole, carbendazime and certain carbamates	CEN/TC275/WG4M 28, juin 2000	Yes	Not
Method of analysis multi-residues:			
for the analysis of organochlorine compounds, organophosphorés, pyrethrinoid, carbamates, etc in the plants;	NF-EN 12393-2, avril 1999.	Yes	Not
for the analysis of organochlorine and Polychlorobiphényles (cPcb) in the products halieutics and other fat content;	NF-EN 1528-1,2,3 de janvier 1997.	Yes	Not
for the analysis of organochlorine and Polychlorobiphényles (cPcb) in water.	NF EN ISO 6468.	Yes	Not
For soils analysis, based on the ISO method.	ISO 10382	Yes	Not

Major equipment used by Locustox:

1. Gas phase chromatograph with mass detector (GC/MS)
2. Two other Gas chromatographs (CPG/TSD/ECD/FPD)
3. Two high-performance liquid Chromatograph (HPLC) with UV and fluorescence detectors.
4. An atomic absorption spectrophotometer (SAA) for analysis of heavy metals.

<u>CERES/Locustox Accreditation</u>

CERES is accredited as conforming to European standards of “Best Laboratory Practices” and is among the list of international Reference laboratories.

COLEACP/PIP: The Europe-Africa-Caribbean-Pacific Liaison Committee for the Promotion of ACP Horticultural Exports (headquarters in France). CERES/Locustox received has received several contracts for analytical services for residue determination for fresh fruits and vegetables in conformity with European regulations and selected as an ACP laboratory.

Experagro (international):

Bipea (Bureau interprofessionnel d’études analytiques), France, July 2001

Wepal SETOC program (International network) April 2004

GIPC (Groupe Interministeriel des Produits Chimiques). Certificate for conformity to Best Laboratory Practices (European), December 2002

SONACOS (Societe Nationale de Commercialisation des Oleagineux du Senegal): Qualification, May 2003

UEMOA (West African Monetary Union): Accredited July 2004

Annex F: SUMMARY OF FAO SUB-REGIONAL INTEGRATED PRODUCTION AND PEST MANAGEMENT PROGRAMME EVALUATION FOR PHASE I

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

Summary

From July-August 2004 an independent review took place of the FAO / Dutch-funded programme: Integrated Production and Protection Management programme (IPPM) in West Africa (Mali, Senegal, Burkina Faso) GCP/RAF/378/NET. The following summarizes certain key statistics from that report
A. Programme statistics from IPPM Phase I evaluation.

A significant number of producers took part in the Farmer Field Schools (FFS) because they were attracted to the objectives of program and by the results they had observed in the fields of their neighbours. In the first three years, the programme succeeded in organizing approximately 810 FFS, and 14,875 farmers finished four months of intensive training. This is remarkable given that the FFS take place during the agricultural season, when the farmers are very busy with their normal agricultural work in the field. The average number of producers per FFS, as indicated by training certificates, was 21 in Senegal, 16 in Mali and 17 in Burkina Faso.

TABLE 1. NUMBER OF PRODUCERS TRAINED BY THE IPPM PROGRAM UP TO JULY 2004.

Year	Rice		Market gardening		Cotton		Total by country	
	# FFS	# Farmers	# FFS	# Farmers	# FFS	# Farmers	# FFS	# Farmers
Burkina Faso								
2001-2002	75	1553 (20)	4	89 (22)				
2002-2003	38	812 (21)	31	645 (21)				
2003-2004	77	1189 (15)	66	1032 (16)	4	73 (18)		
Total	***190***	***3554 (19)***	***101***	***1766 (17)***	***4***	***73 (18)***	***295***	***5393***
Mali [2]								
2001-2002	36	632 (18)	12	142 (12)				
2002-2003	55	832 (15)	40	696 (17)	5	82 (14)		
2003-2004	± 94	1519 (± 16)	67	1456 (22)	15	293 (17)		
Total	***± 185***	***2983 (± 16)***	***119***	***2294 (19)***	***20***	***375 (19)***	***324***	***5652***
Senegal [2]								
2001-2002	5	120 (24)	19	316 (17)				
2002-2003	18	284 (16)	57	1121 (20)				
2003-2004			92	1932 (21)	3	57 (19)		
Total	***23***	***404 (17)***	***168***	***3369 (20)***	***3***	***57 (19)***	***194***	***3830***
Total by crop	**398**	**6941 (17)**	**388**	**7429 (19)**	**27**	**505 (19)**	**813**	**14875**

[1] Between brackets is the average number of farmers per FFS who had received their certificate by the end of training (generally to have taken part in at least ¾ of the total sessions of the FFS)

[2] Because of the differences in the format of the reports, the Mission was unable to be precise on the statistics for Mali and Senegal.

Sources: *progress reports and additional data provided by national coordinators*

On the total of 14,875 trained producers up to July 2004, 5,132 (35%) were women. In the West African context, where the majority of the rural women work in agriculture, but have only limited control the materials and labour resources, the IPPM project was able to mobilize a considerable number of women in the FFS.

Table 2: RATE OF PARTICIPATION OF WOMEN IN FFS DURING THE PERIOD JULY 2001 – JULY 2004.

Country	Rice			Market gardening			Cotton			Total
	Male	Female	%F	M	F	%F	M	F	%F	
Burkina Faso	2419	1135	**32 %**	1335	431	**24 %**	73	0	**0 %**	5393
Mali	2790	193	**6 %**	458	1836	**80 %**	361	14	**4 %**	5652
Senegal	287	117	**29 %**	1972	1397	**42 %**	48	9	**15 %**	3830
Total	5496	1445	**19%**	3765	3664	**48 %**	482	23	**5 %**	14875

Sources: Progress reports and data provided by the coordinators of ?Programme S nationals.

The University of Hanover has recently started an economic impact study on the IPPM programme. (Pemsl *et al.*, 2004). This evaluation is based only on the data collected from the FFS fields and are not necessarily representative of farmers' fields once having completed the programme. Table 3 gives a summary of preliminary results of this study, supplemented by certain figures on the country incomes.

Median yields increased for all crops listed in table 3. Increases in median rice yields were similar in all three countries, and varied from 19 to 27%. Cotton yields increased in IPPM plots, on average, 21%. Increases in market garden yields were more variable, and went from 11 to 44 %.

Table 3: Preliminary estimate of impact of IPPM on the yields, costs of production and net returns to farmers in certain cultures [1].

Country/crop	Median change % yield/ha [2]		Average change of the costs pesticides [3]		Average change of others costs of production [4]		Median change in Net incomes [5]	
	[%]	?(n) [6]	[%]	?(n)	[%]	?(n)	[%]	?(n)
Burkina Faso								
Rice	+ 27	121	– 24	121	0	7	+ 81	19
Tomato	+ 17	15	– 81	15	– 16	15	+ 135	6
Cabbage	+ 38	19	– 75	19	+ 15	19	+ 110	6
Mali								
Rice	+ 19	7	– 100	7	+ 25	7	+ 41	8
Tomato	+ 44	5	– 80	6	– 45	6	+ 36	3
Onion	+ 31	4	– 92	4	– 50	4	+ 36	4
Cotton [8]	+ 21	17	-- [7]	--	– 10	17	+ 58	17
Senegal								
Rice	+ 23	15	– 100	15	+ 10	15	+ 36	13
Okra	+ 21	8	– 42	18	+ 20	10	+ 40	8
Tomato	+ 11	12	+ 10	24	+ 33	13	+ 7	14
Cabbage	+ 28	14	– 7	24	+ 13	15	+ 41	14
Onion	+ 23	15	0	10	+ 5	4	+ 127	8

1 Preliminary estimate only, based on partial data until July 2004. Note that columns are not necessarily additive.
2 As in table 3 in Pemsl et al.. (2004);
3 calculated on the basis of table 4 in Pemsl et al.. (2004);
4 calculated on the basis of figures 5-7 in Pemsl et al.. (2004); costs of inputs other than pesticides, without costs of labour;
5 calculated on the basis of project progress reports (often, the costs of labour were not available)
6 n = data number (fields);
7 -- = data not available
8 All figures for cotton as provided by the Global IPPM Facility

The average cost in pesticide use was reduced in all except two cases--onion and tomato in Senegal. These crops sometimes required the use biopesticides, which are relatively more expensive. Other production costs (especially of agricultural inputs) increased on average for rice crops. They were higher also in the majority of the market gardening plots, except in Mali. It should be noted that the costs of labour were not often included in the cost estimates. The latter are consequently probably underestimated, especially in situations where the IPPM plots require a more significant use of labour.

Median net incomes were always higher in IPPM plots than in farmer-practice plots. However, the use of median values can hide the fact that for certain crops the percentage of the farmers that obtained lower incomes with IPPM could still be considerable. This was the case for tomatoes and okra in Senegal, where almost half the IPPM plots resulted in incomes lower than the farmer-practice plots.

The Mission concludes that the introduction of IPPM resulted, in the majority of cases, in a clear increase in the incomes of the farmers. The high variability in these figures, between countries, suggests that opportunities still exist to improve of incomes benefits to farmers. A careful comparison of agricultural practices in the three countries is recommended, so that the practical technologies developed in the IPPM programme can be used effectively in the sub-region.

Use of pesticides

One of the principal objectives of the IPPM programme is the reduction in use of pesticides to the lowest level possible. Indeed, as described in table 4, pesticide use as reduced considerably in almost all the countries and crops.

Data on the types and quantities pesticides used were collected for farmer practice as well as for IPPM, but they have yet to be analyzed by the Programme. Partial results from Senegal show that in almost all the crops the frequency of pesticide application decreased. Similarly, no pesticide was used in IPPM rice crops in Mali.

Table 4 Change of the number of pesticide applications after introduction of IPPM

Country	Crop	Average percentage of change in the number of applications	N
Mali	Rice	– 100%	--
Senegal	Rice	– 100%	11
	Okra	+ 20%	12
	Tomato	– 42%	21
	Cabbage	– 14%	21
	Onion	– 23%	11
	French bean	– 8%	9

Environment and health

As mentioned above, data on the use of pesticides are not yet fully analyzed. Consequently, an in-depth evaluation on changes in human and environmental risk due to the introduction of IPPM cannot be yet done. However, a certain number of preliminary conclusions can be drawn.

Many farmers met by the evaluation Mission underlined the reduction health hazards as a significant result of the IPPM programme In certain cases, mention was made of a reduction in the headaches or others symptoms linked with the exposure to pesticides. No study has yet been carried out, however, to evaluate this specific impact of IPPM on health human

In contrast to the effects on health human, environmental benefit of IPPM programme were not mentioned much by the farmers. Apparently, these aspects were considered as less important by the farmers, or perhaps the environmental benefit of IPPM were not recognized as such.

The frequency of use pesticide use was generally lower in IPPM plots than in farmer-practice plots, however this measurement does not take into account the change towards the use of less-toxic pesticides, which also took place. The reduction in frequency of use thus underestimates the real benefits of IPPM on the environment and health. In many cases, chemical pesticides are replaced by biological products, or are not used any further (e.g., in rice). Several pesticides with high toxicity that were used by farmers prior to the programme (e.g., métamidophos, monocrotophos, méthomyl and captafol) were replaced by less dangerous products.

The Mission urges the IPPM programme to analyze as quickly as possible, data on pesticide use already collected in the FFS, using the “toxic unity” method, used for the socio-economic study in Senegal, or the “environmental impact quotient” used by the IPPM Program in cotton in Asia. They allow relatively simple analyses for the changes of the environmental risk and health resulting from IPPM adoption.

Cotton IPPM

Cotton was addressed in the IPPM programme relatively late in the programme. As a sector, cotton is considered problematic given the high levels of relatively toxic pesticide typically used, and the high economic importance of the crop for some of the countries (e.g., Mali gains more than 50% of its foreign-derived income from cotton). Intrinsic vested interests exist with regard to pesticide sales, by semi-governmental cotton agencies. This is bound to present additional barriers to the adoption of IPPM. Nevertheless, the first season results from Mali with 17 FFS were highly encouraging. Figure 1 shows an average 21% increase in yield, and average 10% decrease in production costs and an overall 58% increase in net returns to farmers using the IPPM practice.

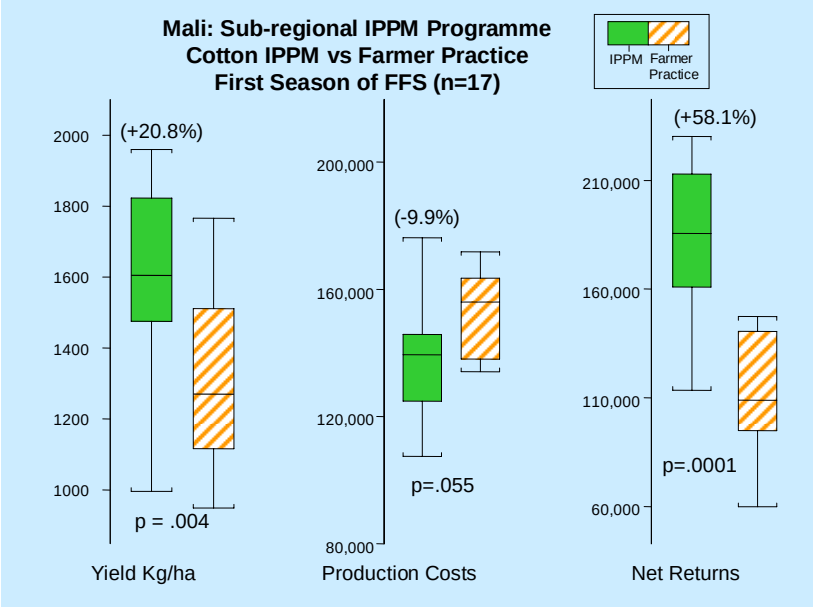


Figure 1. Cotton IPPM results from Mali

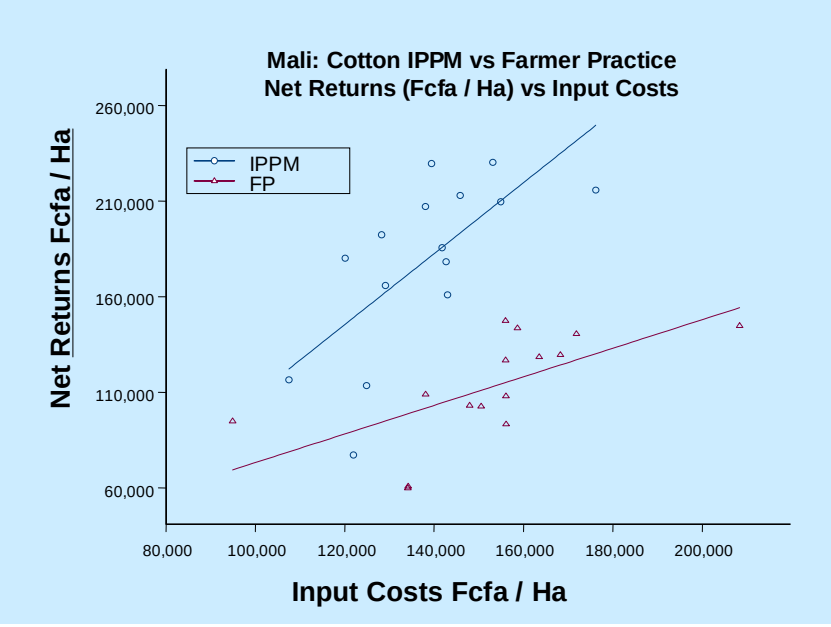


Figure 2 shows these same data from Mali, but looking at a regression of net returns on input costs. The differences in slopes for the graph show that not only do the IPPM farmers enjoy higher net returns, but that for every unit increase in input costs, they gain an increasingly higher net return on their investment.

Annex G: SITE IDENTIFICATION AND ASSOCIATED CROPPING SYSTEMS

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

Sites were determined during the PDF-B by the national steering committees. Full country reports from are on file (in French).

Table 1. Site names and targeted cropping systems

Country	**Site Locations**	**Targeted Cropping Systems**
Benin	Kandi	cotton, rice, market gardens
	Banikoara	
	Malanville	
	Karimama	
	Segbana	cotton, market gardens
Guinea	Siguiri	rice, market gardens
	Kankan	
	Mandiana	
	Kouroussa	
Mali	Kayes	rice, market gardens
	Bafoulabé	
	yanfolila	
	Niono	
	Dioïla	cotton, market gardens
	Kangaba	
Mauritania	Rosso	rice
	Kaedi	
	Bogué	
Niger	Firgoune	rice
	Daykaina	
	Saga	rice, market gardens
	Toula	
	Say	
	Boumba	market gardens
	Gatwany	sorghum
Senegal	Boundoum (PDF-B)	rice, market gardens
	Pont gendarme (PDF-B)	
	Ouro madiou (PDF-B)	
	Aeré Lao (PDF-B)	
	Galoya (PDF-B)	
	Lac de Guiers	
	Guedé chantier	
	Ile à morphil	
	Dagana	
	Lampsar	

Representative Site Maps

1. Participating countries

Figure 1. Overview of participating countries. Round markers

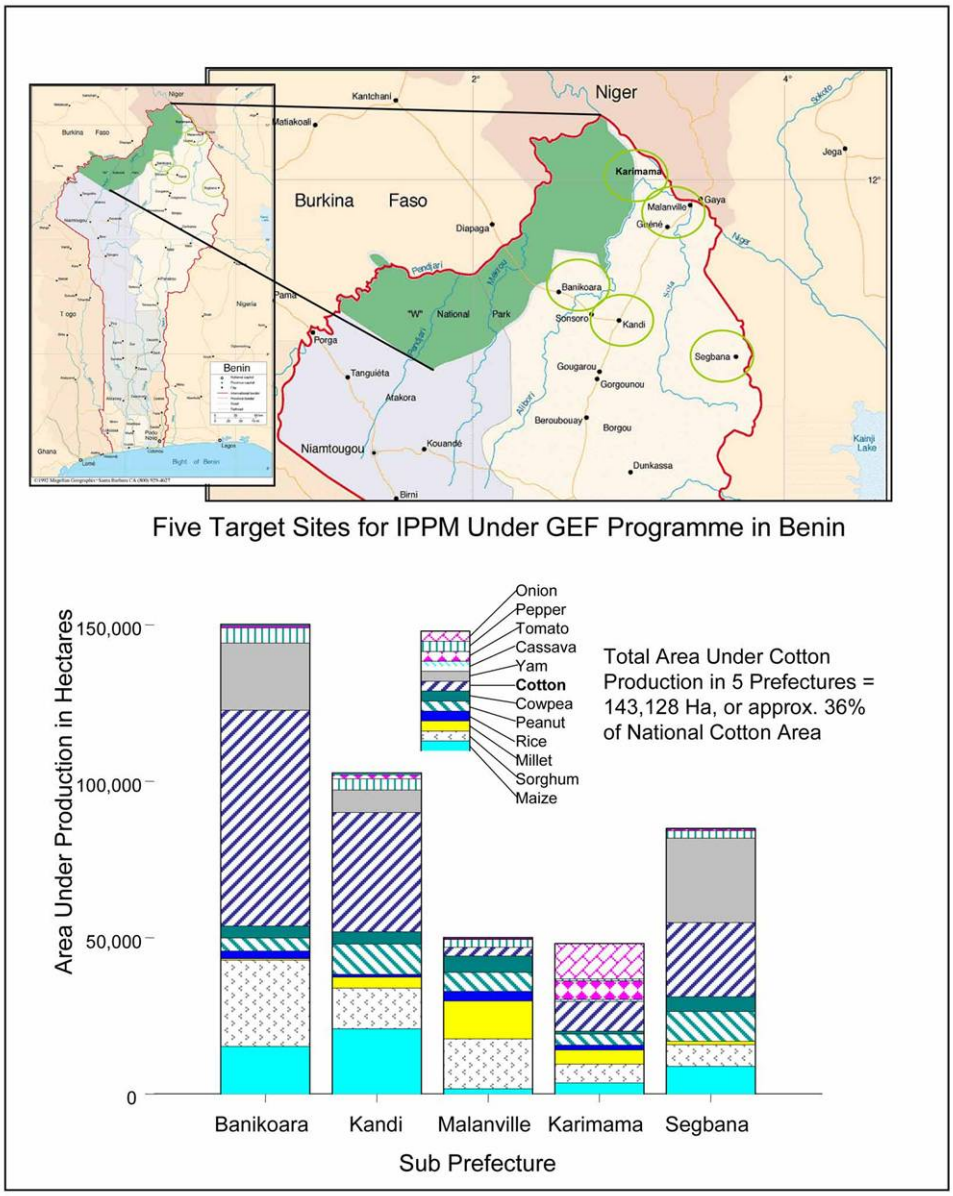


Figure 2. Site details for Benin--Detail. Benin has the highest proportion of cotton area for sites selected among the six countries.

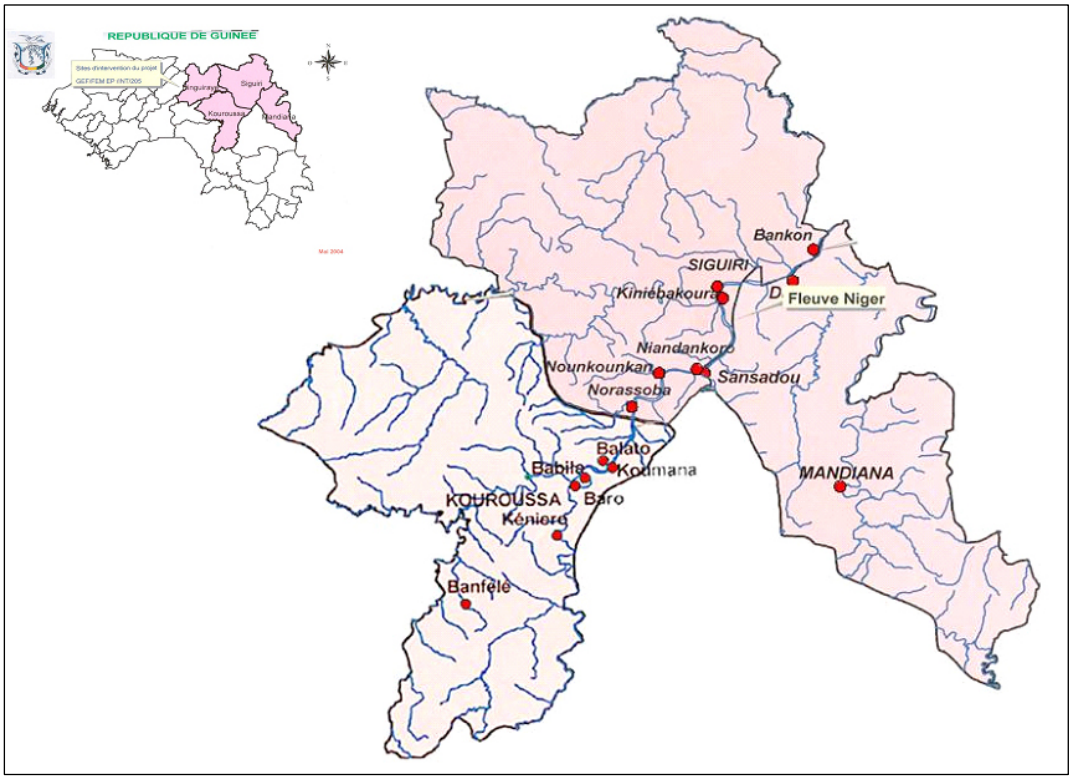


Figure 3. Guinea Site Selection-Detail

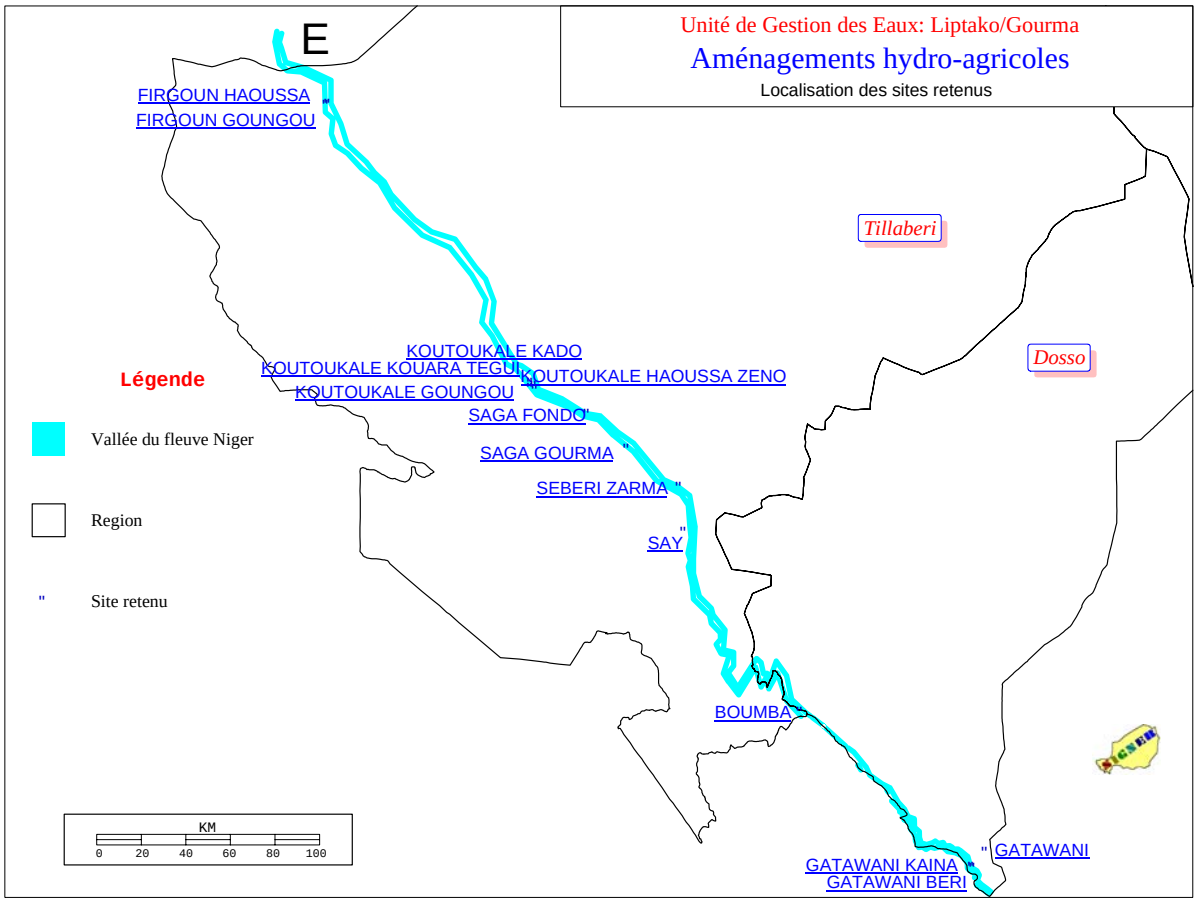


Figure 4. Niger site selection

Annex H: WORKPLAN AND TIMETABLE

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

Overall duration of the project 54 months including the appraisal phase

Component / Activity	Time																			
	2008				2009				2010				2011				2012			
GEF Agency Approval																				
Implementation Start																				
Component 1: Awareness Raising and Establishing Baselines																				
1.1 Conduct consultation and planning meetings at all levels, beginning with Implementatin Workshop:																				
1.2 Meet with CILSS CSP project to discuss information exchanges																				
1.3 Conduct baseline community surveys at 5 project sites in 6 countries:																				
1.4 National policy studies and national workshops held to discuss outcomes:																				
Component 2: Assessments of Freshwater Contaminants																				
2.1 Capacity building for staff of CERES Locustox	**on going w/ co-financing**																			
2.1 Specification of sites for monitoring contamination in the Niger and Senegal Basins:																				
2.2 National teams trained on sampling methods by CERES/Locustox staff members																				
2.3 Water samples taken and analysed in CERES/Locustox laboratory:																				
2.4 At least three simple empirically based modelling approaches explored as means to estimate relative risks to farmers and aquatic biota using results from sample survey																				
2.5 Results translated into curriculum suitable for use in Farmer Field Schools for discussion of risks																				
Component 3: Developing Best Practices for Contaminant Prevention																				
3.1 Curriculum development workshops																				
3.2 Two training of trainers in IPPM (rice and vegetables).																				
3.3 Three training of trainers in IPPM (rice, vegetables and cotton)																				
3.4 Training communities in IPPM																				
3.5 Develop with target communities, through FFS alumni and village leaders, monitoring systems for pesticide used;																				
Component 4: Developing Networks																				
4.1 Develop networks among villages, national and sub-region																				
4.1 Develop networks among facilitators at local, provincial and sub-regional levels																				
Component 5: Project Coordination and Management																				
5.1 Establish Project Steering Committee																				
5.2 Establish Project Coordination Unit																				
5.3 Project Steering Committee Meetings																				
Mid-Term Evaluation																				
Terminal Evaluation																				

Annex I: MONITORING, PROGRESS REPORTING, AND EVALUATION PLAN

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

The objective of monitoring and evaluation is to assist all project participants in assessing project performance and impact, with a view to maximizing both. Monitoring is the continuous or periodic review and surveillance by management of the implementation of an activity. Monitoring helps to ensure that all required actions are proceeding according to plan. Evaluation is a process for determining systematically and objectively the relevance, efficiency, effectiveness, and impact of the activities in light of their objectives. Ongoing evaluation is the analysis, during the implementation phase, of continuing relevance, efficiency, and effectiveness and the present and likely future outputs, effects, and impacts.

The general and specific objectives of the project, and the list of its planned outcomes, have provided the basis for this M&E plan. The project will be evaluated on the basis of execution performance, outputs delivery, and project impact (outcomes per the project logframe.)

EXECUTION PERFORMANCE

Execution monitoring will assess whether the management of project activities is efficient. It seeks to improve efficiencies when needed so as to improve overall effectiveness of project implementation. It is a continuous process, collecting information about the execution of activities programmed from the annual workplans, advising on improvements to methods and performance, and comparing accomplished with programmed tasks. This activity will be the direct responsibility of the Project Implementation Unit (PIU), with reports sent to the National Technical Steering Committee. See Table 1 for the execution performance indicators. The UNEP Project management officer will, in collaboration with the PIU, track these indicators.

Table 1: Indicators for evaluating whether the project implementation unit and Technical Steering Committees are operating effectively

Indicator	**Means of Verification**[12]
Quarterly and annual activity progress reports are prepared in a timely and satisfactory manner	Arrival of reports to UNEP
Quarterly financial reports are prepared in a timely and satisfactory manner.	Arrival of reports to UNEP
Performance targets, outputs, and outcomes are achieved as specified in the annual work plans.	Semi annual and Annual progress reports
Deviations from the annual work plans are corrected promptly and appropriately. Requests for deviations from approved budgets are submitted in a timely fashion.	Timely submission of revised budget to UNEP for approval
Disbursements are made on a timely basis, and procurement is achieved according to the procurement plan. Report on the procurement of non-expendable equipment against the project budget filed in a timely manner.	IMIS system at UNEP and Bank Account statements of executing agency (FAO) Inventory of Non-Expendable Equipment reports
Audit reports and other reviews showing sound financial practices.	Audit statements
Regional Technical Steering Committee (RTSC) is tracking implementation progress and project impact, and providing guidance on annual work plans and fulfilling TOR.	Minutes of RTSC meetings
RTSC is providing policy guidance, especially on achievement of project impact.	Minutes of RTSC meetings

[12] The responsible officer to track this will be the GEF project task manager in consultation with the project manager.

PROJECT IMPACT

Evaluation of the project's success in achieving its outcomes will be monitored continuously throughout the project through semi-annual progress reports, annual summary progress reports, a mid-term and final evaluation, all of which will use the project logframe as a monitoring, evaluation, and reporting tool (See Project Logframe, Annex B). Table 3 presents the key performance indicators. Methods of data collection must strive to ensure that reliable baseline data is collected and that data is collected regularly throughout project implementation. The list of performance indicators should also include interim indicators and numerical targets with timeframes. The FAO project management officer will work closely together with the Regional Project Coordinator to complete this task.

Table 2. List of Key Performance Indicators

	Key performance indicator	**Baseline (if baseline is not known, please identify how and when baseline will be established)**	**Method of data collection/Data collection strategy (including frequency)**
Development objective: To protect transboundary waters in the Niger and Senegal River Basins through elimination of POPs pesticide-use and substantial reduction and elimination of other toxic pesticides used in agriculture; while augmenting agricultural productivity and net economic benefits to farmers	• Best practices curricula adapted and adopted	Current practices are based on chemically intensive production systems in four of six countries. In Senegal and Mali, some farmer involvement with the Netherlands-financed IPPM programme provides a foundation of trainers and farmers already moving to adopt improved practices. However, none of these are as yet focused on contaminant prevention in aquatic systems.	Initial surveys will be conducted in each project site. Baseline data collection is built in as a critical output for project implementation. Post-FFS survey work will be accomplished through impact studies based on model developed by University of Hannover for the IPPM project.
	• Yields of the three targeted systems (cotton, market gardening, rice) increased (Y3,M12)	Current yields in all crops are considered moderate, but able to be improved with improved agronomic methods to be adopted by project farmers.	Baseline survey work will establish expected farmer yields prior to training. FFS plots compare Farmer Practice with the IPPM plots and thereby generate data on potential yield improvements. Follow-up surveys and impact study to establish actual farmer adoption and yield changes several seasons after FFS training.

	• Pesticide use in the target communities reduced (Y3,M12)	Currently, pesticides are a major expense and pesticide application is carried out by virtually all farmers in the project locations, with the exception of prior IPPM farmers (in other communities).	Baseline survey work will establish farmer practices, including pesticide use, prior to FFS training. Follow-up surveys and impact study to establish actual pesticide reductions several seasons after FFS training.
	• Net income increased (Y3,M12)	Farming operations are of variable net benefit to farmers. Net returns are weak or losses incurred particularly in the high-input crops (Senegal River Basin rice producers and all cotton growers)	FFS activities demonstrate economic returns from improved practices compared to existing farmer practice. Follow-up surveys and impact study to establish actual long-term changes in farmer net incomes.
	• Contaminant loads in irrigation and drainage systems decreased (Y3, M12)	No baseline data currently exist other than the PDF-B study in Senegal. Environmental monitoring of locust outbreak will look at some sites in Senegal, Mauritania, Mali and Niger until June 2005. This will be limited in scope and not involve community participation. No follow-up after this is expected.	Project plans are for sampling of water from river and irrigation systems at 30 sites along the Niger and Senegal Rivers. Intensity of sampling with vary with location to a degree to be determined by detailed site profiles and risk characterizations.

	Key Performance Indicator	**Baseline (if baseline is not known, please identify how and when baseline will be established)**	**Method of data collection/Data collection strategy (including frequency)**
Project purpose (immediate objective): Riverine farming communities are provided with and adopt best practices and establish a community-based pesticide-monitoring system; thereby increasing agricultural productivity and profitability, while preventing contamination	• Five locations per country with established FFS programs Y2,M1; • Two curriculum development workshops take place Y1,Y3 • Yields of all target crops up by at least 25% overall average • Pesticide use reduced at least 50% (Y3, M12) Sampling of community waters and calculations of toxic loads and Human Health Risk assessments show greater than 50% reduction in toxic loads and risks to communities (Y3, M12)	• None yet established • Curriculum development workshops to take place under phase II of IPPM program (by June of 2005). This will offer a foundation for subsequent work, but will not touch on aquatic systems or contaminant prevention. • Current yields highly variable depending on crop and location • Pesticide use currently high with many highly toxic chemicals. Farmers often don't know more than local names for chemicals	• Site visits and baseline surveys • Project activity reports • Baseline surveys; subsequent FFS activities and impact study work • Baseline surveys; subsequent FFS activities and impact study work

of freshwater aquatic systems.	• Net income of participating farmers increased by at least 50% average (Y3, M12)	• Net incomes often marginal or negative	• Baseline surveys; subsequent FFS activities and impact study work
	• Contaminant loads in irrigation and drainage systems, including POPs, decreased by at least 50% by end of project (Y3, M12)	• Contaminant loads in project sites unknown, except for PDF-B locations, which show alarming levels of many highly toxic substances	• Intensive and extensive sampling regime over course of project

	Key performance indicator	Baseline (if baseline is not known, please identify how and when baseline will be established)	Method of data collection/Data collection strategy (including frequency)
Outcome1 Partnerships are established at local, national and regional levels; community baseline survey and national policy studies completed and made available to national governments and regional institutions	1.1 One regional, six national, and at least 30 site-specific consultation and planning meetings take place (Y1, M6);	1.1 Not yet done	1.1 Project Field Reports and Semi-annual reports
	1.2 Annual reports from project made available to CILSS CSP project over course of project. (Y4, M12)	1.2 No current feedback from local farming communities into the regional policy making framework	1.2 Results in the form of project reports, especially concerning farming practices (pesticide use), types of chemicals used by farmers and levels of contamination in rivers and irrigation systems to be sent to CPS
	1.3 Baseline community surveys, including water quality tests, conducted at 5 project sites in 6 countries; (Y1, M12)	1.3 Some data exist from extension and management agencies (SAED, Office du Niger, etc.), but not detailed enough or specific to our project sites.	1.3 Agreements with local extension and community-based programs to collaborate on data acquisition (community baseline surveys). ENDA Tiers Monde to head this effort.
	1.4 National policy studies completed and national workshops held to discuss outcomes; (Y3, M12)	1.4 Pesticide socio-economic studies have been completed in Senegal and Mali. Project will conduct similar studies in remaining 4 countries	1.4 National consultants will be hired in each of four countries, with overall supervision of studies to be handled by

			Regional Coordinator, or perhaps outside consultant
Outcome 2 Analysis of water and samples from target sites provide communities, local and national governments, regional and international partners information on contaminant loads in rivers, irrigation and drainage systems	2.1 Water samples taken and analysed in CERES/Locustox laboratory over course of project; 2.2 Data from water samples, together with data from community surveys and appropriate map data entered into GIS; 2.3 At least three simple empirically based modelling approaches used to help estimate relative risks to farmers and components of the aquatic environment from exposure to pesticides;	2.1 Baseline exists for Senegal only during PDF-B phase 2.2 There are various GIS databases in the region (e.g., SAED, WARDA, AGRHYMET, CSE). 2.3 Existing modelling efforts, involving these three simulation models, to date restricted to PDF-B activities.	2.1 Data collection will follow standard field and laboratory procedures, as per protocols established by laboratory and subject to certification requirements for internationally recognized ecotoxicology laboratory. 2.2 The project will work through FAO's existing GIS department (SDRN), which has established partnerships with AGRHYMET and CSE. The FAO-led development of GeoNetwork, an "Open-Source" based GIS platform, will be employed. 2.3 Data from community surveys on farmer pesticide use and water-use practices will be combined with water-sampling data to drive these empirically

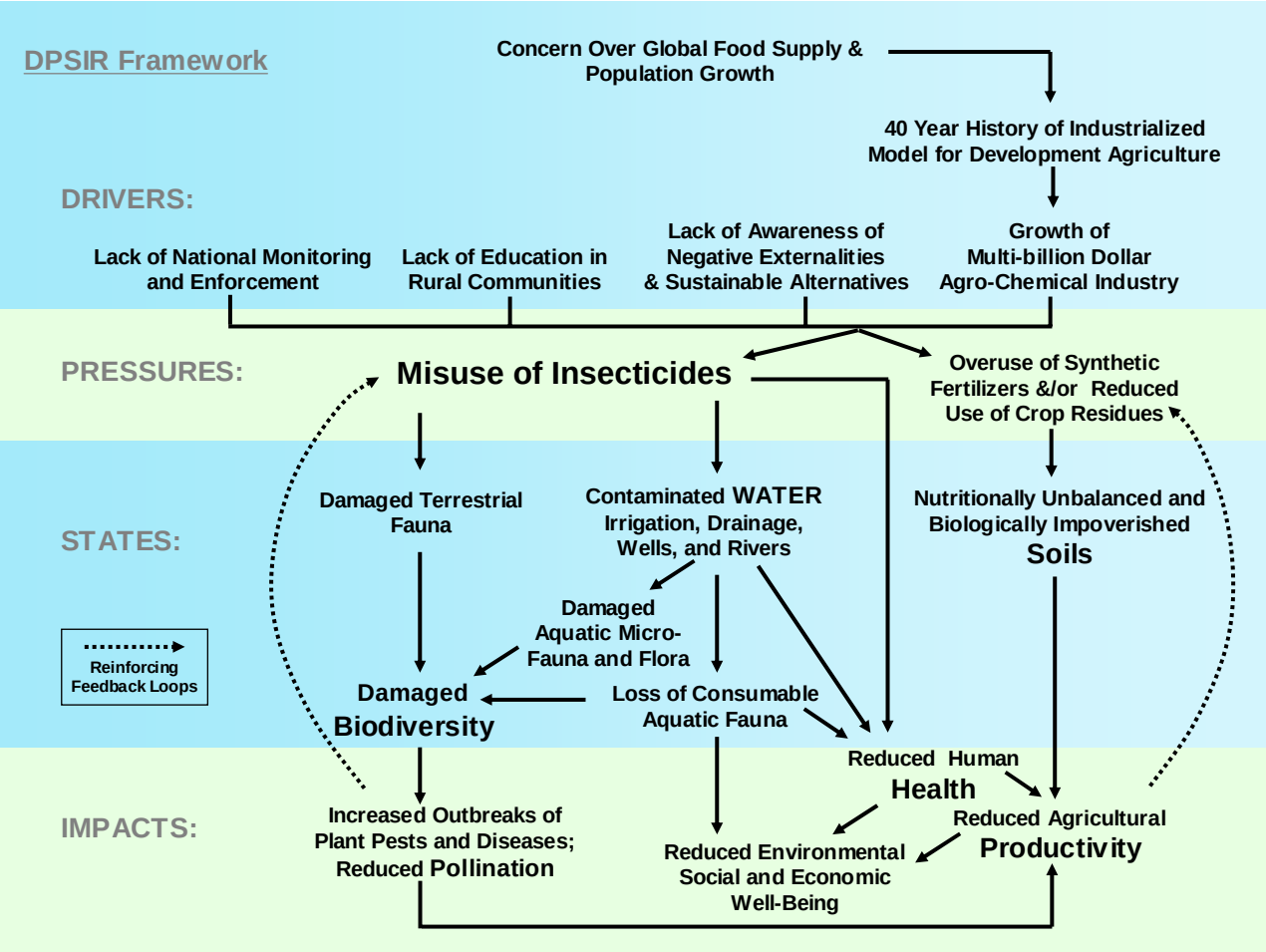
	2.4 Results translated into curriculum suitable for use in Farmer Field Schools for discussion of risks; 2.5 A financial-sustainability strategy developed by end of project to seek commitments necessary to support water-quality monitoring over the long-term (10-15 years) following the closure of the project.	2.4 No baseline on this type of study 2.5 CERES/Locustox is only certified and technically sophisticated laboratory in the sub-region. Project anticipates interest by other governments in developing similar expertise.	based models. 2.4 FAO technical supervision with experience in both technical aspects and especially in interpreting science in a "discovery-based" approach will be employed, along with experienced training facilitators from the sub-region 2.5 See detailed plan in main brief under component 2.
Outcome 3 Best-practices for pesticide-contaminant prevention and improved agricultural productivity are adapted for use, and adopted by local communities;	3.7 Farmer Field School curricula expanded to include best practices, information and issues related to importance, functioning, and contamination hydrological systems and aquatic environments; 3.8 Two curriculum-development workshops held Y1, Y3; 3.9 Two full-season "*Training-of-Trainers*" (TOT)	3.1 No baseline for this yet anywhere in world. 3.2 Curriculum development workshops for FFS style training to be conducted mid-2005. Will not include aquatic ecosystems and contaminant materials, nor the anticipated focus on economics of pesticide use	3.1 Reports from Technical experts collaborating with FFS curriculum development experts 3.2 Reports from Technical experts collaborating with FFS curriculum development experts

national cadres of trainers and farmers trained, and community-level pesticide-monitoring systems in place	programmes held in the third quarter of the first year, one for rice and one for vegetables;	3.3 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries. Redirected baseline to support these activities, along with training expertise from the sub-region developed during the IPPM programme	3.3 Standard reporting procedures for TOT and associated FFS
	3.10 A total of 150 "technician" trainers trained and conducting at least 4 FFS over the course of the project;	3.4 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries. Redirected baseline to support these activities, along with training expertise from the sub-region developed during the IPPM programme	3.4 Standard reporting procedures for TOT and associated FFS
	3.11 300 farmer trainers trained and conducting at least 2 FFS over the course of the project;	3.5 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries. Redirected baseline to support these activities, along with training expertise from the sub-region developed during the IPPM programme	3.5 Standard reporting procedures for FFS, plus results from impact studies
	3.12 Lessons learned and curriculum developed during the course of the project shared across all six countries, and beyond;	3.6 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries.	3.6 Reports from national coordinators and regional PCU regarding regional meetings
	3.13 Participation by women assured in FFS, especially in market gardening where women to a majority of the work;	3.7 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries.	3.7 Standard reporting procedures for FFS, plus results from impact studies
	3.14 Community-based monitoring systems for pesticide use developed and used by target communities;	3.8 No baseline exists anywhere	3.8 Standard reporting procedures for FFS, plus results

			from impact studies
Outcome 4 Inter-community exchange networks are established among communities sharing the same river and irrigation resources, and at national and regional levels, for promoting best agricultural practices and alternatives to pesticides	4.1 Develop networks among villages in the same water-use areas (same, shared river, irrigation and drainage systems) (Y3 M12)	4.1 Baseline does not exist	4.1 Project field reports and results of impact studies and evaluations
	4.2 Conduct "Open door" days at the end of each FFS, in which neighbouring communities are invited to witness and discuss outcomes of FFS training, including the nature of toxic risks from pesticides, the existence and increased benefits from alternative methods, and establishment of community-based monitoring systems; (after every seasonal FFS)	4.2 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries.	4.2 Standard reporting procedures for FFS, plus results from impact studies
	4.3 Farmer-Trainers (FT) to work with Technician-Trainers (TT) in neighbouring villages in new FFS aimed at expanding scope of training to eventually include entirety of water-use area; (Y2, M12)	4.3 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries.	4.3 Standard reporting procedures for FFS, plus results from impact studies
	4.4 Annual "Open door" meetings to be held at larger administrative levels for benefit of prefecture and department-level local government and communities (Y2, M12);	4.4 Baseline exists within the FAO/Netherlands IPPM programme for 2 of 6 countries.	4.4 Standard reporting procedures for FFS, plus results from impact studies
	4.5 Representatives elected from target water-use areas meet to discuss possible outcomes of project on larger scales of the river basin;	4.5 No baseline exists	4.5 Standard reporting procedures for FFS, plus results from impact studies
	4.6 Some inter-country exchanges, depending on strategic analysis of greatest likely outcome (most likely in cotton sector)	4.6 Small baseline exists with Mali-Burkina cotton growers	4.6 Project field reports

Annex J: ROOT-CAUSE ANALYSIS

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management



Based on **global concerns for population growth and future food supplies**, developing countries throughout the world, to varying extents, have laboured for the past 40 years to implement an "industrial" vision of modern agriculture as developed in Europe and North America. Most people consider the "Green Revolution" as having been focused primarily in Asia, and to a lesser extent in Latin America. However, certain sectors in Africa and the sub-region have been driven by this industrial approach. This is particularly true for export commodities--certain fruits, cocoa, tea, and most especially cotton. The industrial approach in rice is more limited. The Senegal River Basin is one of the more advanced cases of a blending of so-called "modern" methods (dam construction, irrigated perimeters, tractors for land preparation, combine harvesters, and intensified agro-chemical inputs) with small-holder communities, and also one of the least economically sound and ecologically sustainable examples. Each of the countries shows a similar pattern of movement towards so-called "intensified" agricultural production. In contrast, the traditional dry-land cereal subsistence-level cropping systems have changed little in terms of methods and yields over these same 40 years.

The problem in the sub-region, as found elsewhere in the developing world, is that not all elements of the industrial agricultural model turned out to be appropriate for small farmers, or indeed, even for large estate crops. The fact is that 40 years ago the world, including the scientists at the time, knew little or nothing about the indirect negative effects of pesticides in terms of agricultural production, nor the fate of agricultural chemicals in the environment, including the transport of persistent organic pollutants from equatorial deposition sites to the entire world, including even polar ecosystems. Negative agricultural outcomes included the rapid development of genetic resistance, and cross-

resistance, by arthropod pest populations to increasingly frequent and toxic doses of biocides, the resurgent and often massive outbreaks of secondary pests due to the disruption of their natural biological control factors, and the depletion over time of soil fertility due to the loss of the biological and ecological functioning of soil biota caused by an over-reliance on synthetic fertilizers.

Today, however, scientific communities, while never 100% in accord, are more-or-less in agreement that alternatives to the industrial models for agriculture are both urgently needed and eminently feasible. The Convention on Biological Diversity is founded on a list of 12 normative principles termed "the ecosystem approach", which advocates, among other areas, a more ecologically sustainable approach for agriculture. Governments around the world, including those in developing countries, are increasingly paying heed to concepts of "biodiversity", "sustainability" and "ecosystem resilience" in their national strategies and action plans.

However, **substantial barriers exist** to the eventual sustainable use and management of agricultural resources.

Drivers: Socio-economic and socio-cultural forces driving human activities, which increase or mitigate pressures on the environment

While most independent scientists have moved away from advocating the chemically intensive agricultural model, a **multi-billion-dollar pesticide industry** represents a continuing driving force in favour of continued high-intensity chemical use. Other barriers that exist in the sub-region include a fundamental **lack of education among rural people**, and more specifically lack of awareness of the overall negative net economic benefits resulting from pesticide use. Communities have some awareness that pesticides are toxic, as shown by the fact that more than 86% of the 500 farmers surveyed in the PDF-B indicated they knew at least one case of a serious intoxication event from pesticide poisoning. However, communities generally **lack awareness of the externalities** associated with pesticide use in terms of the possible long-term negative effects on humans and the environment. While good progress has been made at the regional and national levels in regard to pesticide registration with the creation and ratification of the *Comité Sahelien des Pesticides* (CSP) and the *Comité Phytosanitaire des Pays de la zone Humide de l'Afrique de l'Ouest et du Centre* CPH/AOC, there still is **almost entirely absent any national capacity for environmental monitoring and enforcement**.

Rural populations in some of the most highly industrialized agricultural settings in the sub-region are showing growing concern for profitability and sustainability. Witness the 20% reduction in area under cultivation in the SAED region of Senegal, due to a complex of reasons related to high input costs, poor productivity, subsidized imports of rice from Asia, leading increasingly to credit default and an increasing number of farmers abandoning rice production. However, **populations lack awareness of economically attractive alternatives**.

Pressures: Stresses that human activities place on the environment

The outcome of this confluence of driving forces in the sub-region is, quite simply, the perpetuation of the **misuse of synthetic pesticides** to an alarming extent and scale. This misuse is frequently accentuated by a psychological feedback loop in which insecticide-induced pest outbreaks, misunderstood, lead farmers to increase the amounts and toxicities of pesticides they apply. A similar negative feedback look exists for synthetic fertilizers, which are in themselves insufficient to stand in for a full and balanced nutrient management program. In most cases, populations in the sub-region do not apply excessive amounts of synthetic fertilizers (but this could happen without proper education), as is the case in wealthier countries in the world, but their **lack of awareness of the critical role played by soil organic amendments** still leads to an unbalanced and unsustainable approach to soil fertility management.

***States*: Condition of the chosen state variables for the environment**

Misuse of pesticides and unbalanced soil-fertility management are only two very straight-forward symptoms of unsustainable methods and lack of awareness, but their continued pressure engenders profound impacts on the **states of water**, **soil** and associated **aquatic and terrestrial biodiversity** in the sub-region. In the context of a more economically developed set of countries, these states would offer opportunity for monitoring changes over time; indeed, the DPSIR framework for analysis, and the other variants used in Europe and North America, was first developed in order to derive measurable indicators for monitoring change. *This GEF project represents the first systematic effort to monitor the contaminant levels of either of the two major river systems in the sub-region, and to attempt to model the likelihood of negative impacts on human health and biodiversity.*

***Impacts*: Effects of environmental degradation**

A plausible model for cause-and-effect relationships, once constructed, leads to the opportunity for discussion and debate at local, national, regional and international levels. While the details are always debatable, the impacts are not in doubt. Overuse of pesticides is, ironically, one of the primary causes of **increased plant pest and disease problems**. While human health is a very important end in itself, it also feeds into agricultural productivity in the form of ability to perform labour. Reduced agricultural productivity from biologically impoverished soils, a lack of knowledge of alternative practices, and possibly compromised health conditions from an as-yet-unknown, but possibly significant toxic load, all lead to **reduced productivity** and **reduction in economic and social well-being.**.

***Responses*: by society (not in graphic)**

The feedback loop of pesticide-use engendering increased pesticide use through disruption of native biodiversity is hardly in debate in academic and professional circle; this has been shown literally hundreds of times in the scientific literature. Unfortunately, the outcome is not obvious to the casual observer as it involves indirect pathways of cause-and-effect and the need to understand the functional roles of many small creatures. A minimum of practical education is required to understand some of the subtleties of ecological systems. The participatory Farmer Field School (FFS) approach has proven its strength for this and other reasons. Therefore, at the root of a successful response to the "pathologies" of the system is practical, hands-on, community-based education method, which will help communities to illuminate the causes of problems and offer the chance to explore more sustainable, productive, economically viable and healthy alternatives. Although not modelled in the diagram above, consider that **the most promising responses feed into the system at the level of the drivers** (most anything lower than this will be "**remediation**", not "**prevention**").

The project proposes to address certain of these specific proximate drivers, including lack of monitoring (although not of enforcement), lack of general (agricultural) education, lack of awareness of negative externalities associated with pesticide use, lack of awareness of sustainable alternatives and, indirectly, to address commercial pressures from the chemical industry by giving valuable monitoring and evaluation information to decision-makers nationally and regionally (CSP and CPH/AOC). Finally, and most importantly, the project aims to help farmers and farming communities along the river catchment areas to recognize the counter-intuitive mechanisms and the human, economic and environmental risks of pesticide use, and thereby "turn off" the demand for pesticides at the local level.

Annex K: INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

Institutional Framework

FAO, as the Executing Agency, will be responsible for the implementation of the project in accordance with the objectives and activities outlined in Section 2 of this document. UNEP, as the GEF Implementing Agency, will be responsible for overall project supervision to ensure consistency with GEF and UNEP policies and procedures, and will provide guidance on linkages with related UNEP and GEF-funded activities. The UNEP/GEF Co-ordination will monitor implementation of the activities undertaken during the execution of the project. The UNEP/GEF Co-ordination will be responsible for clearance and transmission of financial and progress reports to the Global Environment Facility.

FAO, as executing agency, will cooperate with UNEP so as to allow the organization to fulfil its responsibility as Implementing Agency accountable to the GEF. To this end, free access to all relevant information will be provided by FAO.

Donors

GEF: The GEF's added value is to provide incentives and financial support for national and local institutions to address priority issues related to POPs reduction and pesticides in inland waters. The Project's regional approach, with GEF support, will make financial resources available to recipient countries, to meet the "incremental costs" to address trans-boundary issues. GEF funds will assist in providing linkages and harmonizing national and local actions with regional objectives.

Co-Financiers: Co-financing agencies are an essential partner to the Project. GEF resources are catalytic in nature and additional sources of financing and expertise are essential to achieving the identified project objectives and programme goal over the longer term. Sources of finance represent a mix of national and re-directed project funding.

Project Execution and Implementation Arrangements

United Nations Environment Programme (UNEP): As the GEF Implementing Agency, UNEP will be responsible for overall project supervision to ensure consistency with GEF and UNEP policies and procedures, and will provide guidance on linkages with related UNEP and GEF-funded activities. The UNEP/GEF Co-ordination will monitor implementation of the activities undertaken during the execution of the project. The UNEP/GEF Co-ordination will be responsible for clearance and transmission of financial and progress reports to the Global Environment Facility.

Food and Agriculture Organization of the United Nations (FAO): As the Executing Agency of the project, FAO will provide the overall co-ordination and technical backstopping of the Project. In this capacity, FAO will be responsible for, *inter alia*, the overall financial management of the project, ensuring the necessary human resources and equipment inputs are provided in a timely manner to ensure smooth implementation of the project and delivery of project outputs, the submission of project progress and financial reports to UNEP/GEF. In close consultation with UNEP/GEF and the participating countries, FAO will recruit an international Chief Technical Adviser, who will be under the overall responsibility and direct supervision of FAO. The CTA will be responsible for providing technical and administrative support as well as for the management of the GEF resources at the level of the Technical Coordination Unit (TCU). The CTA will work with the Regional Project Coordinator in the day-to-day management and coordination of the project. FAO will provide technical support to the project in a very broad sense, tapping into the expertise from its programmes on GIS, land and water, African Stockpiles Programme, extension, legal advice, etc.

Project Coordination Units

The Headquarters-based Chief Technical Advisor (CTA) will organize the creation of a Regional Project Coordination Unit (RCU) to be set up in the sub-region.

The RCU will comprise two FAO professional staff positions and one FAO General Service staff position. To include a:

- **Regional Project Coordinator (RPC)**. Under the immediate supervision of the Chief Technical Officer in Rome (CTA), the officer will be responsible for overall operational activities and staff management of the Regional Project Management Unit (RPCU), as well as providing a strong technical role in guiding design and execution of the two projects. The RPC will liaise with the CTA on programmatic issues but will also maintain direct contact with partners, donors and countries in order to ensure that all technical issues are adequately addressed and technical inputs are suitably coordinated. In addition to ensuring the timely and efficient start-up and functioning of the two projects, the RPC will oversee budget design exercises, overall monitoring of project achievement of milestones and act as focal point for the synthesis of technical and financial reports from the field to be transmitted to the CTA for clearance before submitting to national governments and regional entities. Through oversight of the regional training and regional Monitoring and Evaluation officers the RPC will maintain oversight on training and M&E. Through direct links with CERES Locustox Foundation the RPC will provide frequent oversight on activities related to the water quality assessment work to be conducted under the GEF component #2.
- **Regional Project Administrative Assistant (RPAA)** will be hired by FAO to manage daily administrative and budgetary tasks of the RPCU and to monitor financial details among the seven countries, with guidance and support from the administrative assistant in the PCU Rome.
- **Data management administrator** (DMA) will lead the project in the elaboration of a system to effectively and efficiently assure data harmonization, entry, security and analysis and national and regional levels; monitor the outcomes and quality of the program activities; oversee the country-level technical assistants responsible for the national-level execution of the M&E activities; provide reports to the ICPC on the level of quality in the execution of the training programmes over all 6 countries; compile and keep accurate and up-to-date records of national figures and develop templates for use by the overall program; contribute to the development of tools for measurement of agronomic, socio-economic and environmental impacts resulting from the FFS; contribute to the Training-of-Trainers (ToT) in collaboration with national and regional partner institutions; coordinate the organization of workshops related to M&E in collaboration with national and regional partner institutions;
- **Communications, knowledge platform construction and maintenance consultant (CC)** will provide part-time assistance to the Regional Coordination Unit and National Coordination Units to monitor and maintain the project's Content Management Platform (CMP), including forum, wiki, document exchange and website; assure coherent reciprocal translation of web content in two languages (French and English)

The FAO will establish in each a **National Project Coordination Unit (NCU)**. National Project Coordinators (NPC) will be chosen in the countries by FAO. Semi-annual meetings among the CTA, RPC and the NCs will be held. One of these meetings, each year, will take place immediately prior to the meetings of the Regional Technical Steering Committee (RTSC) as a means of preparing up-to-date synopses of information for presentation to the RTSC. Annual regional meetings for activity assessment and planning will also be convened involving a wider range of participants from the countries involved in the project. These latter meetings will be arranged to take place prior to individual regional consultation meetings among the national and regional project coordinators;

The Project Coordination Units will maintain records of project activities and project expenditures at the national, regional and Headquarters levels. Such records will be made available to the executing and implementing agency representatives on request. The project workplan and timetable is presented in Annex H.

The National Project Coordinator (NPC) will work under the direct supervision of Regional Project Coordinator (RPC) and the national Representation of the FAO. The NPC will work under the general supervision of the Chief Technical Advisor (CTA) and will collaborate closely with the Geographic Information Systems Water Information Officer GIS/WIO and national institutional partners concerned with agriculture, community-level education, inland waters and environment. The NPC will share experiences and work in collaboration with NPCs in the other six countries. The general responsibility of the position will be to provide day-to-day management and supervision, guidance and quality assurance for all aspects of the national program.

Specific:

1. to provide technical and operational supervision for the training-of-trainers and training of farmers;
2. prepare the terms of reference and to supervise national consultants involved in the execution of the project;
3. supervise the administrative and financial aspects of all activities and operations related to the national project;
4. organize national workshops and, in collaboration with the RPCU and PCU, regional and international workshops;
5. develop and promote the principles of Integrated Production and Pest Management (IPPM), including standards and best practices, within the country;
6. collaborate closely with NPCs in the other project countries;
7. participate in meetings and other activities related to the project at the regional level;
8. address other tasks at the request of the RPC and CTA.

Policy and Advisory Bodies

Six National Technical Steering Committees (NTSC) will be set up at the beginning of the project comprising a membership to be decided by each country's lead ministry (which may vary among countries)

Composition

As decided upon during the Stakeholders Meeting in Bamako, Mali, March 2005, the National Technical Steering Committees (NTSC) will comprise a maximum of 11 members from a diversity of Ministries and other entities. The specific composition will depend on the country, but the following was considered representative of a desirable mix.

As an example of the type of composition for National Technical Steering Committees:

1. Ministry of Agriculture
2. Ministry of Environment
3. Ministry of Finance
4. Ministry of Water
5. Ministry of Fisheries
6. Ministry of Health
7. Ministry of Decentralization
8. Civil Society (NGO active in the fields of environment and agriculture)
9. Research (institute active in research in agriculture or environment)
10. The Operational Focal Point for GEF
11. Pesticide distributors association

Scope

The National Technical Steering Committee is responsible for guidance related to the overall orientation of the national program as well as Monitoring of the project execution to assure

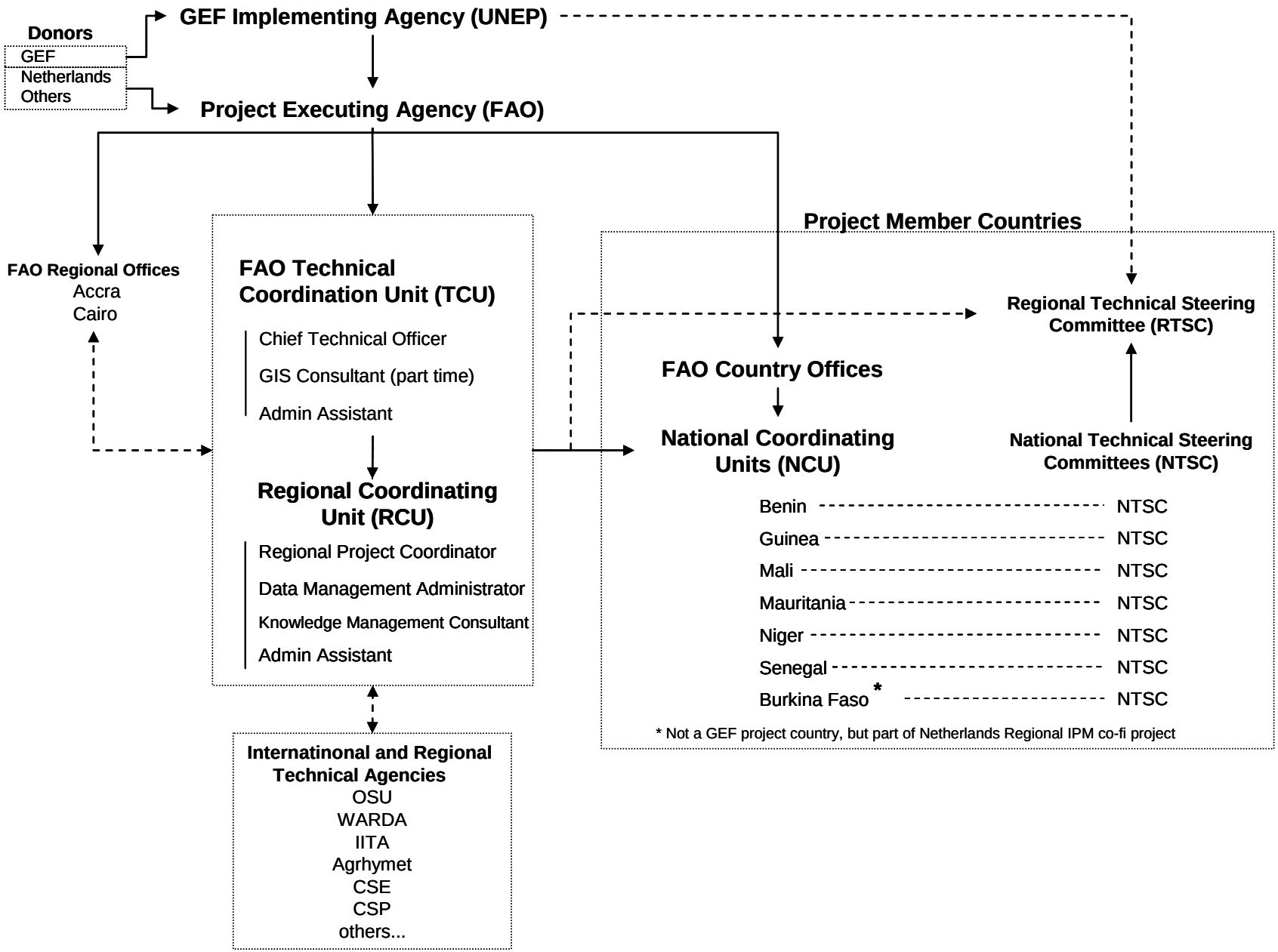
conformance to the project Logical Frameworks and overall project documents. The NTSCs will perform an especially important task in transmitting the results of the project back to the national decision-making bodies with the intent of influencing appropriate policy changes. The two principal projects in the portfolio of the NTSC are the GEF IW/POPs project: *Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management*, and the major co-financing project *GCP/INT/009/NET Sub-Regional Programme for IPPM through Farmer Field Schools: Benin, Burkina Faso, Mali and Senegal*. Of the seven countries involved in these two projects, six are GEF project countries and four are Netherlands regional project countries. Three of the four Netherlands-Regional project countries are also GEF project countries (Senegal, Mali and Benin). As the two projects share complementary objectives, it was decided for the three countries in which both projects are being executed to combine the two projects within a single National Technical Steering Committee structure.

Operational Procedures

Lead ministry and composition will be determined by the committee and will initially conform to structures suggested in the country reports presented in March 2004. Meetings will take place two times per year with the possibility of extraordinary sessions as circumstances warrant. These meetings will be scheduled to take place just prior to the Regional Technical Steering Committee meetings, if possible.

A Regional Technical Steering Committee (RTSC) will be set up at the beginning of the project comprising a representative each from UNEP, FAO, the participating countries' NTSC and possibly relevant regional Agencies. The RTSC will be chaired on a rotating basis by the member countries; a representative of FAO will serve as Executive Secretary and the project coordinator will attend in an ex-officio capacity (see Annex K for details on overall and national coordinating structures;

The RTSC will first meet immediately following completion of the appraisal phase and signatures of the GEF CEO, to act as technical and policy advisor to the project and to assist in any required agreements and arrangements for project execution. The RTSC will subsequently meet one time per year including what will be termed a mid-term meeting and a meeting to be held 3-6 months prior to project completion. At the mid-term meeting, project and component progress will be reviewed, any delays or outstanding difficulties will be discussed and resolved, and forward planning for the subsequent period of project execution will be undertaken. The independent mid-term evaluation commissioned by UNEP in collaboration with FAO will also be reviewed during this meeting. The final RTSC meeting will check to see that all deliverables are completed and that arrangements have been made for sustaining of major consultative and informational components created by the project;


Donors
GEF
Netherlands
Others
GEF Implementing Agency (UNEP)
Project Executing Agency (FAO)
FAO Regional Offices
Accra
Cairo
FAO Technical Coordination Unit (TCU)
Chief Technical Officer
GIS Consultant (part time)
Admin Assistant
Regional Coordinating Unit (RCU)
Regional Project Coordinator
Data Management Administrator
Knowledge Management Consultant
Admin Assistant
Internatinonal and Regional Technical Agencies
OSU
WARDA
IITA
Agrhymet
CSE
CSP
others...
Project Member Countries
FAO Country Offices
National Coordinating Units (NCU)
Regional Technical Steering Committee (RTSC)
National Technical Steering Committees (NTSC)
Benin ---------- NTSC
Guinea ---------- NTSC
Mali ---------- NTSC
Mauritania ---------- NTSC
Niger ---------- NTSC
Senegal ---------- NTSC
Burkina Faso * ---------- NTSC
* Not a GEF project country, but part of Netherlands Regional IPM co-fi project

Annex L: SELF-FINANCED FARMER FIELD SCHOOLS

Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management

The following was excerpted from LEISA MAGAZINE . MARCH 2003. A full version of this paper is available at *www.eseap.cipotato.org/upward.*

Towards self-financed farmer field schools

James Robert Okoth, Godrick S. Khisa and Thomas Julianus

The effectiveness of Farmer Field Schools often depends on their financial sustainability. This article looks at several innovations for financially sustainable FFSs that were developed by the East African Sub-regional Pilot Project on Integrated Production and Pest Management Farmer Field Schools, and are now being taken up by a number of other FFS programmes. The cornerstone of these innovations has been the evolution of an initial grant system (semi-self financed FFSs) into an educational revolving fund (self-financed FFSs), supported by the proceeds of commercial plots that are managed alongside the study plots. Involving farmers right from the start has been crucial in successfully implementing these innovations.

The semi-self financed FFSs were initiated in 1999 with the introduction of the grant system, in which farmer groups wrote simple proposals for grants to run their FFSs. Figure 1 provides a flow chart of steps in the development of a semi-self financed IPPM FFS. Step One is for a group to submit a proposal in response to an announcement that grants are available. Grant forms include guidelines and application forms for groups. Currently, IPPM FFS grants require that the group have three officers (Chairperson, Treasurer and Secretary) of which at least one is a woman (in mixed gender cultures). Groups must have a multi-signatory savings account and agree to record keeping and audits, and the grant must be used for at least one high value crop and a food crop. The group may also include other topics such as IPPM for poultry. An indicative budget is provided for partial guidance, but it is also stated that extension staff should be paid based on officially published rates, although these can be negotiated. The grant form provides space for background, justification for grant and activities, work plans and budget, and should include the signatures of all group members as well as the local agriculture officer.

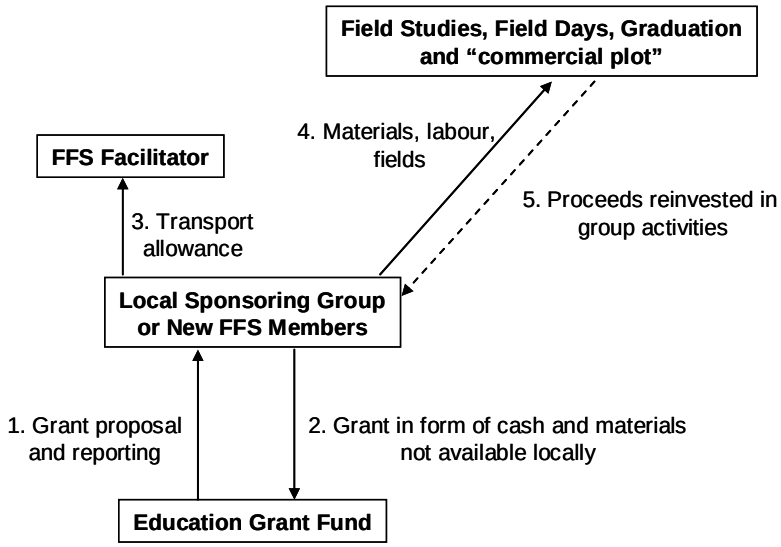


Figure 1.
Semi-self financed FFS with capital provided by grant and proceeds reinvested into group activities.

Once the grant is approved, Step Two is to transfer the grants to the groups. Typically this is a combination of materials and cash or cash alone. Materials such as flip-chart paper, crayons and other stationary are more cheaply available (or only available) in large cities, so it is more efficient to provide some materials. Cash is provided in at least two instalments over the season, depending on the length of the FFS (for example, annual crops are usually 4-5 months, soil and perennial crops are 12-18 months). The size of the grant for IPPM FFSs is typically US$100 to US$400 per season of study. The grant reporting must include bookkeeping, maintaining receipts and accepting an audit. Grants can in some cases be transferred electronically to accounts, and in other cases they are provided in cash. In many cases the opportunity to handle and control funds has led to increased ownership with farmers providing co-financing as well.

In Step Three, payments to field school facilitators are made directly by the field school group at pre-agreed rates. If the facilitator lacks technical skills, is a poor facilitator or even has inappropriate social skills (arrogance and top-down approaches are leading problems), the group may "release" or "fire" the facilitator – and this has indeed been known to happen. Facilitators receive important feedback from this! If the facilitator does not show up or shows up in an inappropriate state (for example, drunk or late), the group can withhold payment. On the other hand, the facilitators usually receive payment on the day they travel – a far better situation, they feel, than filling out paperwork and waiting for a delayed payment, as is typical of most extension travel allowances. Groups may also request that information on special topics such as soils, nutrition, or environment be delivered by specialised staff, in which case they use the grant to pay transport for the specialist.

In Step Five, proceeds from the FFS plots are re-invested in the groups own account. This has now become possible because all grant-recipient FFSs must have their own accounts and means of managing them. The funds are used by the group for further study, and the purchase of animals or other activities. Each group is also requested to assist in training one other group, and farmer-led field schools are quite successful.

As a result of this grant process, groups have shown a very high level of ownership of the FFS process. Many FFSs enjoy a high level of matching funds, material inputs provided by the community and participants, and display an increasing ability to manage funds and activities on their own. Groups become more independent of extension services, and they are also better partners for the extension services – even though many extension services still have difficulty seeing this. The process of applying for grants, making work plans and budgets, organising fields, paying facilitators and managing funds, enables groups to organise themselves to continue on their own. Although FFS grants are intended to support a group for a set time period, many field school participants go on to develop longer-term associations due to the cohesion, trust and joint fund-raising ability developed during the FFS period. The grants provide capital to groups and catalyse new ways of working together. Case studies from various beneficiary semi-self financed groups indicate that if well guided, the groups are able to recover the whole grant after a couple of seasons. As a result, self-financed FFSs are emerging, where the grant has been transformed into an educational revolving loan.

Self-financed FFS

Although semi-self financed IPPM FFSs partially solve at least one issue some of the problems of maintaining the sustainability of farmer groups, extension officers need a new set of funds each season to keep the programme expanding year after year. Thus, new ideas have been sought by IPPM facilitators and farmers, resulting in the self-financed model. The basic difference between this model and the semi-self financed FFS is that the group is the recipient of revolving funds, rather than a grant. The loan-requesting group must agree – by group contract – that they will return the operational costs of the IPPM FFS to the revolving fund. The concept is similar to revolving seed funds, in which one kilogram of seed provided at the beginning of the season is repaid with one or more kilograms of seed at the end of the season. In the case of self-financed field schools, operational costs are pre-financed and the group returns the operational fee at the end of the season through funds raised in the field plots and educational fees.

The model allows very resource-poor farmers to participate, as they are able to help generate funds for the FFS fund by contributing their labour during part of the season. It is conceivable and perhaps even more effective, that instead of cash repayment, farmers could replenish the fund with in-kind contributions.

Operational guidelines are currently being developed on the best way to implement the educational revolving fund, taking into consideration key concerns like the security of the revolving fund from local "leakage" and the problem of payback during drought or flood. The second issue is more problematic, but it is felt that either farmers will have to pay with educational fees, or the repayment could be reduced in proportion to typical yield losses seen in the field. The rationale for the guidelines is the need to come up with an operational framework that can blend into the existing structures such as FFS networks, the extension system, political structures and civil organisations with minimum overhead costs. So far, the FFS networks provide the most suitable structure for handling the revolving fund.

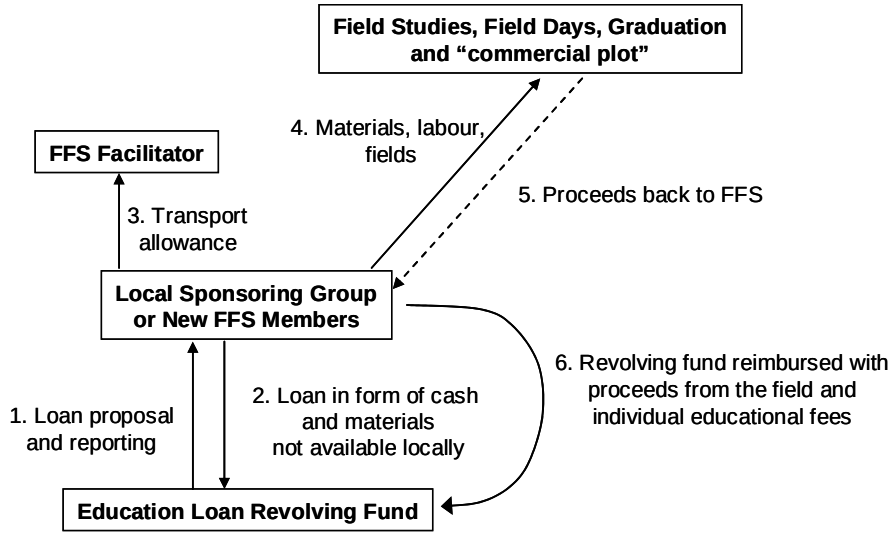


Figure 2. Self-financed Field School with capital provided by revolving fund. The group reimburses the fund at the end of the season.

A major concern is the issue of reputation. The model requires that farmers trust the knowledge and teaching ability of IPPM facilitators before signing the contract. Unfortunately, the top-down programmes of the past have given many extension systems a poor reputation, so this may be a very serious problem. Retraining of extension staff into IPPM facilitators with technical and facilitation skills has helped, but the farmers long-term experiences with extension services may be difficult to overcome.

One positive development is the increasing interest of local governments and some NGOs in the approach, to the extent of committing some of their meagre funds to sponsoring the establishment of FFSs. As a result, the FFSs are recognised as a major channel for community development. Similarly, rural micro-finance institutions are also using the FFSs as an entry point for group loans. In Uganda, Village Banks have been established by private sector promotion centres in the three pilot districts, where the FFSs are able to buy shares and acquire simple loans. The same Centres provide financial management skills to the groups. In Kenya some farmers have began pulling together resources and funding FFS activities, the so-called self-sponsored Farmer Field Schools. This level of confidence in the FFSs indicates a very bright future, which will be strengthened more by the self-financing approach.

Annex M: FORMAT FOR BIANNUAL PROGRESS REPORT TO UNEP
as at 30 June and 31 December
(Please attach a current inventory of outputs/Services when submitting this report)

1. Background Information

1.1 Project Number:

1.2 Project Title:

1.3 Division/Unit:

1.4 Coordinating Agency or Supporting Organization (if relevant):

1.5 Reporting period (the six months covered by this report):

1.6 Relevant UNEP Programme of Work (2002-2003) Subprogramme No:

1.7 Staffing Details of Cooperating Agency/ Supporting Organization (Applies to personnel / experts/ consultants paid by the project budget):

Functional Title	Nationality	Object of Expenditure (1101, 1102, 1201, 1301 etc..)

Sub-Contracts (if relevant):

Name and Address of the Sub-Contractee	Object of expenditure (2101, 2201, 2301 etc..)

2. Project Status

2.1 Information on the delivery of outputs/services

	Output/Service (as listed in the approved project document)	Status (Complete/ Ongoing)	Description of work undertaken during the reporting period	Description of problems encountered; Issues that need to be addressed; Decisions/Actions to be taken
1.				
2.				
3.				

2.2 If the project is not on track, provide reasons and details of remedial action to be taken:

3. Discussion acknowledgment (To be completed by UNEP)

Project Coordinator's General Comments/Observations	First Supervising Officer's General Comments
Name: _____ Date: _____ Signature: _____	Name: _____ Date: _____ Signature: _____

Annex M: ATTACHMENT TO HALF-YEARLY PROGRESS REPORT: FORMAT FOR INVENTORY OF OUTPUTS/SERVICES

a) Meetings

No	Meeting Type (note 4)	Title	Venue	Dates	Convened by	Organized by	# of Participants	List attached Yes/No	Report issued as doc no	Language	Dated
1.											
2.											
3.											

List of Meeting Participants

No.	Name of the Participant	Nationality

b) Printed Materials

No	Type (note 5)	Title	Author(s)/Editor(s)	Publisher	Symbol	Publication Date	Distribution List Attached Yes/No
1.							
2.							
3.							

c) Technical Information / Public Information

No	Description	Date
1.		
2.		
3.		

d) Technical Cooperation

No	Type (note 6)	Purpose	Venue	Duration	For Grants and Fellowships		
					Beneficiaries	Countries/Nationalities	Cost (in US$)
1.							
2.							

e) Other Outputs/Services (e.g. Networking, Query-response, Participation in meetings etc.)

No	Description	Date
1.		
2.		
3.		

Note 4
Meeting types (Inter-governmental Meeting, Expert Group Meeting, Training Workshop/Seminar, Other)
Note 5
Material types (Report to Inter-governmental Meeting, Technical Publication, Technical Report, Other)
Note 6
Technical Cooperation Type (Grants and Fellowships, Advisory Services, Staff Mission, Others

Annex N: CASH ADVANCE STATEMENT

Statement of cash advance as at .....
And cash requirements for the six-months of .....

Name of cooperating agency/ Supporting organization _____
Project No. _____
Project title _____

I. **Cash statement**

1. Opening cash balance as at ..... US$ _____
2. Add: cash advances received:

Date	**Amount**
.....	.....
.....	.....
.....	.....
.....	.....

3. Total cash advanced to date US$ _____
4. Less: total cumulative expenditures incurred US$ (_____)
5. Closing cash balance as at ..... US$ _____

II. **Cash requirements forecast**

6.Estimated disbursements for six-months ending[13] .....US$ _____
7. Less: closing cash balance (see item 5, above) US$ (_____)
8.Total cash requirements for the six-months .....US$ _____

Prepared by_____ Request approved by_____
Duly authorized official of cooperating agency/ supporting organization

[13] A cash request should be supported by a detailed itemized breakdown of estimated expenditures using the same budget lines as per the approved budget in UNEP format, Annex U.

Annex O: FORMAT OF QUARTERLY PROJECT EXPENDITURE ACCOUNTS FOR SUPPORTING ORGANISATION

Quarterly project statement of allocation (budget), expenditure and balance (Expressed in US$) covering the period

..... to .....

Project No. ..... Supporting Organization .....

Project title: .....

Project commencing: ..... Project ending: .....

(date) (date)

Object of expenditure by UNEP budget code	**Project budget allocation for year.....**		**Expenditure incurred for the quarter .....**		**Cumulative expenditures this year .....**		**Unspent balance of budget allocation for year .....**	
	m/m (1)	**Amount (2)**	**m/m (3)**	**Amount (4)**	**m/m (5)**	**Amount (6)**	**m/m (7)**	**Amount (2)-(6)**
1102 National Project Technical Coordinator (P4) / 48 w/m								
1103 Finance and Budget Officer (P3) / 12 w/m								
1203 GIS Consultant 24 w/m								
1204 National Coordinators (3 of 6 countries *) / 144 w/m**								
1205 National Assistants (3 of 6 countries *) / 144 w/m**								
1206 National Technical Staff 2 per country (3 of 6 countries *) / 288 w/m**								
1207 Casual Labour (drivers 336 w/m, office help 48 w/m, temporary personnel 36 w/m)								
1208 Local Travel (within country for National coordination)								
1601 International Travel								
1602 Sub-Regional Travel								
2201 Capacity building for Regional Ecotoxicology Laboratories								

2202	**Water chemical sampling and analysis**								
2203	**Village-level diagnostic surveys, and monitoring**								
2204	**National Publicity (Rural radio, TV, local newspapers)**								
2205	**Socio-economic Studies (pesticide-policy environment)**								
3201	**Training of the trainers**								
3202	**Trainer Refresher Workshops**								
3203	**Training of Farmers (FFS)**								
3204	**Special Topics (IPVM, SRI, Int Aquaculture)**								
3205	**Curriculum Development workshops**								
3206	**Local exchange visits**								
3207	**Regional exchange visits**								
3301	**National technical workshops**								
3302	**Regional technical workshops**								
3303	**Coordination Meetings (national)**								
3304	**Steering Committee Meetings (regional)**								
4101	**Office supplies**								
4102	**Library acquisitions, mapping materials, computer software**								
4201	**Office furniture**								
4202	**Vehicles (5)**								
4203	**Desktop Computers (2 per country * 3 countries)**								
4204	**Laptop Computers (1 per country * 3 countries+ 1 for**								

Rome)								
4205 Printers (1 per country * 3 countries + 1 for Rome)								
4206 Photocopy machines (1 per country * 3 countries)								
4207 Portable PowerPoint projectors (1 per country * 3 countries)								
4208 Universal Power Supplies (2 per country * 3 countries)								
4209 Digital cameras (2 per country * 3 countries)								
4210 GPS units (2 per country * 6 countries)								
4301 National Maintenance								
4302 National office space								
4303 Regional PCU (office space, utilities, maintenance)								
5101 Operation and Maintenance of vehicles (5)								
5201 Documentation and Publications								
5301 National Communications								
5302 Support Services for FAO								
5502 Mid-term and Final project evaluation (UNEP keeps funds for hiring consultants)								
99 GRAND TOTAL								

Signed: _____

Duly authorized official of supporting organization

NB: The expenditure should be reported in line with the specific object of expenditures as per project budget

Annex P: TERMINAL REPORT FORMAT

1. Background Information

1.1 Project Number

1.2 Project Title

1.3 UNEP Division/Unit

1.4 Implementing Organization

2. Project Implementation Details

2.2 Project Activities (*Describe the activities actually undertaken under the project, giving reasons why some activities were not undertaken, if any)*

2.3 Project Outputs (*Compare the outputs generated with the ones listed in the project document*)

2.4 Use of Outputs (*State the use made of the outputs)*

2.5 Degree of achievement of the objectives/results (*On the basis of facts obtained during the follow-up phase, describe how the project document outputs and their use were or were not instrumental in realizing the objectives / results of the project)*

2.6 Determine the degree to which project contributes to the advancement of women in Environmental Management and describe gender sensitive activities carried out by the project.

2.7 Describe how the project has assisted the partner in sustained activities after project completion.

3. Conclusions

3.1 Lessons Learned (*Enumerate the lessons learned during the project's execution. Concentrate on the management of the project, including the principal factors which determined success or failure in meeting the objectives set down in the project document*)

3.2 Recommendations (*Make recommendations to (a) Improve the effect and impact of similar projects in the future and (b) Indicate what further action might be needed to meet the project objectives / results*)

4. Attachments

4.1 Attach an inventory of all non-expendable equipment (value over US$ 1,500) purchased under this project indicating Date of Purchase, Description, Serial Number, Quantity, Cost, Location and Present Condition, together with your proposal for the disposal of the said equipment

4.2 Attach a final Inventory of all Outputs/Services produced through this project

Attachment To Terminal Report: Format For Inventory Of Outputs/Services

a) Meetings

No	Meeting Type (note 4)	Title	Venue	Dates	Convened by	Organized by	# of Participants	List attached Yes/No	Report issued as doc no	Language	Dated
1.											
2.											
3.											

List of Meeting Participants

No.	Name of the Participant	Nationality

b) Printed Materials

No	Type (note 5)	Title	Author(s)/Editor(s)	Publisher	Symbol	Publication Date	Distribution List Attached Yes/No

c) Technical Information / Public Information

No	Description	Date
1.		
2.		
3.		

d) Technical Cooperation

No	Type (note 6)	Purpose	Venue	Duration	For Grants and Fellowships		
					Beneficiaries	Countries/Nationalities	Cost (in US$)
1.							
2.							

e) Other Outputs/Services (e.g. Networking, Query-response, Participation in meetings etc.)

No	Description	Date
1.		
2.		
3.		

Note 4: Meeting types (Inter-governmental Meeting, Expert Group Meeting, Training Workshop/Seminar, Other)
Note 5: Material types (Report to Inter-governmental Meeting, Technical Publication, Technical Report, Other)
Note 6: Technical Cooperation Type (Grants and Fellowships, Advisory Services, Staff Mission, Others)

Annex Q: Inventory of Non-Expendable Equipment Purchased Against UNEP Projects[14]
Unit Value Us$1,500 and Above and Items of Attraction

As At _____
Project No._____
Project Title _____
Executing Agency: _____
Internal/SO/CA (UNEP use only)_____
FPMO (UNEP) use only)_____

Description	Serial No.	Date of Purchase	Original Price (US$)	Purchased / Imported from (Name of Country)	Present Condition	Location	Remarks/recommendationfor disposal

The physical verification of the items was done by:

Name:_____ Signature:_____

Title: _____ Date: _____

Annex R: LIST OF ACRONYMS

ANCAR	*Agence Nationale de Conseil Agricole et Rural*
ASPRODEB	*L'Association Sénégalaise pour la Promotion du Développement à la Base.*
CBD	Convention on Biological Diversity
CILSS	*Comité Permanent Inter Etats de Lutte contre la Sécheresse au Sahel*
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, D.C., 1973.
CMDT	*Compagnie Malienne de Textiles*
COP	Conference of Parties (*e.g.,* to a specific Convention)
CPH/AOC	*Comité Phytosanitaire des Pays de la zone Humide de l'Afrique de l'Ouest et du Centre*
CSP	*Comité Sahelien des Pesticides*
EC	Emulsifiable Concentrate: a water-soluble formulation for pesticides, commonly used by farmers
ENDA	Environment and Development Action in the Third World
FAO	Food and Agriculture Organization of the United Nations
F CFA	*Francs Communauté Financière Africaine*
FFS	Farmer Field Schools
GCP/RAF/378/NET	Reference to Dutch-funded programme: Integrated Production and Protection Management programme (IPPM) in West Africa (Mali, Senegal, Burkina Faso)
GEF	Global Environment Facility
IA	Implementing Agency
IFCS	Inter-Governmental Forum on Chemical Safety
IOMC	Inter-Organisational Programme for the Sound Management of Chemicals
IPCS	International Programme on Chemical Safety
IPPM	Integrated Production and Pest Management
ISRA	*Institute Sénégalese pour la Recherche Agricole*
ITA	*Institute Technologique Agricole*
NBA	Niger River Basin Authority
NGOs	Non-Governmental Organizations
NIP	National Implementation Plan (for POPs under the Stockholm Convention)
OAU	Organization for African Unity (Currently, African Union)
OMVS	Organisation pour la Mise en Valeur du fleuve Sénégal
ONAHA	Office Nationale des Amenagements Hydro-Agricoles
OP	(GEF) Operational Programme
PASAOP	*Programme dAppui aux Services Agricoles et aux Organisations Paysannes*
PASP/ASP	*Le Programme africain relative aux stocks de pesticides* (African Stockpiles Programme)
PDF	Project Preparation and Development Facility (GEF)
POPs	Persistent Organic Pollutants
PNIR	*Programme National d'Infrastructures Rurales*
PRONAT	*Protection Naturelle des Cultures*
PSD	Passive Sampling Device
PTS	Persistent Toxic Substances
Ramsar Convention	Convention on Wetlands of International Importance especially as Waterfowl Habitat, Ramsar, Iran, 1971.
RBA	Regionally Based Assessment of Persistent Toxic Chemicals (GEF Project)
SAED	*Société d'Amenagement et d'Exploitation des Terres du Delta*
SC	Stockholm Convention on Persistent Organic Pollutants
SRI	System of Rice Intensification
TOT	Training of Trainers

ULV	Ultra-Low Volume: a pesticide formulation for use in aircraft and special ground equipment that results in very low dosages being applied
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
WB	World Bank
WHO	World Health Organization
WWF	World Wildlife Fund

Annex S: REFERENCES

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Annex T: Terms of Reference

JOB DESCRIPTIONS

1. Chief Technical Advisor (co-financing contribution by GCP/RAF/009/NET)
2. Regional Project Coordinator
3. GIS Water Information consultant
4. National Project Coordinators (3 of 6 from co-financing contribution by GCP/RAF/009/NET)
5. National Technical Assistant for Non-Formal Education (3 of 6 from co-financing contribution by GCP/RAF/009/NET)
6. National Technical Assistant for Monitoring & Evaluation (3 of 6 from co-financing contribution by GCP/RAF/009/NET)
7. National Technician Trainers (from country co-financing)
8. Headquarters' Clerk (from co-financing contribution by GCP/RAF/009/NET)
9. Regional Administrative Assistant (from co-financing contribution by GCP/RAF/009/NET)
10. National Project Secretaries (3 of 6 from co-financing contribution by GCP/RAF/009/NET)
11. Regional and National Project Coordination Units
12. National and Regional Technical Steering Committees
13. Regional Technical Steering Committees
14. Regional Contractor for Community-Level Diagnostics
15. Regional Contractor for Water Quality Analysis
16. International Contractor for Technical Support: Water Quality, Modeling, GIS

Terms of Reference of the Chief Technical Officer

The Chief Technical Advisor (CTA) will be a senior officer position (P-5) based at FAO in Rome working under the overall supervision of the Director of the Department for Agricultural Production (AGP). The incumbent will provide overall management and coordination of technical activities and administrative duties related to the GEF Senegal and Niger Rivers Pollution project and all related co-financing projects, including the Netherlands-funded IPPM Phase II (IPPM-II) project and in cooperation with the Technical Steering Committees at national and regional levels. The post will provide overall technical and administrative oversight of the Regional Coordination Unit (RCU) based in Dakar Senegal as well as project staff in all project countries. The post will liaise with relevant Headquarters' Departments providing technical and administrative services and promoting synergies with related FAO projects and activities. The post will also liaise at national, regional and international levels with universities, research institutes, government and regional agencies and non-governmental organizations (NGOs) involved in river basin management, as well as Farmer Field School (FFS) and pesticide risk reduction projects.

Specific:

1. Coordinate and monitor activities of all project staff in the RCU as well as all National Project Coordinators (NPCs);
2. Approve and develop work plans and critical time flow analysis of overall project implementation in consultation with the National Coordinators of the various project countries and the RCU;
3. Facilitate and ensure the timely flow of project related funds, timely submissions for calls of funds and drawing up of specifications and terms of reference as required (consultants contracts supplies etc.);
4. Liaise with donors, potential donors, project partners and regional and national agencies related to the implementation of the project and the funding of new elements as need arises;
5. Provide technical and administrative support service inputs to ensure the effective start up of the national IPPM projects and provide advice to national authorities;
6. Provide oversight of all project expenditures and reporting thereof;
7. Monitor monthly and quarterly progress of activities to ensure that the overall project time frame is met and propose acceptable alternatives when difficulties or delays arise;
8. Ensure adequate provision of support for monitoring and evaluation of the country and regional-level activities;
9. Act as secretary for the Regional Technical Steering Committee meetings ;
10. Link to other FAO/GEF programmes of relevance, such as the African Stockpiles Programme (AGPP), various river-basin and watershed development projects, and various Farmer Field School initiatives found elsewhere in Africa and, where relevant, in other regions of the globe;
11. Assist in and contribute to supervision of specialist training consultants and participate as occasional lecturer in workshops and training courses;
12. Oversee overall data management, analysis and reporting, including publications;
13. Communicate with national, regional and international agencies in the context of public awareness and discussions related to project outcomes leading to changes in policy;
14. Ensure national access to country data through the network of FAO Country offices and project databases and website;
15. Coordinate the preparation and final submission of technical, financial and evaluation reports to the various partners and donors;
16. Represent the project at meetings or media events;
17. Perform other duties as needed to facilitate implementation upon the request of the Global Facility Coordinator.

Qualifications:

- A PhD in agriculture, entomology, environmental science or in a related subject matter;
- A minimum of 10 years experience in field of Integrated Pest Management in developing countries;
- Experience and advanced knowledge of principles and practices of participatory education;

- Experience and advanced knowledge of principles and practices of ecological agriculture;
- Extensive experience in Francophone West Africa;
- Experience in working at a senior level with governments, international organizations and other relevant organizations;
- Excellent presentation skills both verbal and in writing;
- Familiarity and experience with data processing, statistical analysis and common computer software;
- Fluent in English (level C) and French (level B).

Duty Station: Rome
Duration: 4 years

Terms of Reference of the Regional Project Coordinator

The Regional Project Manager (RPC) will be Professional Officer (P-4) position based in Dakar Senegal and will work under the overall supervision of the Chief Technical Advisor (CTA). The position will be in charge of operations of the Regional Project Coordination Unit (RPCU) and will oversee National Project Coordination Units (NPCUs) in participating countries.

Specific:

1. Oversee execution of project components, including planning and execution of activities related to awareness-raising, water-quality analysis for pesticide residues, training of trainers and farmers through farmer field school programs, development of networks among participating communities and overall administration of projects in the region
2. Assure assignment of tasks, coordination and monitoring of activities and Regional Project Coordination Unit (RPCU) staff involved in project-related activities
3. Act as focal point for communications to and from the NPCUs
4. Develop work plans and critical time flow analyses for integrated project activities
5. Provide technical and administrative oversight and guidance to ensure the effective start up of the national IPPM projects and provide advice to national authorities;
6. Ensure adequate monitoring and evaluation of IPM projects
7. Participate in the Regional Technical Steering Committee (RTSC) meetings ;
8. Assist in the development and refinement of community-level survey tools to act as baseline data for the projects
9. Oversee curriculum development for Farmer Field School Training in the projects
10. Liaise with technical institutions and governments throughout the region
11. Monitor expenditures
12. Coordinate planning and execution of regional workshops, research sub-projects, training courses and any other regional activities;
13. Ensure timely compilation, synthesis and interpretation of country data and periodic reports deriving from the projects as well as transmission of these periodic reports to the CTA;
14. Develop and promote synergies with relevant FAO and non FAO initiatives, at local, national, transboundary, and global levels
15. Communicate with regional and national government agencies in the context of public awareness and discussions related to policy;
16. Represent the project at meetings or media events in or outside the sub-region;
17. Contribute to the development of partnerships with related initiatives and potential donors.
18. Carry out other related duties as requested by the overall project coordinator

Qualifications:

- Advanced degree in agriculture or closely related field
- Seven years of relevant experience with emphasis on managing programs related to community development and alternative agriculture
- Minimum of four years experience related to community-based development programmes with emphasis on rural-based non-formal education methods
- Relevant experience with project management
- Knowledge related to agriculture practices and policies in West Africa including crop protection strategies and pest and pesticide management issues
- Excellent presentation skills, both verbal and in writing;
- Experience in working at a senior level with governments;
- Fluent (Level C) in French and with working knowledge of English.

Duty Station: Dakar
Duration: 4 years

Terms of Reference of the GIS Water Information Officer

The Geographic Information Systems Water Information Officer will be a local Personal Services Contract position under joint supervision of the Natural Resource Division (NRCE) and Agricultural Production Division (AGP) of FAO

Specific:

1. The officer will support operational Project activities through geospatial and other information management related to the GEF co-financed "Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management", and its sister project, the Netherlands-funded "Programme sous-régional de formation participative en gestion intégrée de la production et des déprédateurs à travers les champs-écoles des producteurs". In this capacity the GIS/WIO will work closely with the headquarters project coordinator (AGPP) and will collaborate with the Regional Project Coordination Unit in Dakar and National Project Coordination units in 7 participating countries in West Africa.
2. Provide technical and scientific support through Geographic Information System (GIS) and other information technologies to the water-quality assessment component, which will entail collaboration between FAO, an ecotoxicology laboratory--CERES Locustox in Dakar Senegal and Oregon State University providing technical support for the river-basin pollution monitoring component in the West African programme.
3. The officer will support the information needs of the collaborative research effort through the compilation and management of relevant water quality, ecotoxicology, socioeconomic, and environmental data and information, including spatially-explicit data deriving from project activities as well as from a wide array of existing data sources as well as to provide a geo-referenced context for reporting to national decision-makers;
4. Help to develop information products to facilitate broad understanding of project-derived activities and outputs both within and outside the project and the dissemination of project outputs to specific target groups. This will include collaborating in the development of a knowledge network where users can access up-to-date information and resources;
5. Collaborate with programme partners to provide geospatial information needs for modeling efforts related to pesticide fate and transport models for the region;
6. Participate as a member of FAO's geo-spatial information team (NRCE);
7. Develop linkages with related initiatives and technical agencies;
8. Carry out other related duties as required.

Qualifications:

- University degree in agriculture or agricultural engineering;
- PhD degree in discipline related to Geographic Information Systems, with preference given to candidates having experience on Multi-criteria Decision Analysis and on integrated watershed management;
- Experience in spatial analysis, modeling; decision support system, uncertainty analysis, and multi-criteria decision-making relative to land/natural resources management;
- GIS experience related to integrated watershed management; food security; remote sensing and disaster risk management;
- experience in Africa, and West African countries;
- A minimum of 5 years experience in the field of applied GIS;
- Excellent communication, writing and presentation skills in English;
- Fluent in English and working knowledge of French (level B).

Duty Station: Rome
Duration: 4 years

Terms of Reference
Regional Data Management Administrator

The **Regional Data Management Administrator** (RDMA) will work under the direct supervision of Regional Project Coordinator (RPC) and the general supervision of the Chief Technical Advisor (CTA) and will collaborate closely with the Geographic Information Systems Water Information Officer GIS/WIO, Communications, knowledge platform construction and maintenance consultant and National Project Coordinators and their teams in the other six countries. The general responsibility of the position will be to provide construction, supervision, security and quality assurance for all aspects of the national program data, including outputs from community base-line studies, training statistics, administrative and financial data. He/she will work closely with technical consultants and contractors who are responsible for data acquisition, especially the water quality and Human Health Risk assessment work being provided by Oregon State University.

Specific:

1. Lead the project in the elaboration of a system to effectively and efficiently assure data harmonization, entry, security and analysis and national and regional levels;
2. monitor the outcomes and quality of the program activities; oversee the country-level technical assistants responsible for the national-level execution of the M&E activities;
3. provide reports to the RPC on the level of quality in the data acquisition and maintenance of databases in the country-level NPCUs;
4. compile and keep accurate and up-to-date records of national figures and develop templates for use by the overall program;
5. contribute to the development of tools for measurement of agronomic, socio-economic and environmental impacts resulting from the FFS;
6. contribute to the Training-of-Trainers (ToT) in collaboration with national and regional partner institutions;
7. collaborate closely with NPCs in the other project countries;
8. participate in relevant meetings and other activities related to the project at the regional level;
9. address other tasks at the request of the RPC and CTA.

Qualifications:

- hold a university degree in a domain related to quantitative science;
- 5 years experience in the area of expertise;
- Excellent knowledge of computers and database management;
- Excellent communication, writing and presentation skills in French;
- work well under pressure;

Duty Station: Dakar
Duration: 4 years

Terms of Reference
Communications, knowledge platform construction and maintenance consultant

The Communications, knowledge platform construction and maintenance consultant (CC) will work under the direct supervision of Regional Project Coordinator (RPC) and the general supervision of the Chief Technical Advisor (CTA) and will collaborate closely with the Geographic Information Systems Water Information Officer GIS/WIO and FAO's Knowledge Management division (KC). The CC will work in collaboration with NPCs in the other six countries. The general responsibility of the position will be to assist in development a full Content Management System (CMS) that provides facilities for improved communications among project coordination units (national, regional and HQ) and a bi-lingual web site. This is a part-time or periodic consultancy.

Specific:

1. Provide part-time assistance to the Regional Coordination Unit and National Coordination Units to construct, monitor and maintain the project's Content Management System (CMS), including forum, wiki, document exchange and website;
2. Liasise with GIS consultant and RDMA to bring interactive maps containing project data to the CMS for use by national decision makers and an international audience;
3. assure coherent reciprocal translation of web content in two languages (French and English)
4. answer questions and provide assistance to NPCs in the project countries;
5. participate in appropriate meetings and other activities related to the project at the regional level;
6. address other tasks at the request of the RPC and CTA.

Qualifications:

- hold a university degree in a domain related to information science;
- 5 years experience in the area of expertise;
- Excellent knowledge of computers and content management systems;
- Skills in computer graphics;
- Excellent communication and writing skills in French and good working knowledge of English;
- work well under pressure;

Duty Station: Dakar
Duration: periodic contracts covering 2 of 4 years with an initial 6 months contract for start-up

Terms of Reference
National Project Coordinators

The National Project Coordinator (NPC) will work under the direct supervision of Regional Project Coordinator (RPC) and the national Representation of the FAO. The NPC will work under the general supervision of the Chief Technical Advisor (CTA) and will collaborate closely with the Geographic Information Systems Water Information Officer GIS/WIO and national institutional partners concerned with agriculture, community-level education, inland waters and environment. The NPC will share experiences and work in collaboration with NPCs in the other six countries. The general responsibility of the position will be to provide day-to-day management and supervision, guidance and quality assurance for all aspects of the national program.

Specific:

1. to provide technical and operational supervision for the training-of-trainers and training of farmers;
2. prepare the terms of reference and to supervise national consultants involved in the execution of the project;
3. supervise the administrative and financial aspects of all activities and operations related to the national project;
4. organize national workshops and, in collaboration with the RPCU and PCU, regional and international workshops;
5. develop and promote the principles of Integrated Production and Pest Management (IPPM), including standards and best practices, within the country;
6. collaborate closely with NPCs in the other project countries;
7. participate in meetings and other activities related to the project at the regional level;
8. address other tasks at the request of the RPC and CTA.

Qualifications:

- hold a university degree in a domain related to agriculture or community education;
- 10 years experience in the area of expertise;
- Excellent communication, writing and presentation skills in French;
- Experience in working at senior level with government officials;
- Familiar with data processing and common computer software;
- work well under pressure and have excellent rapport with field-based technicians and farmers;
- preference will be given to candidates with experience in participative approaches;
- Preference will be given to candidates with experience in formulating and executing projects.

Duty Station: Respective countries
Duration: 4 years

Terms of Reference
National Technical Assistant for Non-Formal Education

The National Technical Assistant for Non-Formal Education (NTA/NFE) will be a government employee assigned to the Project for a period of time to be determined by the respective government in collaboration with the National Project Coordinator (NPC) and Regional Project Coordinator (RPC). The Technical Assistant will work under the direct supervision of National Project Coordinator (NPC), working in close cooperation with the national and regional institutional partners concerned with community-level education. The general responsibility of the position will be to provide supervision, guidance and quality assurance for the national training components of the project.

Specific:

1. assist the NPC in the development of Farmer Field Schools (FFS) curricula and execution of training by project personnel related to the full range of topics for non-formal education,
2. assist in the diagnosis of the organisational constraints of Farmers Organizations (FO) and development of a plan for building capacity in these organizations in relation to their needs in the domain of non-formal education;
3. ensure coordination between the technical content as it evolves during the course of the programme and the training materials developed;
4. prepare in collaboration with the NPC and national structures related to improving literacy, a plan in which local literacy programmes target farmer groups involved in the GEF/IPPM programme;
5. work in collaboration with the other members of the NPCU of the programme, in particular with the technical assistant in charge of Monitoring and Evaluation, to ensure that information from the FFS are consistently recorded and transmitted to the project database;
6. address other tasks at the request of the NPC.

Qualifications:

- be either an experienced IPPM trainer or hold an academic or technical degree related to non-formal education, with at least 5 years experience;
- experience in non-formal education and organization and management of community-based educational programs;
- preference will be given to candidates with experience in IPPM, Farmer Field School (FFS) projects;
- work well under pressure and have excellent rapport with field-based technicians and farmers;
- have excellent knowledge of French.

Duty Station: Respective countries
Duration: 4 years

Terms of Reference
National Technical Assistant for Monitoring & Evaluation

The National Technical Assistant for Monitoring & Evaluation (NTA/M&E) will be a government employee assigned to the Project for a period of time to be determined by the respective government in collaboration with the National Project Coordinator (NPC) and Regional Project Coordinator (RPC). The Technical Assistant will work under the direct supervision of National Project Coordinator (NPC), working in close cooperation with the national and regional institutional partners concerned with community-level education and will collaborate and communicate frequently with the Geographic Information Systems Water Information Officer GIS/WIO. The general responsibility of the position will be to help develop a highly efficient and effective system of Monitoring and Evaluation of field-based training undertaken in the Farmer Field Schools (FFS).

Specific:

1. under the guidance of the RPCU, to assist the NPC in the elaboration of a system to effectively and efficiently monitor the outcomes and quality of the program activities;
2. be responsible for the overall execution of the M&E activities;
3. assess and provide reports to the NPC on the level of quality in the execution of the FFS;
4. compile and keep accurate and up-to-date records of each FFS as well as summary figures based on templates developed by the overall program;
5. supervise and communicate closely with the focal point trainers;
6. contribute to the development of tools for measurement of agronomic, socio-economic and environmental impacts resulting from the FFS;
7. contribute to the Training-of-Trainers (ToT) in collaboration with national and regional partner institutions;
8. contribute to the organization of workshops related to M&E in collaboration with national and regional partner institutions;
9. collaborate and exchange information with M&E counterparts in the other project countries;
10. participate in meetings and workshops at national and regional levels at the request of the NPC;
11. Address other tasks at the request of the NPC.

Qualifications:

- be either an experienced IPPM trainer or hold an academic or technical degree related to agriculture, with at least 5 years experience;
- experience in organization and management of community-based programs;
- preference will be given to candidates with experience in IPPM, Farmer Field School (FFS) projects;
- work well under pressure and have excellent rapport with field-based technicians and farmers;
- have excellent knowledge of French.

Duty Station: Respective countries
Duration: 4 years

Terms of Reference
National Technician Trainers

The National Technician Trainer (NTT) will be a government or NGO employee or a farmer working within a Farmers' Organization (FO). He/she will work closely with the Project under the direction of the National Project Coordinator (NPC) and the National Technical Assistants for M&E and NFE while remaining within his or her administrative structure. The NTT will carry out the day-to-day training of farmers within the FFS. As individual NTTs advance in skills and demonstrate commitment to the project some will advance to focal point positions in which they will carry responsibilities for M&E within national regions being targeted by the project. The general responsibility of the position will be to provide the most important avenue for institutionalization of the project technical content and methodologies and provide the most immediate link to farming communities.

Specific:

1. under the guidance of the NPC and NTAs to conduct seasonal training of farmer groups within the FFS;
2. be responsible for the development and maintenance of high-quality training in FFS. This to involve auto-evaluations by FFS groups and auto-evaluations among groups of NTT;
3. compile and keep accurate and up-to-date records of each FFS as well as summary figures based on templates developed by the overall program;
4. communicate closely with the focal point trainers;
5. act as a conduit and to note new ideas emerging from farmers within the FFS that can contribute to the overall enhancement and advancement of the project goals;
6. participate in national workshops and refresher courses related to project themes and in collaboration with national and regional partner institutions;
7. experienced NTT to act as trainers-of-trainers for new NTT;
8. carry the skills and principles learned back to the parent institution and thereby ensure sustainability of the project methods during and after the project;
9. address other tasks at the request of the NPC and NTA.

Qualifications:

- be an experienced government or NGO extension worker or a member of an FO;
- willing to be responsible for carrying out community-based training programs (FFS);
- farmers from FO will be required to have prior experience in IPPM, Farmer Field School (FFS);
- work well under pressure and have excellent rapport with field-based technicians and farmers;
- have working knowledge of French and be able to read and write.

Duty Station: Respective countries
Duration: 4 years

Terms of Reference
Headquarters' Clerk (G3)

Duties and Responsibilities

Under the general supervision of the Chief, AGPP, the Coordinator for the Global IPPM Facility and under the direct supervision of the senior project officer for the West African Integrated Production and Pest Management Programme, including several sources of funding (GCP/RAF/009/NET, the GEF River Pollution Project and other related projects as they develop) the incumbent will perform a variety of clerical, typing and operational duties in support of project related activities. Specifically, to:

1. receive, screen, maintain control of and route correspondence, reports and other material;
2. as instructed, assemble data, correspondence and reports from field operations units, particularly from the Regional Office in Dakar or from other sources and present it in compact form for use;
3. upon instructions, initiate administrative transactions in the Organization's computerised financial and travel systems, and purchases (i.e. Field Budget Authorisations, Field Disbursement Authorisations, Purchase Requisitions, and Local Orders) as well as preparation of Travel Authorizations (TAs) and processing of travel expense claims (TECs) ;
4. upon instructions, organize recruitment and payment requests for settlement of honorarium of consultants, purchasing of equipment and supplies, prepare Personal Services Agreements (PSAs), raise Letters of Agreement (LOA);
5. as instructed, request visas/UN security clearances and make necessary follow-up with FAO/UNDP Offices;
6. update project related databases containing information on staff, consultants, etc
7. receive and reply to telephone calls and e-mails, answer a variety of enquiries and supply readily available information from office files and records after clearance from supervisor or the G-5 Operations Clerk.
8. type correspondence and documents, including finalization of project reports using word processing equipment;
9. perform other duties as required.

Qualifications

Education: Secondary school education

Experience: two years of clerical and administrative experience

Languages: Working knowledge of French (level C)

Other:

- Knowledge of standard office procedures;
- he incumbent must have passed the Organization's typing test at 50 wpm in French and have working knowledge of English;
- knowledge of the Organization's computerized financial/personnel/travel systems;
- initiative and ability to draft routine correspondence;
- computer literacy and ability to use effectively word processing and office technology equipment.

Duty Station: Rome
Duration: 4 years

Terms of Reference
Regional Administrative Assistant

Under the direct supervision of the Regional Project Coordinator (RPC) and in close collaboration with the Headquarters' Clerk and National Project Sectretaries (NPS) for the project, the incumbent will perform a variety of clerical tasks in support of project related activities. Specifically, to:

1. receive, screen, maintain control of and route correspondence, reports and other material;
2. as instructed, assemble data from project sources in the field, office files, records, reports or from other sources and present it in compact form for use;
3. arrange travel internal to the region;
4. arrange for international travel in collaboration with Headquarters;
5. upon instructions, initiate requests for recruitment of consultants, prepare Personal Services Agreements (PSAs) to be submitted to the FAOR;
6. as instructed, request visas/UN security clearances and make necessary follow-up with FAO/UNDP Offices;
7. monitor expenditures on the basis of budget programmes submitted, and in collaboration with National Project Staff in each project country;
8. update project related databases containing information on staff, consultants, missions, etc
9. receive and reply to telephone calls and e-mails, answer a variety of enquiries and supply readily available information from office files and records
10. type correspondence and documents using word processing equipment;
11. perform other duties as required.

Qualifications:

Education: Secondary school education

Experience: two years of clerical and administrative experience

Languages: Fluent in French (level C)

Other:

- knowledge of standard office procedures;
- he incumbent must have passed the Organization's typing test at 50 wpm in French and have working knowledge of English;
- knowledge of the Organization's computerized financial/personnel/travel systems;
- initiative and ability to draft routine correspondence;
- computer literacy and ability to use effectively word processing and office technology equipment.

Duty Station: Dakar
Duration: 4 years

Terms of Reference
National Project Secretaries (Local Hire)

Under the direct supervision of the National Project Coordinator (NPC) and in close collaboration with the Regional Project Coordination Unit (RPCU) and the Headquarters' Clerk for the project, the incumbent will perform a variety of clerical tasks in support of project related activities. Specifically, to:

- receive, screen, maintain control of and route correspondence, reports and other material;
- as instructed, assemble data from project sources in the field, office files, records, reports or from other sources and present it in compact form for use;
- update project related databases containing information on staff, consultants, missions, etc
- receive and reply to telephone calls and e-mails, answer a variety of enquiries and supply readily available information from office files and records
- type correspondence and documents using word processing equipment;
- Perform other duties as required.

Qualifications:

Education: Secondary school education

Experience: two years of clerical and administrative experience

Languages: Fluent in French (level C)

Other:

- Knowledge of standard office procedures;
- initiative and ability to draft routine correspondence;
- computer literacy and ability to use effectively word processing and office technology equipment.

Duty Station: Respective countries
Duration: 4 years

Terms of Reference
Regional and National Project Coordination Units

The RPCU will comprise one FAO professional staff position and several local consultant positions. To include a:

- **Regional Project Coordinator (RPC)**. Under the immediate supervision of the Chief Technical Officer in Rome (CTA), the officer will be responsible for overall operational activities and staff management of the Regional Project Management Unit (RPCU), as well as providing a strong technical role in guiding design and execution of the two projects. The RPC will liaise with the CTA on programmatic issues but will also maintain direct contact with partners, donors and countries in order to ensure that all technical issues are adequately addressed and technical inputs are suitably coordinated. In addition to ensuring the timely and efficient start-up and functioning of the two projects, the RPC will oversee budget design exercises, overall monitoring of project achievement of milestones and act as focal point for the synthesis of technical and financial reports from the field to be transmitted to the CTA for clearance before submitting to national governments and regional entities. Through oversight of the regional training and regional Monitoring and Evaluation officers the RPC will maintain oversight on training and M&E. Through direct links with CERES Locustox Foundation the RPC will provide frequent oversight on activities related to the water quality assessment work to be conducted under the GEF component #2.
- **Regional Project Administrative Assistant (RPAA)** will be hired by FAO to manage daily administrative and budgetary tasks of the RPCU and to monitor financial details among the seven countries, with guidance and support from the administrative assistant in the PCU Rome.
- **Regional Data Management Administrator**
- **Communications, knowledge platform construction and maintenance consultant**

Each NCU will comprise four local staff positions, to include a:

- **National Project Coordinator (NPC)** to oversee the overall coordination and execution of the project(s) at the national level;
- **Technical assistant** charged with duties related to **Monitoring and Evaluation (M&E);**
- **Technical assistant** charged with duties related to **non-formal education training methods and institutional liaison**;
- **National Project Administrative Assistant**
- **Project Secretary** (provided as National in-kind contribution). Skills must include experience with budget and accounting as well as expertise in the basic computer software packages (Word, Excel).

Terms of Reference
National and Regional Technical Steering Committees

Composition

As decided upon during the Stakeholders Meeting in Bamako, Mali, March 2005, the National Technical Steering Committees (NTSC) will comprise a maximum of 11 members from a diversity of Ministries and other entities. The specific composition will depend on the country, but the following was considered representative of a desirable mix.

As an example of the type of composition for National Technical Steering Committees:

1. Ministry of Environment
2. Ministry of Agriculture
3. Ministry of Finance
4. Ministry of Water
5. Ministry of Fisheries
6. Ministry of Health
7. Ministry of Decentralization
8. Civil Society (NGO active in the fields of environment and agriculture)
9. Research (institute active in research in agriculture or environment)
10. The Operational Focal Point for GEF
11. Pesticide distributors association

Scope

The National Technical Steering Committee is responsible for guidance related to the overall orientation of the national program as well as Monitoring of the project execution to assure conformance to the project Logical Frameworks and overall project documents. The NTSCs will perform an especially important task in transmitting the results of the project back to the national decision-making bodies with the intent of influencing appropriate national policies. The two principal projects in the portfolio of the NTSC are the GEF IW/POPs project: *Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management*, and the major co-financing project *GCP/INT/009/NET Sub-Regional Programme for IPPM through Farmer Field Schools: Benin, Burkina Faso, Mali and Senegal*. Of the seven countries involved in these two projects, six are GEF project countries and four are Netherlands regional project countries. Three of the four Netherlands-Regional project countries are also GEF project countries (Senegal, Mali and Benin). As the two projects share complementary objectives, it was decided for the three countries in which both projects are being executed to combine the two projects within a single National Technical Steering Committee structure.

Operational Procedures

Lead ministry and composition will be determined by the committee and will initially conform to structures suggested in the country reports presented in March 2004. Meetings will take place two times per year with the possibility of extraordinary sessions as circumstances warrant. These meetings will be scheduled to take place just prior to the Regional Technical Steering Committee meetings, if possible.

Terms of Reference
Regional Technical Steering Committees

Composition

As decided upon during the Stakeholders Meeting in Bamako, Mali, March 2005, the Regional Technical Steering Committee (RTSC) will comprise two members from each of the National Steering Committees. The specific choice will depend on the country and might change on a rotational schedule.

The FAO will act as Secretary to the Committee but not hold voting powers. Similarly, staff members from the Regional Coordination Unit or the National Project Coordinators may be invited to attend, but will not hold voting powers.

Scope

The Regional Technical Steering Committee is responsible for inputs related to the overall orientation of the two or more projects subsumed under the overall regional initiative as well as monitoring of the project execution conforming to the activities as laid out in the Logical Frameworks and project documents. The RTSC will perform an especially important task in transmitting the results of the project to the regional organizations and decision-making bodies (e.g., CILSS, OMVS, CSP, etc.) with the intent of influencing appropriate regional policies. The two principal projects are the GEF IW/POPs project: *Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management*, and the major co-financing project *GCP/INT/009/NET Sub-Regional Programme for IPPM through Farmer Field Schools: Benin, Burkina Faso, Mali and Senegal*. Of the seven countries involved in these two projects, six are GEF project countries and four are Netherlands regional project countries. Three of the four Netherlands-Regional project countries are also GEF project countries (Senegal, Mali and Benin). As the two projects share complementary objectives and as the National (for three countries), Regional and Headquarters' Coordination units are jointly managing both projects, it was decided to combine the two projects within a single Regional Technical Steering Committee structure.

Operational Procedures

The location for the meeting of the RTSC will be decided by the group but will follow a rotational schedule so that all seven countries will host the RTSC at least once over the four years. The president of the RTSC will be from the country hosting the meeting. Meetings will take place two times per year with the possibility of extraordinary sessions as circumstances warrant. These meetings will be scheduled to take place just after the National Technical Steering Committee meetings, if possible.

Terms of Reference
Regional Contractor for Community-Level Diagnostics

Under the direct supervision of the RPC and CTA and in collaboration with the Technical Support Contractor for Water Quality, Modeling and GIS, the Geographic Information Systems Water Information Officer GIS/WIO and the NPCU in each project country, the contractor will take the lead in developing a Community-Level Diagnostics (CLD) template for establishing base-line statistics in each target community across all project countries. The template for the CLD will be expanded from that of the pilot phase to include detailed, gender disaggregated descriptions of water-use patterns by villages and more detailed descriptions of pesticide commerce and practice in the communities. The contractor will seek local partners and coordinate activities in the field in all project countries in collaboration with national counterpart institutions. The CLD will make possible a clear profile of community socio-economic and agricultural activities necessary to establish a base-line starting point from which project impacts can be measured.

Specific:

1. In close collaboration with the CTA, RPC, NPCs, GIS/WIO and contractor for water quality, modeling and GIS, the contractor will design participative tools and methods for establishing a base-line Community-Level Diagnostic template applicable to all project sites;
2. Identify local partner organizations with which the field-based activities will be carried out;
3. Test and validate the survey tools;
4. Take the lead in coordination of CLD activities in each country;
5. Compile and analyze the data;
6. Develop summary reports, by country;
7. Coordinate subsequent participatory “restitution” of the results back to the individual communities in order to validate the results;
8. put in place mechanisms for follow-up-evaluations during the course of the project in order to establish progressive impacts of project activities;
9. provide mid-term and final reports of activities to the project Coordination Units.

Duty Station: Regional scope
Duration: 4 years

Terms of Reference
Regional Contractor for Water Quality Analysis

The pilot phase (pdf-b) for this project took place in Senegal along the northern border with Mauritania on the Senegal River. The technical aspects related to assessment of water quality were under the coordination of the CERES Locustox Foundation, in collaboration with other partners in the country (ENDA Tiers Monde and SAED).

A key component for the project is the analysis of pesticides in water along the two principal rivers in the six countries and analyses of potential impacts on human and environmental health. As described in the main text of the project document, CERES is the only institute in West Africa at this time capable of taking on these tasks. However, activities related to monitoring and evaluations under the full project go beyond the activities undertaken in the pdf-b in terms of sophistication in laboratory analytical skills and computer modeling. In order for CERES to be adequately empowered to take on these tasks, CERES staff will undergo further training in these domains under the guidance of, and work in close collaboration during the course of the project with the Contractor for Technical Support for Water Quality Monitoring, Modeling and GIS.

Objectives:
The project has clearly defined tasks related to the analysis of risks to humans and the environment due to agro-chemical pollution in major rivers and irrigation systems. The contractor, under the direct guidance of the Chief Technical Advisor, the Regional Project Coordinator and in collaboration with the GIS consultant and the contractor for technical support to water quality monitoring, the contractor will be charged with carrying out capacity building in at least the CERES Locustox laboratory related to sampling of surface water for presence of pesticides, the introduction of new technologies to the region (e.g., passive sampling devise technologies) that will improve the capabilities of the regional laboratories to efficiently and precisely measure toxic pollutants in water; conduct laboratory analyses at sufficiently rigorous levels and in line with internationally accepted Good Laboratory Practice (GLP); construct transport and fate models in order to estimate the movement of measured chemicals at multiple scales, including transboundary; design technical activities necessary to carry out assessments of Human Health Risk in target communities based on the totality of data available from the project.

Specific:
In collaboration with the Senior Project Coordinator, the Regional Project Coordinator, the Geographic Information Systems Water Information Officer GIS/WIO, and the Contractor for Technical Support for Water Quality Monitoring, Modeling and GIS and the project staff in local offices:

1. identify the specific communities and areas to be sampled within each country;
2. Make available to the project two staff members: i) a laboratory technician who will be responsible for receiving samples at the laboratory in Dakar, for carrying out appropriate analytical techniques on these samples, including calibration and maintenance of the laboratory equipment, and for interpreting the results of these analyses; and ii) a field technician who will be responsible for coordinating the activities related to water and biological sampling in the field and analysis of the results;
3. define a long-term project sampling methodology;
4. Put in place a field sampling and laboratory analysis schedule in order to conform to the timeline of the project and the timely need for results;
5. coordinate analysis of the samples (water, biota) from the field samples;
6. Train technicians on sampling methods in the field and in each of the participating countries to assure precise and accurate results;
7. Support the training of other laboratories in the region in agreement and in collaboration with the project and other partners
8. provide specific reports on project-related results on a schedule to be determined in collaboration with project staff
9. provide semi-annual reports in line with overall project deadlines for reporting

Duration: 4 years

Terms of Reference
Contractor for Technical Support: Water Quality, Modeling, GIS

A key component for the project is the analysis of pesticides in water along the two principal rivers in the six countries and analyses of potential impacts on human and environmental health. As described in the main text of the project document, CERES is the only institute in West Africa at this time capable of taking on these tasks. However, activities related to monitoring and evaluations under the full project go beyond the activities undertaken in the pdf-b in terms of required sophistication in laboratory analytical skills and computer modeling. In order for CERES to be adequately empowered to take on these tasks, CERES staff will undergo further training in these domains under the guidance of, and work in close collaboration during the course of the project with the Contractor for Technical Support for Water Quality Monitoring, Modeling and GIS.

Objectives:
The contractor, under the oversight of the Senior Project Coordinator and in collaboration with the Regional Project Coordinator, the Geographic Information Systems Water Information Officer GIS/WIO, CERES Locustox, ENDA, project staff in local offices and other partners in the region, will be charged with the technical support for activities in the project with the general objective to substantially improve the quality and capacity for analysis of pesticides in water and assessment of associated environmental and human health risks for the West African region. The contractor will be charged with carrying out capacity building in at least the CERES Locustox laboratory related to sampling of surface water for presence of pesticides, the introduction of new technologies to the region (e.g., passive sampling devise technologies) that will improve the capabilities of the regional laboratories to efficiently and precisely measure toxic pollutants in water; conduct laboratory analyses at sufficiently rigorous levels and in line with internationally accepted Good Laboratory Practice (GLP); construct transport and fate models in order to estimate the movement of measured chemicals at multiple scales, including transboundary; design technical activities necessary to carry out assessments of Human Health Risk in target communities based on the totality of data available from the project..

Specific:

1. Provide Capacity Building for CERES Laboratory.
    - Review of existing residue analysis protocols and procedures;
    - Train two CERES staff members, to comprise (1) laboratory focal point; and (1) environmental focal point. Principal focus to be on:
        - Training on new sampling technologies, including the so-called “Passive Sampling Technology”, including:
            - associated laboratory procedures;
            - associated field-based procedures;
        - Training to expand and improve laboratory and field-based skill sets, including, as appropriate for specific compounds:
            - solid Phase Extraction (SPE);
            - gas Chromatography (GC);
            - coupled GC-Mass Spectroscopy (MS);
            - high Pressure Liquid Chromatography (HPLC);
            - field site selection and sample placement;
            - sample collection, transport and storage;
            - clean up and extraction;
            - chemical analysis;
            - data analysis, management and reporting;

2. Participate in the development of a community-level Survey Tool to estimate Use Practices and Exposure Pathways.

3. Develop a methodology for census of systems likely to be impacted by pesticides. to specifically:

    - Develop methods and carry out assessments of aquatic and wetland species with particular attention to species of economic importance, critical for ecosystem function and species/habitats of critical importance for biodiversity, e.g. Ramsar sites;
    - Develop methods and carry out assessments of human subpopulations in regard to avenues of contact with pesticides and pesticide-laden water and based on gender and vocation.

4. Develop a Pesticide Fate and Transport Model (PFT) across multiple spatial scales (FAO/GIS expert takes lead in data acquisition and management; contractor team to lead in drafting PFT). Specifically the contractor will:

    - Assess and coordinate plans for acquisition of needed data;
    - acquire representative farmer pesticide-use data (from project baseline studies);
    - develop project protocols for village level assessment of irrigation channels, flow regimes and relevant irrigation management information;
    - acquire necessary project GIS maps, to include:
        - Land-use maps
        - Topographic and hydrological maps
        - Soil classification maps
        - Demographic maps
        - Climatological maps
    - Collate all data available for the 30 selected project sites, either generated by the project, or derived from readily accessible data including geospatially referenced databases of river flows, soil type, cropping system, climate and socio-economic factors;
    - Complete an initial risk analysis and classify sites according to aquatic residue, pesticide use intensity and human health risk following a period of data acquisition and consultation;
    - Develop an initial process model for each site, capturing essential details of cropping system, hydrology, pesticide use and fate;
    - Make data on chemical use pattern and associated aquatic residues available to project staff and partners on an Internet-based GIS tool that will display pesticide use patterns, and aquatic residue data, as these are collected;
    - Train project participants on data requirements for risk assessment, modeling and various assessment techniques (e.g. irrigation channel discharge rates, temperature and pH measurements, aquatic and channel side vegetation assessment) and in pesticide use reporting. Training for these measurements to be built into the FFS curriculum;
    - Develop human and wildlife ecological risk assessment procedures at high risk sites and undertake focused, intensive assessments in these locations, with follow-up assessments to determine project impact.

Duration: 4 years

Annex U: BUDGET (UNEP FORMAT)

RECONCILIATION BETWEEN THE GEF ACTIVITY BASED PROJECT BUDGET AND THE UNEP BUDGET BY EXPENDITURE CODE

Project No:
Project Name: Reducing Dependence on POPs and other Agro- Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management
Executing Agency: FAO

Source of funding (noting whether cash or in-kind): GEF Cash contribution

		EXPENDITURE BY PROJECT COMPONENT/ACTIVITY *						EXPENDITURE BY CALENDAR YEAR **				
		1	2	3	4	5	Total	Year 1	Year 2	Year 3	Year 4	Total
	UNEP BUDGET LINE/OBJECT OF EXPENDITURE	US$	US$	US$	US$	US$	US$	US$	US$	US$	US$	US$
10	**PROJECT PERSONNEL COMPONENT**											
1100	**Project Personnel w/m (Show title/grade)**											
1101	Chief Technical Advisor (P5) / 48 w/m	0	0	0	0	0	0	0	0	0	0	0
1102	Inter-Country Technical Coordinator (P4) / 48 w/m	136,000	136,000	136,000	136,000	136,000	680,000	170,000	170,000	170,000	170,000	680,000
1103	Finance and Budget Officer (P3) / 12 w/m	0	0	0	0	90,000	90,000	22,500	22,500	22,500	22,500	90,000
1199	Sub-Total	136,000	136,000	136,000	136,000	226,000	770,000	192,500	192,500	192,500	192,500	770,000
1200	**Consultants w/m (Give description of activity/service)**											0
												0
1201	Data management administrator (regional)	0	0	0	0	0	0	0	0	0	0	0
1202	Communications, knowledge platform construction and maintanence consulta	0	0	0	0	0	0	0	0	0	0	0
1203	Geographic Information Systems Consultant (50% cost share) 24 w/m	30,000	30,000	30,000	30,000	0	120,000	30,000	30,000	30,000	30,000	120,000
1204	National Coordinators (3 of 6 countries ***) / 144 w/m	63,360	63,360	63,360	63,360	63,360	316,800	79,200	79,200	79,200	79,200	316,800
1205	National Assistants (3 of 6 countries ***) / 144 w/m	0	0	0	0	99,984	99,984	24,996	24,996	24,996	24,996	99,984
1206	National Technical Staff 2 per country (3 of 6 countries ***) / 288 w/m	14,400	14,400	14,400	14,400	0	57,600	14,400	14,400	14,400	14,400	57,600
1207	Drivers (3 of 6) 144 w/m	3,750	3,750	3,750	3,750	0	15,000	3,750	3,750	3,750	3,750	15,000
1208	Local Travel (within country for National coordination)	20,781	20,781	20,781	20,781	0	83,125	20,781	20,781	20,781	20,781	83,125
1299	Sub-Total	132,291	132,291	132,291	132,291	163,344	692,509	173,127	173,127	173,127	173,127	692,509
1300	**Administrative support w/m (Show title/grade)**											0
												0
1301	Headquarters Admin Assistant (G3) / 48 w/m	0	0	0	0	0	0	0	0	0	0	0
1302	Sub-regional Admin Assistant (G5) / 48 w/m	0	0	0	0	0	0	0	0	0	0	0
1399	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
1400	**Volunteers w/m**											0
1401							0					0
1499	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
1600	**Travel on official business (above staff)**											0
1601	International Travel	16,500	16,500	16,500	16,500	0	66,000	16,500	16,500	16,500	16,500	66,000
1602	Sub-regional Travel	23,521	23,521	23,521	23,521	0	94,083	23,521	23,521	23,521	23,521	94,083
1699	Sub-Total	40,021	40,021	40,021	40,021	0	160,083	40,021	40,021	40,021	40,021	160,083
1999	**Component Total**	308,312	308,312	308,312	308,312	389,344	1,622,592	405,648	405,648	405,648	405,648	1,622,592

20	**SUB-CONTRACT COMPONENT**											
	2100	**Sub-contracts (MoU's/LA's for UN cooperating agencies)**										
	2101						0					0
	2199	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
	2200	**Sub-contracts (MoU's/LA's for non-profit supporting organizations)**										
	2201	Capacity building for Regional Ecotoxicology Laboratories	0	340,593	0	0	0	340,593	148,084	98,723	59,234	34,553	340,593
	2202	Water chemical sampling and analysis: Field and Lab	0	313,000	0	0	0	313,000	78,581	78,581	78,581	77,258	313,000
	2203	ENDA-Pronat Village-level diagnostic surveys and follow-up	270,000	0	0	0	0	270,000	115,714	77,143	38,571	38,571	270,000
	2204	National Publicity (Rural radio, TV, local newspapers)	15,000	0	0	0	0	15,000	0	5,000	5,000	5,000	15,000
	2205	Socio-economic Studies (pesticide-policy environment)	40,000	0	0	0	0	40,000	20,000	20,000	-	-	40,000
	2299	Sub-Total	325,000	653,593	0	0	0	978,593	362,379	279,446	181,386	155,382	978,593
	2300	**Sub-contracts (commercial purposes)**										
	2301							0					0
	2399	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
	2999	**Component Total**	325,000	653,593	0	0	0	978,593	362,379	279,446	181,386	155,382	978,593
30	**TRAINING COMPONENT**											
	3100	**Fellowships (total stipend/fees, travel costs, etc)**										
	3101							0					0
	3199	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
	3200	**Group training (study tours, field trips, workshops, seminars, etc) (give title)**											
	3201	Training of the trainers	0	0	126,000	0	0	126,000	88,200	37,800	0	0	126,000
	3202	Trainer Refresher Workshops	0	0	78,000	0	0	78,000	0	26,000	26,000	26,000	78,000
	3203	Training of Farmers (FFS)	0	0	350,000	0	0	350,000	87,500	87,500	87,500	87,500	350,000
	3204	Special Topics (IPVM, SRI, Int Aquaculture)	0	0	37,500	0	0	37,500	12,500	12,500	12,500	0	37,500
	3205	Curriculum Development workshops	0	0	40,490	0	0	40,490	13,497	10,797	8,098	8,098	40,490
	3206	Local exchange visits	0	0	40,000	0	0	40,000	0	13,333	13,333	13,333	40,000
	3207	Sub-regional exchange visits	0	0	0	25,000	0	25,000	0	8,333	8,333	8,333	25,000
	3208	Local Staff Training	0	0	0	0	0		0	0	0	0	0
	3299	Sub-Total	0	0	671,990	25,000	0	696,990	201,697	196,264	155,765	143,265	696,990
	3300	**Meetings/conferences (give title)**	0	0	0	0	0						
	3301	National technical workshops	0	0	36,000	0	0	36,000	9,000	9,000	9,000	9,000	36,000
	3302	Sub-regional Technical workshops	0	0	50,000	0	0	50,000	12,500	12,500	12,500	12,500	50,000
	3303	Coordination Meetings (national)	5,250	5,250	5,250	5,250	0	21,000	5,250	5,250	5,250	5,250	21,000
	3304	Steering Committee Meetings (national)	0	0	0	0	0	0	0	0	0	0	0
	3305	Steering Committee Meetings (sub-regional) = Inception Workshop (year 1)	15,000	15,000	15,000	15,000	0	60,000	15,000	15,000	15,000	15,000	60,000
	3399	Sub-Total	20,250	20,250	106,250	20,250	0	167,000	41,750	41,750	41,750	41,750	167,000
	3999	**Component Total**	20,250	20,250	778,240	45,250	0	863,990	243,447	238,014	197,515	185,015	863,990
40	**EQUIPMENT & PREMISES COMPONENT**		0	0	0	0	0						
	4100	**Expendable equipment (items under ($1,500 each, for example)**	0	0	0	0	0						
			0	0	0	0	0						
	4101	Office supplies	6,000	6,000	6,000	6,000	0	24,000	6,000	6,000	6,000	6,000	24,000
	4102	Library acquisitions, mapping materials, computer software	5,000	5,000	5,000	5,000	0	20,000	5,000	5,000	5,000	5,000	20,000
	4199	Total	11,000	11,000	11,000	11,000	0	44,000	11,000	11,000	11,000	11,000	44,000

	4200	**Non-expendable equipment (computers, office equip, etc)**										
	4201	Office furniture	2,250	2,250	2,250	2,250	0	9,000	6,000	0	3,000	0	9,000
	4202	Vehicles (3) **	22,500	22,500	22,500	22,500	0	90,000	90,000	0	0	0	90,000
	4203	Desktop Computers (2 per country * 3 countries)	1,875	1,875	1,875	1,875	0	7,500	7,500	0	0	0	7,500
	4204	Laptop Computers (1 per country * 3 countries)	1,125	1,125	1,125	1,125	0	4,500	4,500	0	0	0	4,500
	4205	Printers (1 per country * 3 countires)	375	375	375	375	0	1,500	1,500	0	0	0	1,500
	4206	Photocopy machines (1 per country * 3 countries)	1,125	1,125	1,125	1,125	0	4,500	4,500	0	0	0	4,500
	4207	Portable PowerPoint projectors (1 per country * 3 countries)	1,125	1,125	1,125	1,125	0	4,500	4,500	0	0	0	4,500
	4208	Universal Power Supplies (2 per country * 3 countries)	350	350	350	350	0	1,400	1,400	0	0	0	1,400
	4209	Digital cameras (2 per country * 3 countries)	0	2,400	0	0	0	2,400	2,400	0	0	0	2,400
	4210	GPS units (2 per country * 6 countries)	0	4,200	0	0	0	4,200	4,200				4,200
	4299	Sub-Total	30,725	37,325	30,725	30,725	0	129,500	126,500	0	3,000	0	129,500
	4300	**Premises (office rent, maintenance of premises, etc)**											
	4301	National Maintainence	6,000	6,000	6,000	6,000	0	24,000	6,000	6,000	6,000	6,000	24,000
	4302	National office space	0	0	0	0	0	0	0	0	0	0	0
	4303	Sub-regional PCU (office space, utilities, maintanence)	3,000	3,000	3,000	3,000	0	12,000	3,000	3,000	3,000	3,000	12,000
	4399	Sub-Total	9,000	9,000	9,000	9,000	0	36,000	9,000	9,000	9,000	9,000	36,000
	4999	**Component Total**	50,725	57,325	50,725	50,725	0	209,500	146,500	20,000	23,000	20,000	209,500
50	**MISCELLANEOUS COMPONENT**												
	5100	**Operation and maintenance of equip. (example shown below)**											
	5101	Operation and Maintanence of vehicles (3) ***	48,000	48,000	48,000	48,000	0	192,000	50,249	47,250	47,250	47,250	192,000
	5199	Sub-Total	48,000	48,000	48,000	48,000	0	192,000	50,249	47,250	47,250	47,250	192,000
	5200	**Reporting costs (publications, maps, newsletters, printing, etc)**											
	5201	Documentation and Publications	0	0	27,500	0	0	27,500	0	0	12,500	15,000	27,500
	5299	Sub-Total	0	0	27,500	0	0	27,500	0	0	12,500	15,000	27,500
	5300	**Sundry (communications, postage, freight, clearance charges, etc)**											
	5301	National Communications	7,500	7,500	7,500	7,500	0	30,000	7,500	7,500	7,500	7,500	30,000
	5399	Sub-Total	7,500	7,500	7,500	7,500	0	30,000	7,500	7,500	7,500	7,500	30,000
	5400	**Hospitality and entertainment**											
	5401							0					0
	5499	Sub-Total	0	0	0	0	0	0	0	0	0	0	0
	5500	**Evaluation (consultants fees/travel/ DSA, admin support, etc. internal projects)**											
	5501	Technical support missions	0	0	0	0	0	0	0	0	0	0	0
	5502	Mid-term and Final project evaluations	10,000	10,000	10,000	10,000	0	40,000	0	20,000	0	20,000	40,000
	5599	Sub-Total	10,000	10,000	10,000	10,000	0	40,000	0	20,000	0	20,000	40,000
		Contingencies	35,289	35,289	35,289	35,289	0	141,155	35,289	35,289	35,289	35,289	141,155
	5999	**Component Total**	65,500	65,500	93,000	65,500	0	289,500	57,749	74,750	67,250	89,750	289,500
	TOTAL COSTS		805,076	1,140,269	1,265,566	505,076	389,344	4,105,330	1,251,011	1,053,147	910,088	891,084	4,105,330
			20%	28%	31%	12%	9.5%	100%					

** Project vehicles will be stationed at secure project office sites

*** FAO regulations which will be strictly followed to track vehicle mileage and fuel consumption