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IMPLEMENTATION COMPLETION AND RESULTS REPORT

ON A

GLOBAL ENVIRONMENT FACILITY GRANT

IN THE AMOUNT OF

US$3.19 MILLION

AND A GRANT

FROM THE GOVERNMENT OF THE KINGDOM OF DENMARK

IN THE AMOUNT OF US$0.95 MILLION

TO THE

REPUBLIC OF MALI

FOR THE

MALI OBSOLETE PESTICIDES DISPOSAL AND PREVENTION PROJECT

July 31, 2020

Environment and Natural Resources Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 11, 2020)

Currency Unit = CFA Franc (CFAF)

CFAF 605.50 = US$1

US$ = SDR 1

FISCAL YEAR

July 1 – June 30

ABBREVIATIONS AND ACRONYMS

ASP	Africa Stockpiles Program
ASP-P1	Africa Stockpiles Program-Project 1
CCI	Intermediate Collection Center (Centre de Collecte Intermédiaire)
CEA	Cost-Effectiveness Analysis
CLI	CropLife International
CMDT	Malian Company for Textiles Development (*Compagnie malienne pour le développement du textile*)
CNGP	National Pesticides Management Committee (*Comité National de Gestion des Pesticides*)
CPF	Country Partnership Framework
DEDD	Directorate of Environment and Sustainable Development (*Direction de l'Environnement et Development Durable*)
DNACPN	National Department for Sanitation and Pollution Control (*Direction Nationale de l'Assainissement et du Contrôle des Pollutions et des Nuisances*)
ECOWAS	Economic Community of West African States
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization of the United Nations
FM	Financial Management
GEF	Global Environment Facility
GOM	Government of Mali
GRM	Grievance Redress Mechanism
ICR	Implementation Completion and Results Report
ISR	Implementation Status and Results Report
LCV	Central Veterinary Laboratory (*Laboratoire Vétérinaire Central)*
M&E	Monitoring and Evaluation
MOA	Ministry of Agriculture
NGO	Nongovernmental Organization
NSC	National Steering Committee
OHVN	Office of the Niger Higher Valley (*Office de la Haute Vallée du Niger*)

OP	Obsolete Pesticide
OPDP	Obsolete Pesticides Disposal and Prevention
OPV	Office of Plant Protection (*Office de Protection des Végétaux*)
PAD	Project Appraisal Document
PAN-Mali	Pesticides Action Network of Mali
PDO	Project Development Objective
PEPPO-Mali	*Le Projet Elimination et de Prévention des Pesticides Obsolètes au Mali*
PIU	Project Implementation Unit
PMU	Project Management Unit
PNP	National Prevention Plan (*Plan National de Prévention*)
POP	Persistent Organic Pollutant
PPE	Personal Protective Equipment
PSMS	Pesticide Stock Management System
TAD	Technical Advisor on Disposal
TF	Trust Fund
TOR	Terms of Reference
TTL	Task Team Leader
UN	United Nations

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P146247	Mali Obsolete Pesticides Disposal and Prevention Project
Country	**Financing Instrument**
Mali	Investment Project Financing
Original EA Category	**Revised EA Category**
Full Assessment (A)	

Organizations

Borrower	Implementing Agency
Ministry of Finance	DNACP-Direction Nationale de l'Assainissement et du Controle des Pollutions et des Nuisances, MEADD/DNACPN

Project Development Objective (PDO)

Original PDO

The proposed Project Development Objective (PDO) is to reduce risks from existing publicly-held obsolete pesticide stocks and associated waste; and strengthen the institutional framework for risk mitigation of obsolete pesticides.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-A0665	3,190,000	3,190,000	3,184,912
TF-A0686	950,000	939,496	939,496
Total	**4,140,000**	**4,129,496**	**4,124,408**
Non-World Bank Financing			
Borrower/Recipient	1,000,000	0	0
DENMARK: Danish Intl. Dev. Assistance (DANIDA)	950,000	0	0
Total	**1,950,000**	**0**	**0**
Total Project Cost	**6,090,000**	**4,129,496**	**4,124,408**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
24-Jul-2015	10-Dec-2015	14-May-2018	31-Jan-2020	31-Jan-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	27-Oct-2015	Satisfactory	Satisfactory	0

02	07-May-2016	Satisfactory	Satisfactory	0
03	15-Jun-2017	Moderately Satisfactory	Moderately Satisfactory	.55
04	23-Jun-2018	Moderately Satisfactory	Moderately Satisfactory	1.52
05	22-Jun-2019	Moderately Satisfactory	Moderately Satisfactory	4.12

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Agriculture, Fishing and Forestry	**100**
Public Administration - Agriculture, Fishing & Forestry	5
Other Agriculture, Fishing and Forestry	95

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Environment and Natural Resource Management	**99**
Environmental Health and Pollution Management	99
Air quality management	33
Water Pollution	33
Soil Pollution	33

ADM STAFF

Role	At Approval	At ICR
Vice President:	Makhtar Diop	Hafez M. H. Ghanem
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **By the time of appraisal** of the Obsolete Pesticides Disposal and Prevention (OPDP) project in July 2015, the Republic of Mali had experienced a range of political upheavals and security situations in the preceding years, ranging from a military coup in early 2012 and an occupation of its northern territories by rebel and criminal groups, to a terrorist attack in Bamako targeting the international community in March 2015. The security situation continued to be challenging with migration of the northern conflict further south in the country with violent and extremist groups continuing to control vast areas of Malian territory. In June of 2015, the Government of Mali (GOM) signed a peace agreement with rebel coalitions in the north which enabled a return to some level of security in Bamako and other regions, although security remained an issue in much of the country.

2. **Located at the heart of the Sahel, Mali is a vast, semi-arid, landlocked, and lightly populated country with the largest territory in the Economic Community of West African States (ECOWAS).** Mali has high demographic growth rates but uneven population density[1] and relatively limited natural resources. The country is extremely vulnerable to climate change, and it is particularly affected by droughts and desertification. The Malian economy is characterized by a narrow range of exports, primarily gold and cotton as well as rain-fed subsistence agriculture. According to the Food and Agriculture Organization of the United Nations (FAO), about 40 percent of the rural population depends on income derived from the cultivation of cotton as an export crop.[2]

3. **Given the size of the cotton sector, it is perhaps unsurprising that it is responsible for most of the agricultural pesticide use within the country—approximately 80 percent—of which 95 percent is insecticides distributed by the parastatal cotton development agencies and the Ministry of Agriculture (MOA).** The health sector is the second largest user of pesticides, for example, for mosquito and black fly control. At the time of appraisal, the Government's efforts to boost agricultural productivity and combat periodic desert locust infestations had resulted in the accumulation of considerable quantities of obsolete pesticide (OP) stocks as well as considerable amounts of contaminated associated waste (empty containers, veterinary products, equipment, and material) and polluted soil across the country. Accumulation of OPs in Mali had been aggravated by product bans, product expiration, and deterioration as a result of improper storage. Soil had been polluted as a result of accidental and intentional pesticide spills and leakage from improper storage facilities, which in turn carried considerable risks to human and animal health from direct physical contact of humans and cattle with soil and run-off in water, inhalation of volatilized pesticides, and consumption of polluted groundwater and crops/forage. Almost all OP stocks in Mali were held by the Malian Office of Plant Protection (*Office de Protection des Végétaux*), the Malian

[1] Population density in Mali is 11 persons per km^2 on average and as low as 1 person per km^2 in the Saharan regions.
[2] FAO (Food and Agriculture Organization of the United Nations). 2017. *Mali: Country Fact Sheet on Food and Agriculture Policy Trends*. FAO.

Company for Textiles Development (*Compagnie malienne pour le développement du textile*, CMDT), and the Office of the Niger Higher Valley (*Office de la Haute Vallée du Niger,* OHVN).[3]

4. By 2015, Mali had benefited from a number of donor-funded projects which had helped strengthen its regulatory framework and institutional, technical, and financial capacity to manage OPs, key among these being the Africa Stockpiles Program-Project 1 in Mali (ASP-P1 Mali, 2006–2012).[4] The goal of ASP-P1 was to properly collect and dispose of OPs, establish systems to prevent their re-accumulation, and pilot technologies and methodologies for decontaminating soils contaminated by OPs. Unfortunately, as a result of the 2012 coup and resulting security situation, ASP-P1 had to be closed on December 31, 2012, leaving work uncompleted and a remaining balance in the multi-donor trust fund (including an allocation from the Government of Denmark) earmarked for Mali.

5. **Once the security situation had stabilized to a sufficient degree to undertake work, the OPDP project was prepared to build on the accomplishments of ASP-P1 and undertake the completion of the disposal work through a contract with a qualified international disposal company.** Other activities would include initializing programs to reduce risks from associated wastes, such as containers; identifying additional priority sites for decontamination of soils; and implementing institutional strengthening and capacity-building efforts to assist the GOM in minimizing further accumulation of OPs and associated waste.

6. The project was in line with the World Bank Country Partnership Framework (CPF) (FY16–19) as well as a number of national, regional, and global objectives, particularly those focused on the reduction of persistent organic pollutants (POPs). The Mali CPF was drafted with a focus on 'improving rural incomes by increasing productivity and resilience.'[5] The CPF's three main points of intervention were the following: (a) improve governance, by strengthening public resource management at the central and local levels and fostering citizen engagement; (b) create economic opportunities, by enhancing the productive capacity of smallholders, increasing agricultural value added and diversification to catalyze transformation, and improving basic services by developing infrastructure and connectivity; and (c) build resilience, by developing human capital, strengthening safety nets, improving risk management mechanisms for the poor and vulnerable, and mitigating climate shock. The project's focus on removing dangerous, unsafely stored, and degrading stocks of OPs, most often held in rural areas, which had both direct and indirect adverse effects on human and environmental health, directly supported efforts undertaken under the CPF to build resilience and improve agricultural productivity through enhancing the health of soils, water, livestock, and people in the project zones. In addition, efforts to analyze ASP-P1's pilot approaches to clean up highly contaminated soils (for example, land farming) and develop a national plan for prioritizing sites for decontamination also supported the goals of enhancing agricultural productivity through discovering how to potentially return degraded and contaminated lands to productive use.

7. The OP stocks are made up of a range of pesticides, including POPs, substances which resist degradation and persist in the environment allowing them to accumulate in living tissue and ecosystems and to move across great distances from their source. The OP stocks are highly toxic, causing a range of adverse human and environmental health issues, including birth defects in both humans and animals,

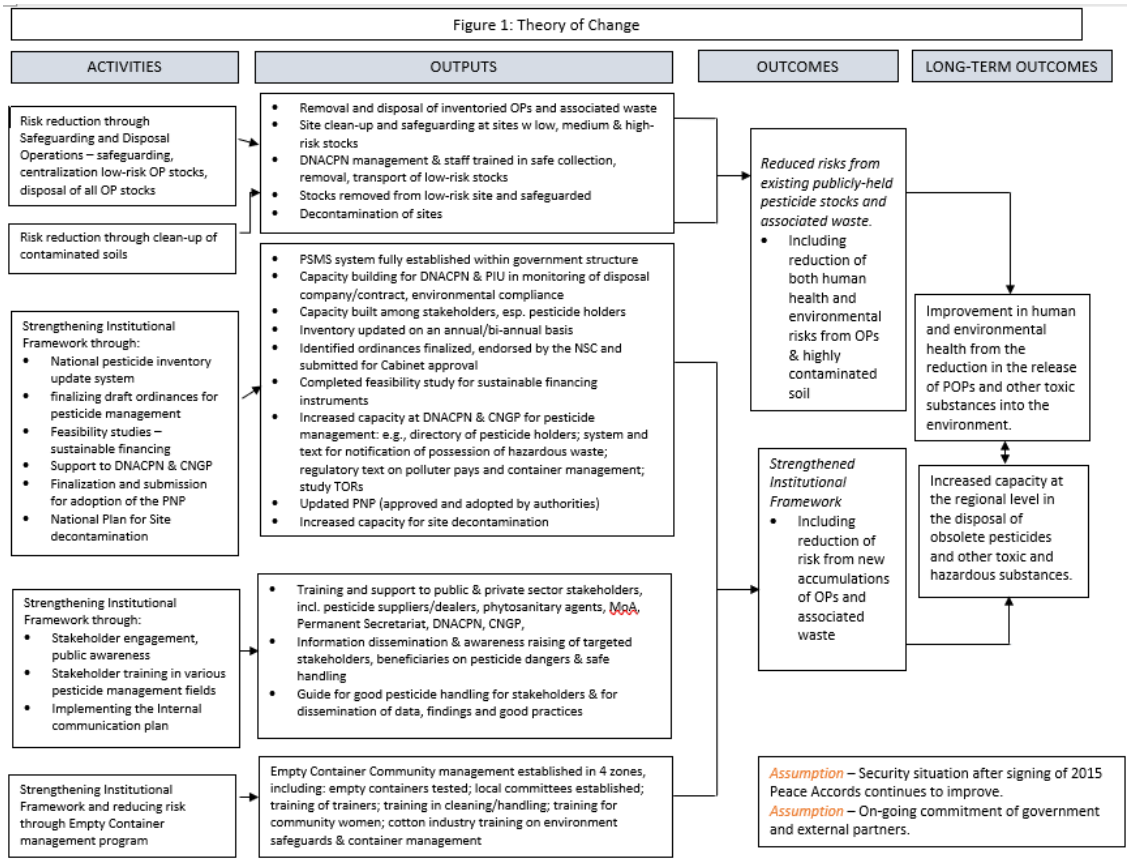
[3] A small percentage of stocks were held by private sector operators and development projects.
[4] Mali was one of seven countries which participated in ASP-P1: Ethiopia, Mali, Morocco, Nigeria, South Africa, Tanzania, and Tunisia.
[5] World Bank Group. 2015. *Country Partnership Framework for the Republic of Mali (FY16–19)*.

reproductive disorders, and in the case of certain pesticides, acute and long-term poisonings resulting in illness and death. When these chemicals become obsolete for agricultural purposes, they remain potent chemical toxins and thus need to be carefully safeguarded or disposed of. The unwanted buildup of such products normally results from inadequate stock management, nondistribution to farmers, bans, uncoordinated or inappropriate supply from donor agencies, unsuitable packaging, and supplier incentive programs. In Mali, the OP stocks are located primarily (though not solely) in rural areas and the negative environmental and human health effects are experienced mostly by poor farming households who live close to sites containing OPs and contaminated associated waste and polluted soil and whose awareness of the proper use and handling of pesticides and other affected products (for example, containers and soil) is low.

Theory of Change (Results Chain)

8. The project's Theory of Change (figure 1) is predicated on the understanding that undertaking activities that safely remove dangerous stocks of OPs and reduce risks from sites with highly polluted soil, along with undertaking activities aimed at building institutional capacity to reduce the re-accumulation of OPs, and raise public awareness, would significantly reduce the immediate and future threats to human and environmental health—both in Mali and globally—from OPs, including POPs (preparation of a Theory of Change was not required at the time of appraisal).

Figure 1. Theory of Change



Note: CNGP = National Pesticides Management Committee (*Comité National de Gestion des Pesticides*); DNACPN = National Department for Sanitation and Pollution Control (*Direction Nationale de l'Assainissement et du Contrôle des Pollutions et des Nuisances*); PIU = Project Implementation Unit; PNP = Plan National de Prévention/ National Prevention Plan; TOR = Terms of Reference.

Project Development Objectives (PDOs)

9. Reduce risks from existing publicly-held obsolete pesticide stocks and associated waste; and strengthen the institutional framework for risk mitigation of obsolete pesticides.

Key Expected Outcomes and Outcome Indicators

10. To achieve the PDO's twin goals of reducing existing risks from OPs and the mitigation of future risks, the project focused on achieving outcomes related to both (a) reduce risks from existing publicly-held OPs and associated wastes and (b) strengthen the institutional framework for risk mitigation of obsolete pesticides. The goal of safeguarding human and environmental health in both Mali and globally served as the underlying principle upon which the project was designed and implemented.

11. The following key indicators were used to assess Outcome (a):

(i) POPs and POPs[6] waste destroyed, disposed of or contained in an environmentally sound manner (Tonnes); and
(ii) Contaminated land managed or dumpsites closed under the project (Hectares).

12. The following key indicators were used to assess Outcome (b):

(iii) Revised National Prevention Plan (PNP) submitted to the Council of Ministers for adoption (Yes/No); and
(iv) Direct project beneficiaries (Number).

Components

13. The project was designed around the following three components:

14. **Component 1: Disposal of publicly-held OPs and associated waste and reduction of risk from three priority high-risk contaminated sites** (Estimated: US$3.45 million, of which GEF: US$2.70 million, Danish TF[7]: US$0.55 million, GOM: US$0.20 million. Actual: US$3.37 million, of which GEF: US$2.40 million, Danish TF: US$0.71 million, GOM: US$0.25 million[8]). Component 1 focused on the removal of immediate threats associated with OP stocks in the country and included the following activities: (1.1) nationwide safeguarding and centralization of low-risk OP stocks; (1.2) disposal of low-, medium-, and high-risk stocks by a qualified international company in an established treatment or disposal facility in a highly regulated environment; (1.3) risk reduction at three priority high-risk contaminated sites according to site-specific methodologies; (1.4) institutionalizing a system for regular updating of the national

[6] In view of the operational difficulty in separating POP pesticides from OPs, 'POPs' is understood in this context as meaning 'obsolete pesticides including POPs', as also used in the Global Environment Facility (GEF) Chemicals strategy.
[7] TF = Trust Fund.
[8] Totals might not add up exactly due to rounding.

obsolete pesticide inventory; and (1.5) development of a national plan for decontamination of additional priority contaminated sites.

15. **Component 2: Strengthening the institutional, regulatory and technical capacity for prevention of obsolete pesticide re-accumulation** (Estimated: US$0.97 million, of which GEF: US$0.34 million, Danish TF: US$0.38 million, GOM: US$0.25 million. Actual: US$0.55 million, of which GEF: US$0.30 million, Danish TF: US$0.09 million, GOM: US$0.17 million). Component 2 was designed to address key weaknesses along the pesticide life cycle, such as regulatory gaps related to container management and pesticide import; distribution and recording; sustainable financing for management of pesticides, OPs, and empty containers; the capacity for pesticide inspection and control; and the continued need of awareness raising and communication with communities concerning poor pesticide management. This prevention-focused component included the following activities: (2.1) finalization of draft ordinances and procedures for pesticide management, to be submitted for endorsement by the NSC before submission for official approval by the Cabinet; (2.2) a feasibility study on sustainable financing instruments for pesticides management to be endorsed by the NSC; (2.3) institutional support to the DNACPN and CNGP for data management, strategic orientation, and enforcement of regulation; (2.4) stakeholder training in various pesticide management fields; (2.5) assessment of gaps and updating of the PNP and having it officially endorsed by the NSC and submitted by the CNGP Chair for adoption by the Council of Ministers; (2.6) piloting of a pesticide container collection and recovery strategy; and (2.7) communication and awareness raising.

16. **Component 3: Project management, monitoring and evaluation** (Estimated: US$0.72 million, of which GEF: US$0.15 million, Danish TF: US$0.02 million, GOM: US$0.55 million. Actual: US$0.99 million, of which GEF: US$0.48 million, Danish TF: 0.14 million, GOM: US$0.36 million). Component 3 financed project management activities (procurement, financial management [FM], preparation of work plans and procurement plans, and facilitation of workshops and meetings), as well as monitoring and evaluation (M&E) of project progress and reporting.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

Revised PDOs and Outcome Targets

17. Neither the PDO nor the outcome targets were revised during project implementation. Changes which occurred as a result of circumstances that arose during implementation are discussed in the following paragraphs.

Revised PDO Indicators

18. Not applicable.

Revised Components

19. Not applicable

Other Changes

20. While the project was not formally restructured, several issues arose during project implementation which resulted in dropping or partial or non-completion of key activities. Those that were expected to be completed, but which did so only partially, are discussed under the 'Efficacy' section. Those which were dropped (that is, not expected to be completed by the end of the implementation period) are listed here:

(a) Risk reduction at three priority high-risk contaminated sites (Dropped)

(b) Institutionalizing a system for regular updating of the national pesticide inventory (Dropped)

Rationale for Changes and Their Implication on the Original Theory of Change

21. **Conducting risk reduction activities at the highly contaminated sites of Kara, Bambara Maoudé, and Goundam was dropped in early 2017** due to the dangerous and unstable security situation in the region where the sites were located, which had further deteriorated after project approval. These sites were identified as posing the greatest threat to human and environmental health with substances continuing to leach into the soil and remain open to humans and animals after ASP-P1 closed early. Signs had pointed to improvement in political and security conditions, but this was not borne out over the years following project effectiveness. Instead the project used funds to complete an analysis of soil remediation (discussed in the following paragraphs) which began under the original Africa Stockpiles Program (ASP) which added to the knowledge base on the effectiveness given different pesticides, soil types, and techniques. The lack of soil treatment and decontamination at these three sites did diminish, to some degree, the reduction of risk from OPs. However, this did not affect the overall Theory of Change which is predicated on removing the major risks to the human population and the environment, which in this case were the large number of OP stocks (particularly those of high risk) that were held under various conditions, including poorly secured, open sites in various parts of the country (mostly in the southern subregion).

22. **Institutionalizing the system for updating the national pesticide inventory could not be completed due to the failure of the FAO to provide ongoing hosting services for the Pesticide Stock Management System (PSMS).** Hosting of the site by the FAO was viewed as best practice at the time and the standard approach supported through FAO technical assistance provided initially to the country under the original ASP. The country did not have the budget or capacity to establish a new information system so reverted to a business as usual with different agencies tracking pesticide imports, holdings, and so on. While the agencies are still maintaining a tracking system, the failure to institutionalize this system reduces to some extent the ease of use of data and development of an integrated approach to data tracking, which would enhance the GOM's ability to more effectively manage pesticide acquisition.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating
Rating: High

23. The PDO continues to be in line with national, regional, and global concerns regarding addressing pesticides use and management, improved environmental and human health, and reduction of hazardous chemicals, particularly POPs. As the FY16–19 CPF has not yet been updated, the relevance of the PDO remains high, as at appraisal.

24. On the global level, the programming priorities for the current replenishment of the GEF which run through 2022 (GEF-7), prioritize focal areas concerned with chemicals and waste as well as land degradation. For chemicals management, GEF cites the need to develop 'practices aimed at becoming more environmentally sustainable, including eliminating POPs…' as well as 'facilitating the sound management of chemicals and waste.' The PDO's twin objectives of reducing risks from OP stocks and associated waste and strengthening the institutional framework to prevent the re-accumulation of OP stocks through filling regulatory gaps, providing training, improving management of pesticide inventories, and so on is directly in line with the GEF's approach of sustainability and sound management. In addition, the GEF's focus on land degradation looks specifically at 'restoration of degraded production landscapes', a key element of reducing risk through helping to identify and mitigate risks at sites contaminated with OPs. The PDO is also in line with Mali's continued involvement in regional efforts toward the implementation of harmonized regulations with regard to pesticide import, registration, and use (see for example, the West African Committee for Pesticides Approval established under ECOWAS regulation on harmonizing registration of pesticides in the region).

B. ACHIEVEMENT OF PDOs (EFFICACY)
Rating: Substantial

25. The OPDP project faced a number of challenges throughout implementation, often related to ongoing security issues within the country. While this ultimately affected the achievement of certain aspects of the project's expected outcomes, it is important to keep in mind that in the face of a continued, and over time, deteriorating security situation in various portions of the country, the project achieved the safe and effective cleanup and disposal of all inventoried OPs in the country (552 tonnes) along with other significant achievements. This removed the major threat from POPs and other pesticides in the country and safely prevented their dispersal into the global environment.

Assessment of Achievement of Each Objective/Outcome

Objective 1: Reduce risks from existing publicly-held obsolete pesticide stocks and associated waste

26. **Reducing risks from existing publicly-held OP stocks and associated wastes was undertaken through the following activities:**

(a) **Nationwide safeguarding and centralization of low-risk OP stocks.** This activity was carried out effectively using local, trained teams from the DNACPN which successfully safeguarded and centralized low-risk stocks.[9] Using local teams not only allowed for building technical capacity within the DNACPN with regard to safe handling, transport, and storage of low-risk stocks, but it also ensured that the time-consuming work of consolidating small amounts of low-risk stocks from a relatively large number of disparate sites could be done cost-effectively. After receiving training in safe handling and transport for the acquisition of personal protective equipment (PPE), DNACPN teams were able to safely and effectively secure low-risk stocks from 11 sites around the country and transport them to approved collection centers in Kayes and Sanankoroba. In addition, the DNACPN team was able to secure and transfer to the Sanankoroba collection center associated waste (empty pesticide packaging). The work was overseen by the prevention specialist and the environmental and social safeguard officer, a designated agent of the DNACPN, and section head of the Pollution and Nuisance Control and Environmental Monitoring Division there. After receiving additional safeguards training organized by the World Bank, the safeguards officer worked closely with the Technical Advisory on Disposal (TAD)[10] in overseeing the implementation of the project's Environmental and Social Management Plan (ESMP) and HSE plans in collaboration with the prevention specialist.

(b) **Disposal of low-, medium-, and high-risk stocks by a qualified international company in an established treatment or disposal facility.**[11] The project successfully disposed of all known remaining OP stocks (552 tonnes) and associated wastes in the country. While this number is lower than the original target of 666 tonnes, the variance is due to (i) a 10 percent contingency added to the contract over and above the 2014 inventoried amount and (ii) changes in the 2014 inventoried amounts due, among others, to theft, leakage, and the dispersal effects of heat and time on the stored materials which had remained on site in the years between ASP-P1 and the OPDP project.

(c) A 14-month contract was signed with Veolia Ltd in September 2017 and was successfully completed within 16 months. (The addition of two months to the original contract was a no-cost extension and did not require any budgetary changes to the contract). After project effectiveness, the project team initially began work with SAVA[12], the firm which had been preidentified during preparation (as it had been prequalified under ASP-P1 to undertake the disposal work in Mali), in hopes of a quick start to the disposal component. Unfortunately, the company decided the security risk was too high for their team to undertake the work

[9] Defined as stocks which do not contain World Health Organization class Ia (extremely hazardous) or Ib (highly hazardous) pesticides and weigh less than 500 kg.
[10] The hiring of an internationally recognized TAD to assist the PIU was considered essential to ensure that the disposal contract was executed in line with all international and regional regulatory requirements (for example, container and shipment requirements under the United Nations [UN] and Basel Convention) as well as to ensure the highest standard of environmental and occupational safety during the disposal process. The position was funded by CropLife International, representing the pesticide manufacturers, and was an important element of ensuring private sector involvement in the project.
[11] The specificity in this activity with regard to disposal in an 'established treatment or disposal facility' and in a 'highly regulated environment' were established both under ASP-P1 and in the OPDP project to ensure that disposal would take place in proven disposal facilities without the danger of creating additional POPs, such as dioxins and furans, due to improper disposal.
[12] REMONDIS SAVA, GmbH is a German hazardous waste management company.

which meant that an additional bidding process had to be executed. With the assistance of an internationally recruited TAD, the project team was able to successfully vet the bidders, choosing and contracting Veolia.

(d) The contract covered the safeguarding, centralizing, transporting, and disposal of all OPs and associated waste recorded in the PSMS (low, medium, and high risk), including those low-risk stocks collected by the DNACPN. The company was responsible for establishing an approved environment and health plan under the overall Environmental Management Plan (EMP) of the project. The contract also covered (i) the repacking and safeguarding (where needed) of all quantities of medium and high-risk stocks, (ii) site cleanup to avoid further environmental impact, (iii) storage of the stocks in temporary secure storage facilities, (iv) transfer of all stocks by road to an agreed port of export, and (v) shipment of stocks by sea to a licensed high-temperature disposal facility. The GOM received a license for the transport and disposal of up to 1,000 tonnes of OPs from the Government of France, in accordance with regulations under the Basel Convention. All collection, repackaging, transport, and disposal stages were completed in line with international standards for environmentally sound management and disposal of POPs and associated wastes, including the guidelines adopted by the Basel and Stockholm Conventions, under the responsibility of the disposal company and supervision of the DNACPN/PIU and the TAD. Throughout the execution of the contract, the project team, with the assistance of the TAD, conducted thorough monitoring of the contractor and its subcontractor. The DNACPN and the project coordinator and team consistently practiced a high level of engagement in ensuring the safe and effective execution of the contract despite numerous challenges. According to the completion report filed by the TAD after contract completion, the PIU gained significant capacity in monitoring the disposal contractor and its operations (despite having no technical experts on the team due to the deaths of both the team's technical expert on pesticide management and his assistant within a two-year period) and effectively ensured the contractor's compliance with the tender documents throughout the implementation of the component.[13]

(e) **Risk reduction at three priority high-risk contaminated sites.** Three high-risk contaminated sites (Kara, Bambara Maoudé, and Goundam) were identified as a priority for intervention from an FAO/DNACPN assessment of contaminated sites across Mali[14] undertaken during ASP-P1. The project had hoped to undertake a pre-feasibility study, followed by site-specific strategies for decontamination. Unfortunately, the activity was not carried out due to the high level of violence and insecurity in the region where these three sites are located.

(f) **Institutionalizing a system for regular updating of the national pesticide inventory.** Since the first national inventory of OPs and related waste was undertaken in 2005/2006, the collection of data on the sites, quantities, condition, and storage conditions of this waste has been carried out in a fragmentary and partial manner by ASP-P1 Mali Project Management Unit (PMU) (between 2007 and 2012) and the OPDP PIU on an ad hoc basis. The OPDP

[13] "Technical Advisor for Disposal: Final Report." (July 2019) COWI A/S, Lyngby, Denmark.
[14] DNACPN. Report of the first phase of the second investigation mission of new contaminated sites in Bambara Maoudé, Koriomé, Goundam, and Diré (Tombouctou), conducted from September 17 to 26, 2010, and report of the second phase of the mission in Kara (Diafarabé) and Niono et Marila (Kayes) conducted from October 27 to November 4, 2010. Bamako, 2010.

project planned to institutionalize this system of tracking and data gathering as part of a PSMS that would be updated on an annual/biannual basis before and after the main agricultural seasons in the country. While some capacity-building activities were carried out in preparation of institutionalizing the system, the FAO-based server failed in 2017 and has never been brought back online. While this means that an integrated stock management system is not currently in place, the agencies which import pesticide stocks still maintain an inventory system for tracking imports and storage of pesticides in the country.

(g) **Development of a national plan for decontamination of additional priority contaminated sites.** Under ASP-P1, a set of four initial sites were identified where two decontamination methodologies were initiated to test which of these might be the most effective given particular soil, levels, and types of pesticide contamination, and climatic and environmental conditions. Under the OPDD project, it was expected that a national plan would be developed to identify additional priority sites to follow through on the next phase of using the proven methodologies in cleaning up new, high-priority contaminated sites. The national plan of additional priority sites was not developed due to budgetary constraints brought about by the need for additional security during execution of the disposal contract as well as security challenges in carrying out an inventory of contaminated sites in insecure areas of the country. However, the project team did undertake the evaluation of sites where decontamination activities had begun under ASP-P1 allowing for longer-term data collection and analysis of important results on effectiveness of 'land farming' and containment methodologies which will provide essential information for the decontamination of future sites. The team monitored each of the sites, assessed the state of colonization of the sites (with fauna and flora), and took plant and soil samples which were analyzed by the Laboratory of Toxicology and Environmental Quality Assessment of the Central Veterinary Laboratory (*Laboratoire Vétérinaire Central,* LCV). The results on four sites, three which undertook land farming and one which used simple containment methods, showed a reduction of contamination on all sites, with at least one site now suitable for human habitation and use. (For details on chemical types and quantities, see table of results in annex 6c.) This work was disseminated to a range of stakeholders during a workshop organized by the project on site decontamination methodologies.

Table 1. Status and Risk Reduction Impact for Objective 1

Objective 1: Key Outcomes	Status	Risk Reduction Impact
Nationwide centralizing and safeguarding low-risk OPs	Achieved	High
Disposal of Ops	Achieved (552 tonnes - all existing OP stocks)	High
Risk reduction of three priority sites	Not Achieved	Medium
Institutionalizing the pesticide management system	Not Achieved	Low
Development of a national plan for decontamination of additional sites	Partially Achieved	Low
Overall Results	Substantial	

Objective 2: Strengthen the institutional framework for risk mitigation of obsolete pesticides

27. While disposing of stocks and other activities under Component 1 looked to reduce the immediate risks presented by the improper storage and resulting contamination from OPs, the risk of continued re-accumulation of OPs due to a lack of tracking and management systems and poor regulatory oversight along with the risks presented from the lack of a management system to deal with empty, yet still dangerous, pesticide containers entering the marketplace meant that a focus on institutional strengthening and other activities would be essential for the long-term prevention of harm from OPs. This institutional strengthening and prevention objective would be achieved through undertaking the following activities:

(a) **Finalization of draft ordinances and procedures for pesticide management and submission for endorsement by the NSC before submission for Cabinet approval**. Several draft texts (11) were partially developed in the years before the project and slated for finalization under the OPDP project. Texts were successfully finalized and submitted to a first review by the CNGP during its ordinary session held in July 2018. Texts were developed in accordance with the CILSS[15] Common Regulations - the basis for Law No. 02-014 of June 3, 2002, instituting the approval and control of pesticides in the Republic of Mali and Implementing Decree No. 09-313 of June 19, 2009. All draft texts are harmonized with the rules governing the registration of pesticides in the ECOWAS region. The approval and official adoption of draft texts are the responsibility of the various departments in charge of Agriculture, Environment, and Health.

(b) **A feasibility study on sustainable financing instruments for pesticides management in Mali.** Due to a lack of funds, this activity was not successfully completed. Although TORs were prepared for the feasibility study, the hiring process was not launched.

(c) **Institutional support to the DNACPN and the CNGP.** The project established a working group with the DNACPN and CNGP which undertook regular working sessions to identify the major needs for institutional support and capacity building. Work and training focused on institutional support to both the DNACPN and CNGP to help them manage data collected (under the OPDP project), determine strategic approach to operations, and enhance their capacity to enforce regulations and the 'polluter pays principle' for OPs. Specific institutional strengthening, included, among others,

- Development directory of pesticide holders. official notice of possession of hazardous waste. texts on the 'polluter pays principle', and the management of empty packaging of pesticides;
- Identification of draft complementary texts for improved management of OPs and empty packaging;
- Identification of costs parameters for the application of the 'polluter pays principle' (as set out in Law No. 01-020 on pollution and nuisances, May 2001); and
- Development of TOR for a feasibility study on establishing sustainable management of OPs and other dangerous chemicals.

[15] CILSS = Permanent Interstates Committee for Drought Control in the Sahel (*Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel*).

(d) **Stakeholder training in various pesticide management fields.** Training of key stakeholders in various areas of pesticide management was successfully undertaken. A key element was to revitalize the CNGP which brings together all the structures and actors involved in the management of pesticides in Mali. Members are responsible for collecting data and monitoring the strategic approach of pesticide management, including the application of decisions and recommendations of the Sahelian Pesticides Committee[16] and the regulations in force at the national level. The project supported the CNGP, its members, and other stakeholders in a range of training and institutional strengthening initiatives, including

- Training of agents responsible for phytosanitary control and pesticides in the eight subregions and the District of Bamako;
- Training of pesticide dealers in the District of Bamako and in the Koulikoro region on legislative and regulatory texts on the management of pesticides and the conditions for obtaining approval to resell pesticides in the Republic of Mali.
- Support for the adoption of a new decree instituting the registration and control of pesticides in Mali
- Support for the harmonization of national texts with the C/REG Regulation 05/03/2008 harmonizing the rules governing the registration of pesticides in the ECOWAS region adopted in May 2008 in Abuja/Nigeria.

The question of permanent funding of the CNGP through creation of a budget line for operation and management—a key recommendation from this activity—is still under consideration by the GOM. If this recommendation is approved, it would have a substantial positive effect toward preventing the re-accumulation of obsolete stocks in the country.

(e) **Implementing the empty container community management strategy in the four cotton production zones.** The pilot approach for community packaging management is fully functional in two cotton zones (Kita [West subsidiary] - Malian Company for Textiles Development [CMDT] and Koutiala (Northeast subsidiary CMDT). This includes successfully establishing local committees to monitor the implementation of the community management strategy in Kita and Koutiala. The project also undertook a series of important trainings and capacity-building initiatives, including training of trainers from the Environment and Sustainable Development Department of the CMDT to assist with moving the system to the remaining two cotton zones. This activity included a mainstreaming of improved environmental practices into the CMDTs which is considered a major achievement. The strategy is now ready to be rolled out in the remaining two cotton production zones. The pilot empty container community management strategy was developed in line with the strategy developed by the Directorate of Environment and Sustainable Development (DEDD) of the CMDT to ensure full harmonization of the approaches.

(f) **Internal communication plan (for communication between the DNACPN and other relevant stakeholders from the Government) was prepared by the DNACPN under ASP-P1**

[16] With support from the FAO, under the CILSS, the Sahelian Pesticides Committee serves as a clearinghouse for all pesticides entering the Sahel Region.

Mali. The communication strategy was implemented successfully (some activities still being completed post project completion). In addition to a range of awareness-raising activities, including a range of accessible publications on safe handling of pesticides and so on, the project developed an orientation guide for communication and awareness raising on pesticides and their management for all stakeholders. The guide, included in the updated National Prevention Plan, will serve as a dashboard to inform target groups on data, statistical analysis, and raising awareness on the pesticide use and dangers and outlining good practices.

(g) **Finalization and submission for adoption of the PNP.** The PNP developed under ASP-P1 serves as a dashboard for the implementation of activities relating to the prevention of obsolete stocks and related dangers and risks. The PNP was successfully updated considering the change in context in the management of pesticides since it was first developed in 2007. It is slated to be adopted during the next session of the CNGP and submitted to the Minister of Agriculture who chairs the CNGP for official presentation to the Council of Ministers.

Table 2. Objective 2 and Status

Objective 2: Outcomes	**Status**
Submission of a revised National Prevention Plan (PNP) by the CNGP to the Council of Ministers for Adoption (Main)	Achieved
Sustainable financing instruments for pesticides management identified and validated by the CNGP (Intermediate)	Not Achieved
Piloting of final strategy in four cotton production zones (Intermediate)	Partially Achieved
Overall Results	**Substantial**
Key Activities	
Draft Ordinances	Achieved
Feasibility Study on Sustainable Financing	Not Achieved (ToR completed)
Institutional Support for the DNACPN	Achieved
Stakeholder Training	Achieved
Pilot Container Strategy	Partially Achieved (2 of 4)
Communication Strategy	Achieved
Finalization of PNP	Achieved

Justification of Overall Efficacy Rating
Rating: Substantial

28. For Objective 1, despite security issues which resulted in difficulties with contracting the disposal company and increasing the cost of implementation and supervision, the project completed the two activities known to have the highest impact on reducing risk, that is, the centralization of low OP stocks and the safe disposal of all known OP stocks in the country. These two outcomes significantly reduced risk to human and environmental health in the country. By permanently disposing of obsolete POP pesticides in the country, risks were reduced globally as well. While some outcomes under Objective 1 were not fully achieved, primarily due to security reasons, those outcomes had a lower risk reduction potential and did

not detract from the overall achievement of the risk reduction objective. For Objective 2, the project successfully completed activities which have materially changed the prevention climate in the country, including updating key decrees governing pesticide import, use, and disposal; establishing a community-managed program for empty container management; building knowledge and capacity on both a national and regional basis on site decontamination and disposal operations; updating the National Prevention Plan on pesticides; and raising awareness among farmers and farming households, including women, pesticide holders, government staff, and other stakeholders on the dangers posed by OPs and on safe handling and management of pesticides. These actions benefitted over 6.9 million beneficiaries living near sites and depots and/or having been informed and made aware of the impacts of pesticides and good management practices. Approximately 3.6 million of these beneficiaries are women. Finally, the project provided key training to environmental officers in the cotton sector companies which are responsible for most pesticide use in the country. This work is considered key for long-term pesticide management and prevention of risk from poorly used and stored pesticides. Overall, three out of four of the PDO-level indicators were met and the fourth was not met for reasons outside the control of the project.

29. In a country facing continued economic and political hardship, the cleanup of OPs, the piloting and establishment of new programs on managing used pesticide containers, and enhanced capacity for disposal and management of pesticide stocks, along with increased public awareness and the strengthening of regulatory and institutional capacity, are especially impressive achievements and an important addition to improving the quality of life of the project beneficiaries, as well as to improving the environment, both locally and globally. Given the overall achievements, despite some shortcomings, the efficacy rating is considered **Substantial**.

C. EFFICIENCY

Rating: Modest

Assessment of Efficiency and Rating

30. The efficiency analysis is based on two criteria: (a) economic analysis and (b) implementation efficiency, presented in the following paragraphs.

Economic Analysis

31. The project successfully eliminated the country's known OPs, and improved its capacity to prevent OPs' re-accumulation, thus generating significant benefits. These are related to health (for example, reduced health risks due to lower exposure levels); environment (for example, reduced risk of polluting water and soil); and economy (for example, avoided income losses due to crops contamination). However, the lack of dose-response functions between the chemicals found in OPs and their impacts makes it impossible to conduct a cost-benefit analysis of the project. The Project Appraisal Document (PAD) presented a rapid cost-effectiveness analysis (CEA) related to removing and disposing the existing OP stocks. This section illustrates results of an ex post CEA for the project. Annex 4 presents more details of this analysis as well as an incremental cost analysis for the GEF funds.

32. **CEA.** The project disbursed US$4.9 million in actions that benefited over 6.9 million people—corresponding to a unit cost of US$0.7 per beneficiary. The figure is considerably lower than that estimated for the same project at appraisal, as well as for similar projects conducted in other countries,

for example, Egypt and Côte d'Ivoire (table 4). However, the cost of disposing OPs and associated waste was estimated at US$5,700 per ton. This is higher than the one estimated at appraisal[17] and is at the upper end of the range of costs incurred by other countries, that is, between US$4,200 in Côte d'Ivoire and US$6,500 in Egypt. This low cost-effectiveness is because (a) the total cost of OPs' disposal includes additional expenses of security guards (for example, travel and subsistence) necessary for the safe collection, transport, and disposal of OPs;[18] (b) the project eliminated a lower quantity of OPs compared to the one estimated at appraisal (552 tonnes versus 666 tonnes), which increased the unit cost of disposal.

Table 3. Results of Cost-Effectiveness Analysis

	Project at Appraisal	Project at Completion	Other Projects[b]
Project cost (US$ per beneficiary)	2.6	0.7	12 in Egypt 76 in Côte d'Ivoire
Cost of disposal (US$/tonne)[a]	4,700	5,700	4,200 in Côte d'Ivoire 4,800 in Moldova 4,900 in Tanzania 6,500 in Egypt

Note: a. Includes the cost related to repackaging, safeguarding, temporary storing, shipment. b. Egypt: Sustainable POPs Management Project (P116230), Implementation Status and Results Report (ISR) December 2019; Côte d'Ivoire: Obsolete Pesticides Management Project (P131778), PAD, August 2015; and Moldova: Persistent Organic Pollutants (POPs) Stockpiles Management and Destruction Project (P090037), Implementation Completion and Results Report (ICR), 2011; Africa Stockpiles Program - Tanzania (P103189), ICR, 2013. For direct comparability, the unit estimates were adjusted to 2019 prices.

33. A few other activities were conducted in a cost-effective manner (for example, finalization of regulations related to pesticide management, communication, and training[19]); others were only partially conducted at a higher cost than expected at appraisal[20] while others were not conducted at all.[21]

Implementation Efficiency

34. Project implementation efficiency was affected to some degree by a range of exogenous factors, including loss of the original contractor due to security concerns causing delays in the first years of the project; security issues and distance of the sites from Bamako; loss of technical staff; high turnover rates among directors at the DNACPN; and the difficulty in making technical expertise available to the project, particularly in the areas of FM and disposal. The team and task team leader (TTL) worked with the Government to find solutions to mitigate the effects on implementation efficiency, including quickly

[17] The economic and financial analysis of the PAD mentioned an estimate of US$3,950 per tonne; however, this was most likely calculated based on the GEF allocation to the 'disposal of publicly-held OPs and associated waste' of US$2.63 million (PAD, page 31) and a quantity of 666 tonnes. If the total cost of this activity had been used (US$3.08 million), then the estimated cost of disposing POPs should have been US$4,700 at appraisal.

[18] The share of costs related to security in the total cost of disposal is not known.

[19] Although no indicators are related to these activities, they have been completed satisfactorily, at a minor cost than that estimated at appraisal (for example, US$0.2 million at completion versus US$0.28 million at appraisal for the finalization of regulations; US$30,000 at completion versus US$60,000 at appraisal for communication and awareness raising).

[20] For example, the actual cost of implementing the empty container community management strategy was higher than that estimated at appraisal (US$0.64 million versus US$0.54 million), although the implementation was done in only two of the four chosen sites.

[21] For example, risk reduction at three priority high-risk contaminated sites and institutionalizing a system for regular updating of the national pesticide inventory.

seconding an FM specialist from another World Bank project to support the team and to get things back on track. Within one supervision cycle, the FM issues were resolved. Implementation efficiency was positively affected by the effective working relationship between the PIU, DNACPN, and NSC. In addition, the NSC followed through on time on clearances and other key commitments. This helped avoid the typical bottlenecks that can arise between the PIU and government agencies. Moreover, the locally based TTL was in close contact with the PIU team, which contributed to efficient communication and response to any issues—particularly concerning the implementation of Component 1 and the disposal contract.

Overall Efficiency

35. Overall, due to the cost-effectiveness aspects and difficulties faced during implementation (for example, delays, high turnover of project directors, change in contractors), the project efficiency is rated Modest.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Satisfactory

36. The relevance of the PDO was and remains High, project efficacy is considered Substantial, and due to higher-than-expected cost of disposal, project efficiency was rated Modest. Despite facing multiple challenges, the project was able to achieve both a significant reduction of risk through disposal of all known OP stocks in the country and strengthening the institutional framework for prevention. A project restructuring (discussed under Implementation factors below), including a revised Results Framework would have helped make results clearer, but even without this revision, achievements and risk reduction significantly outweigh the lost impact from 'dropped' or 'partially achieved' actions. Therefore, the overall project rating is considered Substantial.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

37. Women, particularly in rural areas, are highly likely to be exposed to the dangers of pesticides, OPs, and empty pesticide containers, through daily activities at the market, in food preparation, and in keeping the home and farm clear of pests. For example, some families in Mali have used soil that is highly contaminated with dangerous pesticides to kill pests within the home. Empty containers may be used for holding water or other food goods. Given this situation, the project included education and awareness-raising activities specifically targeting women. Local nongovernmental organizations (NGOs) were brought in to facilitate the awareness-raising campaigns and women have been an integral part of the community-managed approach to management of empty pesticide containers. Over 3 million women are estimated to have benefitted from the project's activities either directly or indirectly. During the course of the project, three workshops aimed at young women were organized to train them in keeping and cooking a healthy diet free of OPs. Blogs on Facebook, Twitter, and Instagram included healthy recipes, which were viewed by more than 95,000 Malians.

Institutional Strengthening

38. The project particularly targeted the DNACPN and CNGP along with other stakeholders, both public and private for institutional strengthening and capacity building. As discussed earlier, institutional

strengthening was successful in a range of areas, including the revitalization of the CNGP and its crucial role in coordinating issues around pesticide management in the country. Particularly regarding the hands-on experience of monitoring the disposal contractor and in working with the international TAD, DNACPN staff and others were able to gain significant technical knowledge. In addition, to the specific activities outlined above, DNACPN staff that were seconded to the PIU staff received substantial knowledge in technical aspects of disposal operations and in project management which they were able to bring back to the DNACPN at the end of the project.

39. An extremely important achievement of the project, particularly in relation to supporting institutional strengthening in the private sector, was providing support for the establishment of the CMDT, one of the largest users of pesticides in the country. This mainstreamed environmental issues into the CMDT which should have long-term impacts on enhancing pesticide management and lowering risk from the cotton sector. Finally, staff at the DNACPN have become a resource for other countries in the region on issues of disposal of OPs and site decontamination. Since completion of the disposal contract and removal of OPs, the DNACPN has been contacted by agencies in other countries in the region that have reached out to gain from their experience from technical aspects of collection, transport, and disposal (of both low-risk and high-risk OPs) and also of the complex process of managing the international transport according to the rules of the Basel Convention and other UN standards.

Mobilizing Private Sector Financing

40. The project was successful in mobilizing private sector financing of approximately US$120,000 from CropLife International (CLI) for an internationally recognized TAD. The positive input of the TAD in the successful outcome of the disposal is discussed further under 'Key Factors During Implementation.' The financing was important for (a) ensuring a significant level of support to the PIU and Government during the complex process of developing bidding documents and vetting bidders for a highly technical contract; (b) providing ongoing support with monitoring the full disposal operation which would have serious environmental and human health impacts, if poorly executed; and (c) allowing for financial support from the industry which was responsible for sale of pesticides within the country creating at least some level of accountability.

Poverty Reduction and Shared Prosperity

41. Not applicable.

Other Unintended Outcomes and Impacts

42. Not applicable.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

43. **Project preparation benefitted** from a variety of lessons derived from the original ASP-P1 undertaken in Mali from 2006 to 2012. The lessons include (a) the importance of including flexibility within the disposal contract to deal with unexpected contingencies, given the uncertainty of inventories over

time; (b) an audit of OP sites during project preparation to better determine the amount of stocks and the disposal budget; (c) an understanding of the importance of finalizing regulatory measures to control imports, increase institutional capacity, and so on, to prevent accumulation; (d) preparing and approving of framework safeguard documents during preparation, so as to avoid delays during implementation; (e) addition of measures to expedite procurement, for example, limited international bidding from preapproved list of qualified companies; (f) experience gained in the importance of having qualified technical experts for OPs' disposal; (g) planning for pre-feasibility studies of contaminated sites to determine specific conditions and concomitant risk reduction technique; (h) the importance of a community-based approach for container management; and (i) ensuring of a pesticide management communication plan and that it is executed to build a baseline for sound pesticide management. Staff who were engaged from the previous project were able to ensure that the design of the OPDP project directly built on and consolidated the achievements of ASP-P1 and addressed the key priority issues that could not be completed under ASP-P1.

44. In many cases, these lessons proved to be extremely important in achieving project objectives, particularly with regard to the TAD, being flexible about what could be covered in the disposal contract, pre-developing safeguards instruments, and ensuring a communications plan was developed and executed for a wide range of stakeholders.

B. KEY FACTORS DURING IMPLEMENTATION

Factors Subject to the Control of the Government and/or Implementing Entities

45. **The TAD has significantly contributed to the success of the project.** The role of the TAD, identified as key for support on disposal operations based on lessons learned from ASP-P1 and included in project design, was a significant contributor to the success of the disposal operation and of Objective 1. The development, assessment, and implementation of a disposal operation for high-risk OPs is complex and multitiered with actions that need to be carried out at the local, regional, and international level for safe and effective disposal to take place. The process is made even more complicated when one considers the security situation in the country and the fact that Mali is landlocked, requiring shipment through another country in the region to reach an acceptable port. The role became even more integral to project success, with the deaths of both the PIU's pesticide management specialist responsible for operations and M&E and his assistant within two years of each other early in the project. This made the support of the TAD even more critical and allowed other members of the PIU to build capacity alongside the TAD on field missions, site supervision, assessment of EMPs, and so on.

46. **Selection and implementation of the disposal contract.** A 14-month contract was signed with Veolia Ltd in September 2017 and was successfully completed within 16 months. (The addition of two months to the original contract was a no-cost extension and did not require any budgetary changes to the contract). After project effectiveness, the project team initially began work with SAVA, the firm which had been preidentified during preparation (it had been prequalified under ASP-P1 to undertake the disposal work in Mali), in hopes of a quick start to the disposal component. Unfortunately, the company decided the security risk was too high for their team to undertake the work, which meant that an additional bidding

process had to be executed. With the assistance of the TAD,[22] the project team was able to successfully vet the bidders, as well as choose and contract Veolia.

47. **Formal and 'on-the-job' capacity building.** A number of specific trainings were carried out under both Components 1 and 2 which resulted in significant improvement in the capacity of various players to better undertake their roles in the various aspects of pesticide management in the country. The revitalization of the CNGP was a key element in both capacity building and in enhancing the overall efficiency of implementation for the project. Staff from the DNACPN who were seconded to the PIU were able to build capacity, which was eventually reintegrated fully into the DNACPN. Through undertaking the collection and transport of the low-risk OP stocks, members of the PIU, DNACPN agents, and others were able to gain valuable skills and experience in the hands-on training of disposal teams, environmental management, following of international guidance on worker safety and transport, and so on along with working on the high-risk disposal, as outlined earlier. This built-in capacity has proven to be an extremely valuable regional resources, as well, as discussed earlier.

48. **Government commitment and participation.** Government commitment was high, both in terms of availability of DNACPN staff and other ministry staff to participate in NSC meetings, provide guidance, as needed during the implementation of the disposal contract, and provide US$1 million for project implementation. Regular meetings of the NSC, chaired by the Minister of Environment Sanitation and Sustainable Development or their representatives, were well attended and meant that involved government agencies were kept well abreast of project progress and issues and were able to provide guidance and monitoring, as needed. The PIU had a collaborative relationship with DNACPN staff and shared information during weekly and monthly meetings. This information sharing meant that implementation of activities throughout the country could be facilitated by the supervision of DNACPN staff in various subregions.

49. **On the less positive side**, however, there were serious issues regarding a lack of consistency in key government posts and a failure of the Government to provide additional funding to ensure completion of project activities. From 2015 to 2020, the Minister of Environment changed six times, with nearly as many changes in the National Director of the DNACPN. These numerous changes among key government posts linked to the project had a negative impact on project implementation, particularly regarding monitoring and coordination. In addition, in the first quarter of 2018, after the completion of the midterm review, the need for additional funds was identified and a six-month plan was developed to get activities back on track. At that time, the GOM committed to providing additional funds (US$400,000) to ensure that key studies and other prevention activities could be done before project closure. However, these funds were never transferred to the project.

50. While it had been envisioned that the NGO Pesticides Action Network of Mali (PAN-Mali) would expand upon its original role under ASP-P1 and monitoring and oversight of disposal activities for the OPDP project, this was not possible due to lack of available funding. However, the project continued to involve PAN-Mali in the activities it had supported under ASP-P1, namely support to the NGO Sahel-

[22] The hiring of an internationally recognized TAD to assist the PIU was considered essential to ensure that the disposal contract was executed in line with all international and regional regulatory requirements (for example, container and shipment requirements under the UN and Basel Conventions) as well as to ensure the highest standard of environmental and occupational safety during the disposal process. The position was funded by CLI, representing the pesticide manufacturers, and was an important element of ensuring private sector involvement in the project.

Solidarité, which was involved in the decontamination of polluted sites, and the Association for Support to Community Initiatives involved in the community management of empty pesticide packaging where they played a crucial role in achieving community involvement and supporting awareness-raising activities.

Factors Subject to World Bank Control

51. **Transfer to a locally based TTL.** The transfer of the task team leadership from a headquarters-based TTL to one located in the field in early 2017 proved to be an important element for expediting and improving communication, clearances, and day-to-day availability of World Bank support during the challenging process of executing the disposal contract. This proved to be a significant support to the project.

52. **Project restructuring.** It seems clear when reviewing documentation of the project, that it could have benefitted from a restructuring to consider the need to drop activities due to security risks and higher-than-expected costs for security, particularly during missions and disposal activities. GOM and the World Bank ensured that the more crucial activities on disposal were prioritized to lessen the risks posed to humans and the environment. While the lack of restructuring made implementation and assessment of activities a bit less clear, the overall decision to prioritize risk reduction was in line with project objectives and how to best protect human and environmental health in the country.

Factors Outside the Control of Government and/or Implementing Entities

53. **Security issues.** While the OPDP project became effective a few months after a peace agreement had been signed between the GOM and rebel factions in the north of the country, the security situation in Mali continued to be difficult and began to actually deteriorate over time. This had a series of direct and indirect effects on the project activities and the ability to reach expected outcomes. These included (a) the first disposal contractor, SAVA, dropping out due to security concerns meaning additional costs and delay of a bidding and vetting process for a new disposal contractor; (b) Veolia, the second contractor, requiring security at all field sites and missions,[23] causing additional cost of ensuring military escorts; and (c) the inability to travel to the zone where the three priority contaminated sites were located forcing the team to drop the activity linked to an outcome indicator under Objective 1. Reduced finances due to extra costs, as above, resulting in difficulties in undertaking initiatives under Objective 2, requiring the country to prioritize the disposal activity, as yielding the most benefit for the country regarding risk reduction. Recognizing the funding shortfall, the GOM did commit to contributing additional funds, when concerns were raised at the midterm review. A six-month plan was introduced to get most of the activities[24] back on track. These funds, however, did not materialize, leaving several activities uncompleted, either fully or partially.

54. **Capacity issues and loss of key personnel.** Delays and difficulties arose in several areas regarding a lack of specific technical capacity within the country. The project had challenges in recruiting specialists

[23] For sites in the cotton zones, the security was provided by the CMDT and in the non-cotton zones by Malian military. The security was paid for through the GOM's contribution to the project and approved by the World Bank through a no-objection issued by the TTL.

[24] The plan did not include the priority site decontamination or institutionalizing of the pesticide management system which had been dropped for reasons other than lack of funds.

in the area of FM, M&E, and disposal/pesticide management. The deaths of two technical specialists in pesticide management hit the project team hard both from a personal and technical standpoint. Efforts to recruit a new pesticide management specialist who could monitor the disposal operation failed and the team's prevention specialist was asked to support Component 1 activities, often at the expense of his original work program, creating additional challenges for successful implementation of activities related to Objective 2 and the prevention of future risks/accumulation of OPs. In addition, there was no existing capacity to replace the loss of the server and hosting of the PSMS when the FAO server failed, and no further support was forthcoming from the FAO in that respect.

55. **Issues with the disposal contractor and subcontractor.** The disposal contractor Veolia sent a new manager to the project site every six weeks. These individuals' work typically had no overlap and the incoming site manager was ill prepared to take on the task. In addition, the Algerian subcontractor who remained on site had several issues with appropriate management of local workers both from a cultural and language perspective. Most of this work took place 500 km from Bamako and required additional supervision from the PIU, both the coordinator and the prevention specialist, along with other staff who joined from the DNACPN. This resulted in additional management and M&E costs, resulting in a further erosion of the project budget.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

56. The quality of M&E was High with Satisfactory ratings given throughout project implementation. Reports were filed on time; staff participation in World Bank supervision missions and in communications and meetings with the TTL was high; and commitment to participation in field missions/site visits to ensure safe and effective implementation of the low-risk collection operations as well as the high-risk OPs' disposal operation was high. Monitoring of these activities and working with World Bank staff also improved capacity for M&E which should last beyond the life of the project.

M&E Design

57. While a Theory of Change was not required at the time the project was developed, the key activities and expected outcomes were well in line with the objectives stated in the PDO. The indicators developed were well designed and allowed for clear monitoring of progress toward outcomes.

58. Clear lines of responsibility were established under the M&E design with overall responsibility resting with the PIU. M&E was carried out through (a) annual supervision missions of the World Bank (according to guidance for small projects); (b) semiannual and annual reporting by the PIU to the World Bank, including a participation and reporting on a midterm review; (c) meetings of the NSC convened and chaired by the Minister of the Environment and the participation of all the structures and actors involved in the management of pesticides; (d) weekly, monthly, and yearly meetings organized by the DNACPN; (e) periodic reports to the Environmental Planning and Statistics Unit; (e) financial monitoring reports; and (f) annual audits.

59. The GEF POPs' Tracking tool, specifically the worksheet for management and disposal of OPs, including POPs, which was designed with input from the GEF POPs Task Force, to track results of GEF-funded projects under the POPs' focal area was to be used by the PIU to report specific results to the World Bank. This would then allow the World Bank to communicate POP-specific results to the GEF Secretariat as part of the GEF annual evaluation exercise. This was not periodically updated during the project; however, an updated GEF POPs' tracking tool was prepared at completion and is filed with the project documents.

60. Regarding the indicator on number of beneficiaries, it appears that it may have been under targeted at design, given the substantial overachievement.

61. PAN-Mali, which had supported awareness-raising activities under ASP-P1 along with the Prevention Working Group was expected to play a role in monitoring the implementation of the PNP.

M&E Implementation

62. In general, the PIU maintained a high standard of monitoring and reporting throughout the project.[25] The PIU met reporting requirements on time and undertook the difficult work of monitoring the disposal activity with great dedication and commitment, especially given the variety of exogenous challenges that arose. Information gathering was consistent and allowed for reporting that fed clearly and directly into monitoring of results. Data were collected and organized for activities in line with the implementation of each component, making it possible to assess the outcome indicators and monitor the achievement of the project objectives. In addition to reporting to the World Bank, results were communicated every six months to the members of the NSC (including NGOs and civil society) during its ordinary sessions, convened and chaired by the Minister of the Environment. As the NSC was made up of key agencies and stakeholders involved in the management of pesticides and the project activities, it enabled a consistent feedback loop to the project team. Progress and results were also shared with the players and stakeholders involved in pesticide management during the semiannual sessions of the CNGP.

63. During preparation, the project undertook an inventory update throughout the country, which allowed for a more accurate figure of OP stocks and their condition. (Although given delays caused by the original contractor dropping out, these amounts were reduced due to time, temperature, and deterioration of packaging).

M&E Utilization

64. The monitoring system assisted the PIU with identifying and resolving issues during execution of the disposal contract, particularly regarding improving effectiveness of the subcontractor, given lack of consistency in management at times, on the part of the contractor. In addition, the M&E process was extremely valuable in ensuring the contractor met all requirements regarding compliance with the EMP. This not only helped lead to the successful removal of all known OP stocks in the country but also did so with no accidents or increased risks to human and environmental health.

[25] Some issues with regard to financial reporting were experienced early in the project, but this was strengthened through seconding a finance specialist to the team on a part-time basis (see under fiduciary compliance).

Justification of Overall Rating of Quality of M&E
Rating: Substantial

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

65. **Safeguard compliance was Satisfactory.** The project was classified as environmental category A (full assessment) and triggered the following safeguards policies: Environmental Assessment (OP/BP 4.01) and Pest Management (OP 4.09). An overall Environmental and Social Impact Assessment was prepared, as well as an ESMP, which served to guide the environmental and social management during project design and implementation. Safeguard missions were conducted by a World Bank safeguards specialist to support implementation during the lifetime of the project and mission findings were recorded in the Aide Memoires. While the Grievance Redress Mechanism (GRM) took some time to be put in place due to difficulties in meeting with communities in outlying areas, it was eventually established in June 2017. The GRM was later revised to better capture the views and needs of the communities that would be potentially affected by the disposal operations. No grievances were recorded throughout the life of the project.

66. **FM was Satisfactory.** An FM specialist based in the World Bank office in Bamako carried out regular implementation support missions. The quarterly interim unaudited financial reports were submitted to the World Bank for review on time and there were no inconsistencies for follow-up. The latest project audit for the year ending December 31, 2019, will be submitted at the end of June 2020. The project audit for the year ending in December 31, 2018, resulted in an unmodified (clean) opinion on the project financial statements. The Audit Report was received in June 2019 and reviewed as satisfactory by the FM team in July 2019. The PIU is to be commended for maintaining an overall Satisfactory rating on FM arrangements given the precarious security situation in the country through the lifetime of the project.

67. **Procurement was Moderately Satisfactory.** Procurement activities were implemented based on the applicable Procurement Guidelines at the time of project appraisal and in accordance with the Procurement Plan, which was duly updated, reviewed by the World Bank, and disclosed regularly. The last post review was conducted on June 10, 2019, and found that procurement arrangements were still in place and in line with the workload. Procurement process and contract administration were reviewed and the main conclusions are as follows: (a) Request for Quotation with several allotments, (b) frequent consultation of the same suppliers for quotation, (c) lack of internal quality control of bid documents, and (d) documentation not uploaded in Systematic Tracking of Exchanges in Procurement (STEP). Procurement processes and asset verification under the small grants program were verified by external auditors acceptable to the World Bank, and no issues were raised.

C. BANK PERFORMANCE

Quality at Entry

68. The World Bank did significant work in supporting the GOM both in building a project that addressed objectives which had been left uncompleted after the early closure of ASP-P1 and in mobilizing project financing (unutilized funds from the GEF TF and Denmark). The project had a clear PDO with complementary, country-driven objectives. In addition, the project's design addressed key capacity gaps in the country which led to significant increase in the state of knowledge (both locally and regionally) on OP disposal operations and decontamination of contaminated sites. The project also built directly upon

lessons learned from ASP-P1 which helped in the development of proven actions and management approaches. Given the complexity of the security situation in the country, it may have been prudent to reduce the number of activities at entry, although the deteriorating situation could not necessarily be predicted at that time.

Quality of Supervision

69. The decision to site the task team leadership at the local office in Bamako added significantly to the quality of supervision given to the PIU throughout the project. This was particularly important given that guidance on projects with smaller budgets calls for only one official supervision mission a year. With the TTL at the local office, these official missions could be augmented with weekly or monthly meetings, (or even daily phone calls at some points), depending on the stage of implementation and the level of guidance needed.

70. Training on key issues on reporting, procurement, and financial matters was conducted on time and the World Bank provided guidance to resolve issues related to capacity gaps, for example, the part-time secondment of a financial specialist from another project to the PIU. The World Bank effectively monitored the implementation of the GEF and Danish TF financing agreements.

Justification of Overall Rating of Bank Performance

Rating: Satisfactory

71. The World Bank provided sound guidance and technical advice to solve a number of challenges faced by the project, particularly with regard to capacity issues at the PIU with regard to FM and disposal operations. Supervision and support went beyond the required annual supervision mission to a cooperative and collegial working relationship which allowed the PIU's coordinator and staff to be in communication with the World Bank whenever necessary. The World Bank assisted the country in completing the challenging objective of disposal of high-risk OP stocks from the country, a clear priority of the GOM.

D. RISK TO DEVELOPMENT OUTCOME

72. By prioritizing and successfully achieving disposal of over 550 tonnes of OPs, along with other outcomes, particularly with regard to container management and supporting tracking and compliance for cotton companies, the project has significantly reduced risk to human and environmental health. The overall reduction of OPs along with the mainstreaming of other changes within the private sector and civil society support a good outlook for these outcomes to remain in the longer term. However, shortcomings in undertaking some institutional strengthening activities—including not finalizing the institutionalization of pesticide management to allow for sustained and integrated collection, tracking and monitoring of data on pesticide purchase, use, and obsolescence across government agencies—increases risk of the accumulation of OP stocks in the future. The revitalization of the CNGP and its key role in pesticide management was another major outcome of the project, but the gains will only be sustainable if the CNGP receives autonomous and sustainable funding. Finally, the ongoing security risk in the country places barriers to the Government's ability to undertake work on monitoring, particularly in regions further away from Bamako.

73. The risks to development outcomes are mitigated, among others, by gains in (a) capacity building achieved during the project; (b) the execution of public awareness campaigns and changed handling practices; (c) the establishment of the community-managed empty container management program; and (d) availability of newer pesticides (those likely to be procured by the Government in the future) which do not contain POPs, so the reduction of risk from these particular chemicals, both locally and globally has been permanently achieved.

V. LESSONS AND RECOMMENDATIONS

74. **Lesson 1: A highly skilled technical advisor on disposal operations to support the country on developing bidding documents, vetting bids, monitoring EMPs, and monitoring collection, transport, and site cleanup is essential.** The role of the TAD and the individual filling that role are key to supporting the country in undertaking the complex and potentially high-risk operation of removing OP stocks. The process involves multiple layers of very specific technical and managerial expertise as well as experience with disposal contractors and subcontractors. The PIU team brought local knowledge and a high level of commitment to the operation which was bolstered by the experience of the TAD and together ensured a fairly smoothly running contract with no safety breaches to final disposal in Europe and appropriately cleaned and safeguarded former storage sites. In addition to the disposal operation itself, the PIU and DNACPN staff working alongside the TAD increased technical capacity which has begun to serve others in the region as well. Recommendation: Operations in other regions, at the moment in West Africa, the Middle East, and Asia should consider this as they move forward with disposal of POPs and other hazardous substances.

75. **Lesson 2: Ambitious and complex data management systems always fall short.** Data held offsite and/or part of an overly complex system makes data difficult to access and pesticide management less effective/efficient. Simpler options focused on final outcomes of specific tasks, that is, (a) inventory of OPs destined for disposal; (b) inventory of pesticides for reformulation and use elsewhere; (c) inventory of pesticides likely to go obsolete within a year; and (d) inventory of pesticide strategic stocks for locust, armyworms, or for vector control and so on will support the country's pesticide management more effectively than complex data management systems. Recommendation: Develop realistic and practical pesticide stock management plans.

76. **Lesson 3: Priorities for disposal, risk reduction, and prevention of future accumulation of stocks should be clearly prioritized in project design.** Several challenges developed during implementation of the OPDP project, which put pressure on budgets and staff time, leading the GOM to prioritize disposal operations. This was in line with the overall objective of risk reduction, but a clearer delineation of priorities in the PAD would have helped clarify choices during implementation. Recommendation: Focusing on key priorities when developing similar projects ensures that a smaller set of essential activities can be undertaken based on priorities should challenges arise during implementation.

- **Priority 1.** Inventory and disposal of obsolete stocks
- **Priority 2.** Risk reduction (assessing risks and develop mitigation measures), including the most effective ways to reduce risks, for example, good storage facilities, safeguarding, health and safety, and associated communication

- **Priority 3.** Avoiding accumulation of future stocks through—better assessment of pesticide needs, good procurement strategies, and good storage and stock management.

77. **Lesson 4: The Government's ability to manage pesticides could be enhanced by mainstreaming the issue into the design of projects in other sectors rather than just in 'disposal projects'.** Given their 'stand-alone' nature, trying to mainstream full-scale pesticide management activities within a project focused on disposal may not be the most effective way to manage the issue in the long term. Recommendation: Mainstream pesticide management in (a) most agricultural projects, including assisting client countries to adopt the voluntary International Code of Conduct on pesticide management and adhere to its key articles, and (b) emergency projects which procure large quantities of pesticides (for example, locust, armyworm, and mosquito control projects, including pesticide storage and stock management and preparatory work for disposal of obsolete stocks).

78. **Lesson 5: A sustainably-financed structure for pesticide management in Mali is essential for management over the long term and to avoid the re-accumulation of new OP stocks.** At the close of Le *Projet Elimination et de Prévention des Pesticides Obsolètes au Mali* (PEPPO-Mali), the PMU made a proposal to the Government through the DNACPN and the Ministry of Environment, Sanitation and Sustainable Development for the development of an agency or structure to undertake pesticide management in Mali for the long term. The proposal outlines the funding of a coordination unit for 24 months to allow the completion of two studies which would define all the characteristics relating to the long-term structure and its sustainable management and funding method. In order not to leave a vacuum following the closure of PEPPO-Mali, the unit in question could also respond to the various requests from partners in terms of pesticide and associated waste management. The proposal was deemed relevant by the GOM but has yet to find funding. Recommendation: In the interim, and to ensure the ongoing work of the CNGP, particularly regarding the holding of statutory sessions for approval of ongoing work, the GOM should use its previously pledged funds to continue to support the CNGP. In addition, the World Bank should engage with the GOM on this topic in the ongoing discussions for the new CPF, particularly with the MOA which has participated well in the CNGP but has not yet been willing to work collaboratively with other ministries on establishing a more permanent pesticide management structure.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Reduce risks from existing publicly-held obsolete pesticide stocks and associated waste; and strengt

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
POPs&pops waste destroyed,disposed or contained in environmentally sound manner	Metric ton	0.00 30-Apr-2014	666.00 31-Jan-2020		552.00 31-Jan-2020

Comments (achievements against targets):
All available inventoried pesticides have been eliminated. The variance from the forecast of 666 tonnes is due, among other things, to theft, leaks and spillage of liquid products under the effect of heat for several years.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Contaminated land managed or dump sites closed under	Hectare(Ha)	0.00 30-Apr-2014	0.60 31-Jan-2020		0.00 31-Jan-2019

the project					

Comments (achievements against targets):
All of the affected sites are located in insecure areas and have not been accessible.

However, the project followed up on the reduction of risks on decontamination operations for polluted sites carried out by PASP-Mali, ie a total of 4.5 ha of surface area of contaminated contaminated sites.

Molodo: 0.25 ha

Dialakoroba: 2 ha Djidian: 0.005 ha

Niogomer: 2.5 ha

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Submission of a revised National Prevention Plan (PNP) by the CNGP to the Council of Ministers for Adoption	Yes/No	N 30-Apr-2014	Y 31-Jan-2020		Y 31-Jan-2020

Comments (achievements against targets):
Revised National Prevention Plan is complete and

CNGP adoption in progress.

Adoption in the Council of Ministers planned after that of the CNGP

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	0.00 30-Apr-2014	2000000.00 31-Jan-2020		6932000.00 31-Jan-2020
Female beneficiaries	Percentage	0.00	50.00		50.00

Comments (achievements against targets):

Beneficiaries are defined as those living in communities where obsolete pesticide, waste sites and storage depots were sited, as well as those who were reached through training, awareness raising on the impacts of pesticides and good management practices

An estimated of 52% female beneficiaries was made based on population percentages. Numbers may be higher due to an emphasis on focusing on women for many of the training and awareness raising activities.

A.2 Intermediate Results Indicators

Component: Component 1: Disposal of publicly-held obsolete pesticides and associated waste and reduction of risk from three priority high-risk contaminated sites

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Stocks of obsolete pesticides contained and shipper	Yes/No	N 30-Apr-2014	Y 31-Jan-2020		Y 31-Jan-2020

Comments (achievements against targets):
All 552 tonnes of obsolete pesticides and associated waste were shipped overseas for disposal in France following national/ international requirements.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of priority sites where reduction risk measures have been applied	Number	0.00 30-Apr-2014	3.00 31-Jan-2020		0.00 31-Jan-2020

Comments (achievements against targets):
Due to the security situation of the localities hosting the 3 sites concerned, the activities could not be carried out

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Plan for decontamination of prioritized polluted sites endorsed by the CNGP	Yes/No	N 30-Apr-2014	Y 31-Jan-2020		N 31-Jan-2020

Comments (achievements against targets):

The Plan was not completed. However, analysis of decontamination options and evaluation of the related costs were carried out through monitoring and evaluation missions of the former depolluted sites (Molodo, Niogoméra, Dialakoroba, Djidian)

Component: Component 2: Strengthening the institutional, regulatory and technical capacity for prevention of obsolete pesticides re-accumulation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Sustainable financing instruments for pesticides management identified and validated by the CNGP	Yes/No	N 30-Apr-2014	Y 31-Jan-2020		N 31-Jan-2020

Comments (achievements against targets):
The study was not completed due to lack of funds. However, the ToR were developed and approved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Piloting of final strategy in four cotton production zones	Number	0.00 30-Apr-2014	4.00 31-Jan-2020		2.00 31-Jan-2020

Comments (achievements against targets):
The pilot scheme for community management of packaging initiated in Mali is functional in all of the subsidiaries of Kita (West subsidiary CMDT) and Koutiala (North subsidiary CMDT).

In collaboration with the FAO Regional Project GCP / INT / 147 / GFF-, the evaluation of this scheme was carried out in April 2018 by an international consultant recruited by FAO with a view to its extension to other areas. Training of trainers from the Environment and Sustainable Development Department of the CMDT was carried out for the extension of the strategy in the 2 other remaining subsidiaries

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Reduce risks from existing publicly-held obsolete pesticide stocks and associated waste; and strengthen the institutional framework for risk mitigation of obsolete pesticides	
Outcome Indicators	1. POPs and POPs waste destroyed, disposed of, or contained in an environmentally sound manner Baseline: 0 tonnes; Target: 666 tonnes (per 2014 inventory + 10% contingency); Actual: 552 tonnes (due to losses this means all known stocks in country 2018–19 were disposed of) 2. Contaminated land managed or dumpsites closed under the project Baseline*:* 0; Target: 0.6 ha; Actual: 0 ha 3. Direct project beneficiaries Baseline: 0; Target: 2 m; Actual: 6.932 m (of which 52% women)
Intermediate Results Indicators	1. Stocks of obsolete pesticides contained and shipped 2. Number of priority sites where reduction risk measures have been applied Baseline: 0; Target: 3; Actual: 0 3. Plan for decontamination of prioritized polluted sites endorsed by the NSC Baseline: No; Target: Yes; Actual: No
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	Component 1 1. 552 tonnes of OPs disposed 2. PPE for all staff acquired and utilized 3. Small, low-risk stocks from the Dioumara, Diéma, Nioro, Mahina, and Yélimané sites secured and transferred to the Intermediate Collection Center (CCI) of the Regional Plant Protection Service at Kayes 4. Small, low-risk stocks from the sites of the DRA of the District, of the Mouche Tsé-Tsé Project, DRSV of the District, VET-Pro, Noumoubougou Technical Landfill Center secured and transferred to the CCI of Sanankoroba 5. Secured and transferred empty packaging of pesticides collected in the municipalities of Kita and Koutiala to Sanankoroba 6. Transfer of large stocks to CCIs: o Nanguila, Ex Société malienne de produits chimiques (SMPC) Factory in Sanankoroba o Bla, Kimparana and Karangana at CMDT Koutiala o Kignan, Technical Landfill Center, Veterinary Sector, Sikasso Services régionaux de la protection des Végétaux (SRPV) at CMDT Sikasso o Koumantou at CMDT Bougouni.

	7. Reconditioning and transport abroad of 552 tonnes, that is, 100% of all obsolete pesticides and associated waste available 8. Two sets of laborers trained and prepared for work, including health testing 9. Field visits, oversight of Veolia contract and sub-contract and all works, work plans, EMPs, and so on.
Objective/Outcome 2: Strengthen the institutional framework for risk mitigation of obsolete pesticides	
Outcome Indicators	1. Revised National Prevention Plan (PNP) submitted to the Council of Ministers for adoption Baseline: No; Target: Yes; Actual: Yes 2. Direct project beneficiaries Baseline: 0; Target: 2 m; Actual: 6.932 m (of which 52% women)
Intermediate Results Indicators	1. A feasibility study on sustainable financing instruments for pesticides management in Mali Baseline: No; Target: Yes; Actual: No (ToR developed) 2. Piloting of container management strategy in all four cotton production zones Baseline: 0; Target: 4; Actual: 2
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	Component 2: 1. Finalizing draft ordinances 2. Development of the 2018–2019 action plan of the DNACPN/PEPPO-Mali team 3. Development of TOR for o Feasibility study for the establishment of sustainable financing instruments for pesticide management in Mali; and o Feasibility study for the establishment and operation of a sustainable structure for the sustainable management of obsolete pesticides and associated waste and certain dangerous chemicals. 4. Development and implementation of CNGP action plans 5. Organization and funding of statutory meetings of the CNGP and bodies (permanent secretariat and working committees) 6. Harmonization of community management strategies for empty pesticide packaging of PEPPO-Mali and the DEDD of the CMDT 7. Support for the development of 2018-2019 harmonized action plans for empty packaging management 8. Development and implementation of the extension of community management of empty packaging 9. Three workshops specifically targeting young women provided training in cooking, healthy diet, and staying safe from OPs and pesticides 10. Communication plan executed, including blogs on Facebook, Twitter, and Instagram—viewed by more than 95,000 Malians.

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Dahlia Lotayef, Laurent Granier	Task Team Leader(s)
Mahamadou Bambo Sissoko	Procurement Specialist(s)
Celestin Adjalou Niamien	Financial Management Specialist
Issa Thiam	Team Member
Fatoumata Diourte Berthe	Team Member
Ayala Peled Ben Ari	Team Member
Ruxandra Costache	Team Member
Aissatou Diallo	Team Member
Laurent Granier	Team Member
Maman-Sani Issa	Environemnt Specialist
Salamata Bal	Team Member
Ellen J. Tynan	Team Member
Virginie A. Vaselopulos	Team Member
Supervision/ICR	
Emeran Serge M. Menang Evouna	Task Team Leader(s)
Boubacar Diallo, Mahamadou Bambo Sissoko, Mamadou Sangare	Procurement Specialist(s)
Tahirou Kalam	Financial Management Specialist
Virginie A. Vaselopulos	Team Member
Aissatou Diallo	Team Member
Aissata Diop Diallo	Team Member

Ayala Peled Ben Ari	Team Member
Fatoumata Diourte Berthe	Team Member
Issa Thiam	Team Member
Bougadare Kone	Environmental Specialist
Mahamadou Ahmadou Maiga	Social Specialist
Abdelaziz Lagnoui	Team Member
Lelia Croitoru	Consultant
Yasmina Oodally	Team Member
Sujatha Venkat Ganeshan	Team Member

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY14	3.880	72,670.75
FY15	8.487	87,480.30
FY16	3.317	23,349.05
Total	**15.68**	**183,500.10**
Supervision/ICR		
FY16	2.975	26,509.98
FY17	5.168	47,514.27
FY18	2.964	27,425.98
FY19	3.663	34,788.58
FY20	1.298	105,018.98
Total	**16.07**	**241,257.79**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval (%)
Component 1: Disposal of publicly-held OPs and associated waste and reduction of risk from three priority high-risk contaminated sites	3.45	3.37	98
Component 2: Strengthening the institutional, regulatory and technical capacity for prevention of obsolete pesticides re-accumulation	0.97	0.55	57
Component 3: Project management, monitoring and evaluation	0.72	0.99	137
Total	**5.14**	**4.91**	**95**

ANNEX 4. EFFICIENCY ANALYSIS

Economic Analysis

1. By successfully eliminating the country's known OPs and improving its capacity to prevent OPs' re-accumulation, the project generated significant benefits at the local and global levels. These are related to health (for example, reduced health risks due to lower exposure levels); environment (for example, reduced risk of polluting water and soil); and economy (for example, avoided income losses due to crops contamination). However, the lack of dose-response functions between the chemicals found in OPs and their impacts makes it impossible to conduct a cost-benefit analysis of the project. The PAD presented a rapid CEA related to removing and disposing the existing OP stocks. This section describes an ex post CEA and an incremental cost analysis for the GEF funds.

2. **CEA.** The results of a CEA of the project are summarized in section II, table 4. It disbursed US$4.9 million in actions that benefited over 6.9 million people living near OP disposal sites or having been trained on the need for good environmental practices. This corresponds to a unit cost of US$0.7 per beneficiary. The figure is considerably lower than that estimated for the same project at appraisal (US$2.6 per beneficiary) and for similar projects conducted in other countries, for example, Egypt[26] (US$12 per beneficiary) and Côte d'Ivoire[27] (US$76 per beneficiary).

3. The cost of disposing OPs and associated waste was estimated at US$5,700 per tonne. It is higher than the one estimated at appraisal[28] (US$4,700 per tonne) and at the upper end of the range of the unit costs estimated for other countries, that is, between US$4,200 in Côte d'Ivoire and US$6,500 in Egypt. This low cost-effectiveness is because (a) the total cost of OPs' disposal includes additional costs of security guards (for example, travel and subsistence) necessary for the safe collection, transport, and disposal of OPs and (b) the project eliminated a lower quantity of OPs compared to the one estimated at appraisal (552 tonnes versus 666 tonnes), which increased the unit cost of disposal.

[26] Based on a disbursement of US$4.7 million and about 383,000 beneficiaries (Egypt: Sustainable POPs Management Project P116230, ISR of December 2019).
[27] Based on a project cost of US$7 million, about 100,000 beneficiaries, and price adjustment to 2019 (Côte d'Ivoire: Obsolete Pesticides Management Project, PAD, 2015)
[28] The economic analysis of the PAD mentioned an estimate of US$3,950 per tonne; however, this was most likely calculated based on the GEF allocation to the 'disposal of publicly-held OPs and associated waste' of US$2.63 million (PAD, page 31) and a quantity of 666 tonnes. If the total cost of this activity had been used (US$3.08 million), then the estimated cost of disposing POPs should have been US$4,700 at appraisal.

4. A few other activities were conducted in a cost-effective manner (for example, finalization of regulations related to pesticide management, communication, and training[29]); others were only partially conducted at a higher cost[30] while others were not conducted at all.[31]

5. **Incremental cost analysis.** No incremental cost analysis was conducted at appraisal. However, the PAD indicated a GEF allocation of US$3.19 million, with a direct cofinancing of US$1.95 million from the Danish TF and GOM. At completion, the disbursed GEF grant amounted to US$3.18 million, or nearly 100 percent of the allocated amount (table 4.1). This indicates a cofinancing ratio of about 0.6:1 both at appraisal and completion; however, as the contributions from several partners (for example, local NGOs, Cooperative of Cotton Producers, and so on) were not assessed, this ratio underestimates the real value of cofinancing leveraged by the GEF funds.

Table 4.1. GEF and Cofinancing by Source of Funding (US$, millions)

Funding Sources	Original Amount (expected at appraisal)	Actual Amount (disbursed at completion)
GEF	***3.19***	***3.18***
Direct cofinancing (a)		
• **Danish TF**	0.95	0.94
• **GOM**	1.00	0.78
Parallel financing (b)		
• **CLI**	n.e.	0.12
• **DEDD/CMDT***	n.e.	0.01
• **Other****	n.e.	n.e.
Total cofinancing (a + b)	**1.95**	**1.85**
Ratio (cofinancing/GEF)	**0.6:1**	**0.6:1**

Sources: PAD for the original amounts; World Bank for actual disbursement of GEF and Danish TF; Borrower Completion Report for the actual disbursement of GOM.
Note: n.e. = not estimated. At completion: * In addition to the cash contribution, the DEDD/CMDT made in-kind contributions by participating in stocks identification and safeguarding in CMDT zones and providing infrastructure and materials necessary for disposal. ** These include local NGOs and associations (who participated at CNGP meetings), Cotton Producers Cooperative (who made available agents for the implementation of the community management strategy for empty pesticides packing in Kita and Koutiala), and the FAO (through Regional Project GCP/INT/147/GFF, which recruited an international consultant to evaluate the pilot scheme for the community management strategy for empty pesticides packing). These contributions have not been estimated in monetary terms.

[29] Although no indicators are related to these activities, they have been completed satisfactorily, at a minor cost than that estimated at appraisal (for example, US$0.2 million at completion versus US$0.28 million at appraisal for the finalization of regulations; US$30,000 at completion versus US$60,000 at appraisal for communication and awareness raising).
[30] For example, the actual cost of implementing the empty container community management strategy was higher than that estimated at appraisal (US$0.64 million versus US$0.54 million), although the implementation was done in only two of the four chosen sites.
[31] For example, risk reduction at three priority high-risk contaminated sites and institutionalizing a system for regular updating of the national pesticide inventory.

6. **Without the GEF funds,** the project would have provided limited benefits, primarily to local communities (for example, inventorying and safeguarding the OP stocks), and weaker technical support to strengthen the institutional capacity to manage pesticides. The GEF support successfully helped the country dispose of its entire OP stocks and considerably improve the institutional capacity for risk mitigation. The GEF funds contributed to (a) the GEF-4 Strategic Objective of the POPs focal area: to protect human health and the environment by assisting recipient countries to reduce and eliminate production, use, and releases of POPs and consequently contribute to capacity development for sound management of chemicals; (b) the goal of the GEF-5 Chemicals Program: to promote the sound management of chemicals throughout their life cycle in ways that lead to the minimization of significant adverse effects on human health and the global environment; and (c) the GEF-6 Chemicals and Waste Strategy of developing the enabling conditions, tools, and environment for the sound management of harmful chemicals and wastes and reducing the prevalence of harmful chemicals and waste and supporting the implementation of clean alternative technologies/substances. Specifically, the use of the GEF funds resulted in the following achievements and global environmental benefits:

- **Health, environmental, and economic benefits.** By successfully disposing of the country's known stock of OPs in an environmentally sustainable manner,[32] the project significantly reduced the risk of present and future chemical contamination. This translated into lower risk of trans-boundary OPs' movement, which generated significant benefits related to health (for example, reduced potential morbidity and mortality risks); environment (for example, avoided risk of water and soil contamination); and economy (for example, avoided potential losses from international food trade) at the global scale. While this is an impressive outcome, some targets remained underachieved (for example, no risk reduction measures have been implemented at the three priority sites).
- **Improved institutional capacity to mitigate the risks related to OP stocks.** The project considerably strengthened the institutional, regulatory, and technical capacity to prevent re-accumulation of OPs—thus providing a solid knowledge base for institutional coordination at the regional and global levels on reducing the OP stocks. It has done so through concrete improvements in regulatory texts (for example, finalizing draft ordinances for pesticides management and updating the National Plan for Prevention of the Accumulation of OPs); strengthening the capacity of relevant institutions (for example, working sessions with DNACPN and CNGP to help manage data collection and enforce regulations); and providing stakeholder training (for example, agents responsible for phytosanitary control and pesticide dealers). However, a few targets were underachieved (for example, no feasibility study on sustainable financing instruments for pesticides management has been conducted).

[32] Through activities of (a) repacking and safeguarding of medium- and high-risk stocks, (b) site cleanup to avoid further environmental impact, (c) storage of the stocks in temporary secure storage facilities, (d) transfer of all stocks by road to an agreed port of export, and (e) shipment of stocks via sea to a licensed high-temperature disposal facility.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

RAPPORT D'ACHEVEMENT DU PROJET D'ELIMINATION ET DE PREVENTION DES PESTICIDES OBSOLETES AU MALI (PPEPO-MALI)

REPUBLIQUE DU MALI
Un Peuple - Un But - Une Foi

Mai 2020

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RÉSUMÉ EXÉCUTIF

Le Projet Elimination et de Prévention des Pesticides Obsolètes au Mali (PEPPO Mali) est une initiative du Gouvernement de la République du Mali et de la Banque Mondiale. Il fait suite au Programme Africain relatif aux Stocks de Pesticides obsolètes (PASP) clôturé le 31 décembre 2012 et a démarré en 2016. Le coût total du Projet se chiffre à : 5,14 millions $ EU, soit 2 milliards 570 millions FCFA Le financement des partenaires s'élève à 4,14 millions $ EU (2 milliards 070 millions FCFA) et se répartis comme suit : FEM : 3,19 millions $ EU (1 milliard 595 millions FCFA), Gouvernement Danemark : 0,95 million $ EU (475 millions FCFA), Contribution de l'Etat : 1 million $ EU (500 millions FCFA). La prise en charge financière de la Conseillère Technique en l'Elimination (CTE) a été assurée par CropLife- International (CLI) pour un montant de 0,12 millions $EU. Le PEPPO vise à mettre en œuvre les principales activités nécessaires restantes afin d'éliminer les stocks de pesticides obsolètes et déchets apparentés et de réduire durablement leur future accumulation.

L'objectif de développement du projet (ODP) consiste à aider le Mali à: (i) Réduire les risques liés aux stocks de pesticides obsolètes et déchets apparentés; et (ii) Renforcer le cadre institutionnel en vue de la réduction des risques liés aux pesticides obsolètes.

Le projet est structuré en 3 composantes : (1) Élimination des Pesticides obsolètes publics et déchets associés et réduction des risques dans trois sites prioritaires à haut risque contaminés, (2) Renforcer la capacité institutionnelle, réglementaire et technique pour éviter la ré-accumulation des pesticides obsolètes, (3) Gestion, suivi et évaluation du Projet

Le projet a couvert toute l'étendue du territoire national et les inventaires ont concernés les pesticides obsolètes et déchets apparentés disponibles auprès des structures détentrices.

Des résultats significatifs ont été obtenus dans la réalisation des objectifs physiques à savoir :

Composante Elimination

- *Sécurisation et centralisation des stocks de PP à faible risque dans l'ensemble du pays :*

- *Elimination des stocks à faible, moyen ou haut risque par une entreprise internationale qualifiée : Exécution du Contrat d'élimination*
- *Réduction des risques dans trois sites prioritaires à haut risque contaminés selon une procédure adaptée à chaque site*
- *Institutionnalisation d'un système permettant la mise à jour régulière de l'inventaire des stocks nationaux de pesticides périmés*
- *Elaboration d'un plan national de décontamination des autres sites contaminés prioritaires*
- *Suivi/Evaluation des sites dépollués de Molodo, Niogoméra, Didjan et Dialakoroba : mission d'évaluation des sites et de prélèvement pour le suivi, Atelier de restitution des résultats*

Composante Prévention

- *La finalisation des propositions de textes et procédures concernant la gestion des pesticides*
- *Une étude de faisabilité des instruments de financement soutenable en matière de gestion des pesticides, à faire valider par le CNP ;*
- *L'apport d'un soutien institutionnel à la DNACPN et au CNGP pour les aider à gérer les données collectées, à déterminer une ligne stratégique et à faire appliquer la réglementation*
- *L'évaluation et la mise à jour du PNP, qui devra être officiellement validé par le CNP, puis soumis au président du CNGP afin d'être adopté par le Conseil des ministres*
- *La mise en place d'un système de collecte et de récupération des emballages vides de pesticides*
- *La mise en place d'un programme de communication et de sensibilisation*

Composante Gestion

- *Passation des marchés*
- *Gestion financière*
- *Préparation des plans de travail et de passation des marchés*
- *Suivi et évaluation (S&E) de l'évolution du projet et présentation de rapports*

Le projet a touché environ 6,932 millions de bénéficiaires vivant à proximité des sites et dépôts et/ou ayant été informés et sensibilisés sur les impacts des pesticides et les bonnes pratiques de leur gestion. 52% de la population est constitué de femmes d'où environ 3,604 millions de bénéficiaires

En ce qui concerne l'évaluation du projet, l'on peut dire qu'au regard de la politique nationale, des besoins

des populations ; de la logique interne et de la cohérence du projet, les résultats obtenus ont été pertinents et satisfaisants. Les performances du Gouvernement, des bailleurs de fonds et des services techniques sont jugées également satisfaisantes.

Les principales recommandations tirées de l'exécution du projet sont les suivantes ;

- *Faire le plaidoyer auprès du Gouvernement sur le bien-fondé de la pérennisation afin de renforcer les propositions des services techniques allant dans ce sens ;*
- *Appuyer autant que faire se peut les activités du Comité National de Gestion des Pesticides (CNGP) avant sa prise en charge effective par l'Etat du Mali (Ce comité avait été redynamisé avec l'appui du PASP-Mali puis de celui du PEPPO).*
- *Capitaliser et valoriser les acquis du projet ;*
- *Rechercher le financement pour la poursuivre du projet dans le cadre d'une 2ème phase, notamment à partir de 2020 pour la consolidation des acquis. Une requête officielle de financement doit être adressée à la Banque mondiale et aux PTFs intéressés ;*
- *Rechercher des financements pour le fonctionnement d'une cellule rattachée à la DNACPN qui servira non seulement de mémoire du PEPPO mais aussi et surtout qui s'attèlera à la mise en œuvre du Plan national de Prévention en vigueur ;*
- *Raccourcir autant que possible la durée de l'interphase, le temps de battement entre la phase qui vient de finir et celle à venir, et prévoir, au besoin, la poursuite de certaines activités essentielles pendant l'interphase. Ces activités peuvent être par exemple : la poursuite des missions de suivi-supervision par les services techniques de terrain et la sensibilisation à travers les radios de proximité ;*
- *Mettre à la disposition de la DNACPN, en collaboration avec le Ministère en charge du Budget, des crédits supplémentaires pour consolider les acquis pendant l'interphase et un mécanisme adéquat de mobilisation rapide de ces crédits ;*
- *Prendre des dispositions nécessaires pour les aspects de sécurité dans le cadre du projet suite ;*
- *Finaliser les documents et textes relatifs à la création et au fonctionnement d'une structure pérenne, à travers les études programmées pour la détermination du statut juridique de ladite structure et les instruments de son financement durable*

ANNEX 6. SUPPORTING DOCUMENTS

Annex 6a: Supporting Documents[33]

- Borrower's Completion Report March 2020
- GEF's POPs Tracking Tool OPDP Mali May 2020
- Articles (in French) on the project published by www.Benbere.com, an online Malian youth network:
    - ***Au Mali, récupérer et détruire les déchets de pesticides:*** https://benbere.org/terre-dopportunites/stoppesticidesobsoletes-mali-recuperer-detruire-dechets-pesticides/
    - ***L'imprégnation des moustiquaires en question:*** https://benbere.org/terre-dopportunites/stoppesticidesobsoletes-impregnation-moustiquaires-question/
    - ***Avec l'arrêt du PEPPO, le danger des pesticides pour la biodiversité:*** https://benbere.org/terre-dopportunites/stoppesticidesobsoletes-arret-peppo-danger-pesticides-biodiversite/
- Videos (with French subtitles) on the project produced and posted on Facebook by www.benbere.com:
    - ***Le témoignage d'une famille victime de l'utilisation des pesticides obsolètes:*** https://www.facebook.com/BenbereMali/videos/564798167467863/
    - ***Sketch sur les conséquences de l'utilisation des pesticides:*** https://www.facebook.com/BenbereMali/videos/2624739317810545/

[33] Filed with project documents unless otherwise noted.

Annex 6b. Photos

Disposal of Obsolete Pesticides at Sanankoroba Site

(Source : H. Gologo, 2019)

Annex 6c: Risk Reduction Analysis Results on Sites Undergoing Decontamination

Site	Pesticides Analyzed	Pesticides Detected	Conclusion and Recommendations
Dialakoroba	• Chlorpyriphos ethyl • Cypermethrin • Deltamethrin • Diazinon • Dieldrin • Endosulfan A • Fenitrothion • Malathion • Parathion ethyl • Profenofos	• Chlorpyriphos ethyl • Cypermethrin • Dieldrin • Endosulfan A • Profenofos • Constant degradation of pesticides	• The site is still contaminated in places and is not usable by the population (no well, housing, or farm) • Resumption of certain reduction works necessary • Close the site and prohibit its access • Create a green space • Continue monitoring through soil samples with the support of LCV, OHVN and municipal authorities • Inform local administrative authorities and elected officials about the state of the site
Djidian	• Atrazine • Chlorpyriphos ethyl • Cypermethrin • Dimethoate • Profenofos	• No pesticides detected	• Do not break or destroy the containment created • Can be used for residential purposes • Inform local administrative authorities and elected officials about the state of the site
Molodo	• Dieldrin • Parathion Ethyl	• Dieldrin • Parathion Ethyl (only detected at the foot of the store wall = 1.23 mg/kg of soil) and absent over the entire extent of the land farm	• Strip the interior and exterior parts of the wall of the contaminated store • Plaster with cement up to 1 m the internal and external parts of the contaminated wall • Strip the contaminated floor of the store • Spread out in a watertight pit all the rubble from the pickling • Strip the soil from point E3 (test of decomposition of dieldrin in the open air in the land farm) to 1 m^2 and 0.50 cm deep and put the contaminated soil in the sealed pit • Inform local administrative authorities and elected officials about the state of the site
Niogoméra	• Cypermethrin • Diazinon • Dieldrin • Endosulfan A	• Dieldrin: (2016=11.38 mg, en 2017=7.18 mg) • Endosulfan A	• Extend the delimitation of the site to 0.5 hectare because there are contaminated soils 10

Site	Pesticides Analyzed	Pesticides Detected	Conclusion and Recommendations
	• Fenitrothion • Lambda • Cyhalothrin • Parathion ethyl	• Ethyl parathion (transverse over the entire surface), hence the presence of odor on the site	m upstream and downstream outside the land farm • Fence the site to prevent access to populations and livestock • Demolish the contaminated house and confine the rubble in a watertight pit • Plant trees on the site (no fruit trees) • Do not use the site for housing or agricultural fields) • The site cannot be used as it is for several years • Inform local administrative authorities and elected officials about the state of the site