



LESS BURNT FOR A CLEAN EARTH PROJECT
Minimization of Dioxin Emission from Open Burning Sources in Nigeria

FEDERAL MINISTRY OF ENVIRONMENT

MID-TERM PROJECT ASSESSMENT
FINAL REPORT

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I trust that this report and its recommendations will provide a solid basis for moving forward with this very important project and for achieving greater effectiveness in the minimization of dioxin emissions from open burning sources in Nigeria.

I hope that this document will be disseminated through related chemicals information media such as the LBCEP website, the Chemicals Information Exchange Network (CIEN) website and the UNDP website; while lessons learnt in the implementation of this project in Nigeria would be valuable in guiding other countries, as they seek to implement projects of this nature in their domain.

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ABBREVIATIONS AND ACRONYMS

ABU	Ahmadu Bello University Zaria
ANSG	Anambra State Government
BAT/BEP	Best Available Technology/Best Environmental Practice
BUK	Bayero University Kano
CELD	Centre for Education and Leadership Development (Kano)
CIEN	Chemicals Information Exchange Network
DFID	Department for International Development (UK)
EPA	Environmental Protection Agency
FEC	Federal Executive Council
FMARD	Federal Ministry of Agriculture and Rural Development
FMENV	Federal Ministry of Environment
g	gramme
GEF	Global Environment Facility
ha	hectare
HCB	HexaChloroBenzene
IMSWM	Integrated Municipal Solid Waste Management
IWM	Integrated Waste Management
KNSG	Kano State Government
KUST	Kano State University of Science and Technology
LBCE	Less Burnt for a Clean Earth
LBCEP	Less Burnt for a Clean Earth Project
LGA	Local Government Area
MAW	Municipal and Agricultural Waste
MWM	Municipal Waste Management
NESREA	National Environmental Standards & Regulations Enforcement Agency
NGO	Non-Governmental Organization
PCBs	PolyChlorinated Biphenyls
PCDDs	PolyChlorinated Dibenzo Dioxins
PCDFs	PolyChlorinated Dibenzo Furans

PMU	Project Management Unit
POPs	Persistent Organic Pollutants
PSC	Project Steering Committee
PSP	Private Sector Participant
REMASAB	Refuse Management and Sanitation Board (Kano State)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEQ	Toxicity Equivalence
TEQ/a	Toxicity Equivalence per annum
TOR	Terms of Reference
UK	United Kingdom
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UPOPs	Unintentional Persistent Organic Pollutants
WMA	Waste Management Authority

EXECUTIVE SUMMARY

I Introduction

The Less Burnt for a Clean Earth Project is designed to enable Nigeria reduce its total unintentional persistent organic pollutants (UPOPs) emissions from the open burning of municipal and agricultural waste (MAW). It is expected to achieve a global benefit of a 20% and 100% reduction of UPOPs released from open burning of collected and uncollected wastes, respectively, in the two pilot cities (Kano and Onitsha) thereby enhancing human health and environmental quality (UNDP, 2010). The project document stipulates that mid-way into the life of the project, a comprehensive assessment should be carried out by a Consultant. Mr. Bosun Oladimeji, an Environmental Expert, was therefore commissioned to carry out the mid-term assessment of the project.

II Methodology

The adopted methodology involves review of relevant documents, interview with relevant stakeholders and fieldwork assessment of project outputs (UNDP, 2006). A focus group discussion was conducted, project management unit (PMU) and some project steering committee (PSC) members were interviewed and documents collected.

III Legislative Strengthening and Policy Development

Fifty people were trained in the use of toolkit for the quantification of dioxin emissions from open burning of MAW. Only the two pilot states (Kano and Anambra) submitted data on UPOPs emissions from open burning of MAW. Website for the project, www.upops.org.ng, was developed and hosted but is currently undergoing reconstruction. National policy on MAW management and guidance notes on UPOPs reduction have been developed, reviewed and adopted by stakeholders. Thirteen state governments have endorsed the policy. Each pilot city council is yet to draft, review and gazette the by-laws. Refuse Management and Sanitation Board (REMASAB) in Kano State has an existing by-law on sanitation but is yet to update it with the national policy on MAW and the reduction strategy on open burning of MAW. Inauguration of the by-laws drafting committees in the two pilot states to be done in

August 2013. 40% of major stakeholders in waste management in the pilot states are now familiar with UPOPs reduction principles.

IV UPOPs Reduction through Best Practices in Municipal Waste Handling

The project established active household-level sorting and collection programme in Kabuga-Jambolo, Kano and distributed three colour-coded waste bins to each of 250 households achieving about 70% sorting of the 258.49 tonnes of waste collected so far at mid-term. Replication of the project in Onitsha scheduled to start in August 2013. One 30.2 hectare dumpsite in Kano is currently undergoing upgrade to a simple landfill site. Community level awareness of UPOPs in Kano has risen by 40% while that of Onitsha rose by 20%. 11 stakeholders were trained in 'train the trainer' on UPOPs reduction sorting and composting. At Dorayi quarters, Kabuga-Jambolo, Kano, a three-bin compost plant and a plastic shredder have been installed currently producing an average of 3.7tonnes of compost per month. The project has developed a BAT-BEP procedure in two places in Kano for UPOPs reduction.

V UPOPs Reduction through Agricultural Land Clearing

Alternative approaches to agricultural waste burning were introduced in 120 and 165 hectares of farmlands in Danbatta and Doguwa Local Government Areas (LGAs), respectively. Currently, 175 farmers who used to burn their croplands in preparation for planting season did not do so in 2012/2013. Baseline of cropland burnt in Kano was obtained for sorghum, millet, maize, rice, cowpea and sugarcane and also at mid-term. Public awareness and sensitization campaigns were carried out in farming communities. Farmers' awareness level on alternative uses of their crop residues rather than burning has increased significantly to about 35% from the four training/demonstration workshops and awareness programmes undertaken by the project as at 30th of June 2013. The project established one shredding centre with motorized shredding machines in each of the two pilot sites in Kano (Danbatta and Doguwa). Introduced alternative approaches to stubble burning in pilot sites in Kano and replicated in 6 farms in Kura and Wudil LGAs of Kano State.

VI Findings

Generally, the project proceeded relatively smoothly and most of the project components have been delivered even before target dates. The coordination of the implementation has been very strong. The implementation of the project in Anambra State has been slower than

anticipated for a variety of reasons, including delays in releasing land by the Anambra State Government. The project approach with the levels of ownership and sustainability that resulted from it has given the farmers substantial economic upliftment. Stakeholders were very thankful to the UNDP for emancipating them from their former state of non-awareness of the economic and environmental benefits of agricultural wastes. There is adequate capacity, clarity of responsibilities, involvement of all stakeholders, adequate orientation and training, regular monitoring/evaluation and prompt delivery of project activities. Mid-way into the life of the project, satisfactory achievement has been recorded. Stakeholders in the two states were generally satisfied with the participatory approach employed by the PMU in the implementation of the project giving the PMU and PSC an excellent rating. Some other states like Taraba, Jigawa and Zamfara have indicated their readiness to replicate this project in their domain. Ownership and sustainability elements were built in to the project implementation.

VII Outcome Analysis

The SWOT analysis has revealed that the impacts of the advantages inherent in this project in terms of the internal strengths and external opportunities have been utilized to their maximum while the disadvantages in internal weaknesses and external threats have been reduced to their minimum. Therefore, the performance rating for the Less Burnt for a Clean Earth project at mid-term is satisfactory in Kano but fair in Anambra.

VIII Lessons Learnt

Some of the lessons learnt in the implementation of the project activities include:

- Project manager/technical director operates a sound leadership role;
- Close cooperation with all the stakeholders involved in the project;
- Decentralization and devolution of power in the implementation of project activities;
- Dorayi facility is now a research centre for conducting research studies in waste;
- Traders from Mali, Sudan, Niger and Chad learnt from the benefits of the project;
- All the LGAs in Kano State have put necessary facilities in place for the project;
- A radio station 'Manowa' Radio Agriculture has been established in Kano State;
- Individuals procured shredders for use in their farms for production of animal feeds;
- Burning of bushes and agricultural wastes is now an unpopular practice in Kano State;
- Zero tillage is now being combined with zero burning in Danbatta, Kano;

- Recycled plastics from Dorayi facility are now for sale plastic companies in Kano;
- There is collaboration between the project and some NGOs in Kano State; and
- Possibility of allocation of additional shredders to more communities in Kano State.

IX Conclusion

Considerable progress and prompt delivery of project components have been achieved in many measurable deliverables even before the target dates. The PMU and PSC contributed substantially to the achievement of the project deliverables. The partnership strategy with all stakeholders and the implementing agencies was appropriate and very effective. Waste-to-wealth approach demonstrated through sales of compost/recyclables and the more the agricultural wastes are utilized, the less the burning. The project reduced migration of cattle rearers and the attendant conflicts with crop farmers. Open burning has drastically reduced in Kano State but not yet zero burning. However, slow implementation of the project in Anambra State was due to the bureaucratic bottlenecks in securing a dedicated parcel of land for the compost facility in Onitsha.

X Recommendations

Some recommendations for prompt delivery of the remaining activities of the project within the next two years include:

- The Onitsha site development should be pursued with extra vigour;
- All targets not achieved mid-year should be delivered before the end of project life;
- Consult more states on UPOPs emission and to endorse the policy/reduction strategy;
- Training needs assessment/trainings should be completed within the next one year;
- Federal cabinet should endorse the national policy on MAW;
- Reconstruct project website to allow interactive website tracking on UPOPs reporting.
- Implementation of the project activities should continue to be all-inclusive;
- Strong coordination in the implementation of programme activities at all levels;
- Assist individuals and organizations in waste management facility acquisition;
- The Dorayi compost facility should continue to offer support to researchers;
- More awareness activities should include the print and electronic media;
- Possibility of allocation of more shredders to other communities in Kano State; and
- Remaining targets should be accomplished before the end of project life;

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The unintentional release of persistent organic pollutants (POPs) is an undesired side effect of many anthropogenic activities such as the open burning of municipal and agricultural waste (UNDP, 2010). Measures to reduce or eliminate releases from such sources of unintentional POPs production are the subject of Article 5 of the Stockholm Convention on POPs and it aims at the minimization of releases of unintentional persistent organic pollutants (UPOPs) such as polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs) to the environment (Stockholm Convention, 2001).

Stockholm Convention was adopted on 22nd of May 2001 and entered into force on 17th of May 2004. Nigeria became a Party to the Convention by signing on 23rd of May 2001 and ratifying the Convention on 24th of May 2004 (Stockholm Convention, 2004; Magulova, 2010; CIEN, 2013). Article 5 Annex C of the Convention on continued reduction of POPs states that each Party shall adopt measures to reduce or eliminate releases from unintentional production; develop and implement an action plan to evaluate and address releases and promote alternatives and BAT/BEP for priority sources of releases (Magulova, 2010). In addition, Article 7 of the Convention states that all Parties shall prepare a national implementation plan showing an indication on how the Party will implement its obligations under the Convention; identifying the priorities, technical and financial needs for the Party in implementing its obligations and process for development and implementation with active engagement of stakeholders (Stockholm Convention, 2004; Magulova, 2010).

During many anthropogenic activities, such as undesired side effect, POPs may be unintentionally produced and released, which are the subject to the requirements of Article 5 and Annex C of the Stockholm Convention. Release inventories under Article 5 states that Parties are required to identify, characterize, quantify and prioritize sources of releases of Annex C chemicals; develop strategies with timelines and goals to minimize these releases; evaluate effectiveness of these strategies and their success in minimizing releases of Annex C

POPs every five years and report such reviews in reports submitted to the Stockholm Convention Secretariat, pursuant to Article 15 of the Convention (Magulova, 2009).

Nigeria generates approximately 20 million tonnes of municipal waste annually, which is deposited in unmanaged waste dumpsites by private and municipal waste collectors (UNDP, 2010). A conservative estimate of municipal waste burned through spontaneous combustion and/or intentional fires is about 20%. Approximately 50% of the collected waste is organic providing alternative management opportunities such as composting for biodegradables with other waste categories reused or recycled. The burning of agricultural stubble and waste in preparation for planting is a common agricultural practice in Nigeria, leading to local air pollution in the form of harmful substances including UPOPs releases. Much of the formed UPOPs are left in the land and make their way into the human food chain through absorption by crops and ingestion by domestic animals.

Preliminary inventory of UPOPs generation in Nigeria shows that high levels of UPOPs are generated by open burning of municipal and agricultural waste (MAW). In order to reduce this harmful practice, the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP) provided financial support to the Government of the Federal Republic of Nigeria through the Federal Ministry of Environment for the implementation of the Less Burnt for a Clean Earth Project: Minimization of dioxin emission from open burning sources in Nigeria.

The project document stipulates that mid-way into the life of the project, a comprehensive assessment should be carried out by a third party (UNDP, 2010), specifically an independent Consultant, in order to evaluate the performance of the project in terms of the expected outcomes and proffer solutions and recommendations to overcome identified challenges for better and improved delivery of the remaining project activities in the last half of project life. An Environmental Consultant, Mr. Bosun Oladimeji, was therefore commissioned to carry out the mid-term assessment of the project.

1.2 The Less Burnt for a Clean Earth Project (LBCEP)

The Less Burnt for a Clean Earth Project is designed to enable Nigeria reduce UPOPs emissions from the open burning of municipal and agricultural waste (MAW) (LBCEP, 2013). This GEF's UPOPs intervention project is expected to achieve a national benefit of a 20% reduction in the 489.1g I-TEQ/a of UPOPs released from open burning of collected

waste in the two pilot cities, Kano and Onitsha (UNDP, 2010). Total emission of dioxins and furans released into the air in Nigeria is 2,783.98g TEQ per annum and open burning of waste is the most important source of UPOPs releases to air and residues (FMENV, 2009). Estimate of the total UPOPs releases in Nigeria from open burning of MAW is about 5,300g I-TEQ/a (UNDP, 2010). Overall UPOPs releases from the open burning of collected waste in dumpsites in the two pilot cities (Kano and Onitsha) are estimated to be 489.1g I-TEQ/a (UNDP, 2010).

The project's incremental efforts with sorting of waste and organizing waste 'scavengers' and composting efforts will reduce the open burning in the pilot site dump sites preventing burning of 20% of the collected waste, thereby avoiding the release of 97.8g I-TEQ/a. The project's incremental input will also reduce burning of uncollected waste resulting in the avoidance of 85.12g TEQ/a of UPOPs in the two pilot sites. Altogether, the project's near-term, direct effect on UPOPs releases is anticipated to be 182.9g I-TEQ/a in both pilot sites. The project's conservative estimate of the total anticipated reductions of UPOPs releases to the environment from cropland burning by end of the project is 5.55g I-TEQ/a which will result in a total anticipated reduction and measurable global benefit during the project's lifespan of 188.47g I-TEQ/a (UNDP, 2010).

The LBCEP project has three components, namely:

- Legislative Strengthening and Policy Development;
- Reduction of UPOPs Emissions through new Practices/Approaches in Municipal Waste Handling; and
- Reduction of UPOPs Emissions from Agricultural Land Clearing

Implementation of project activities commenced on 27th April 2011 instead of the expected date of 1st August 2010 and the expected date of completion is 26th April 2015 instead of the 30th July 2014 in the LBCEP document. The beneficiaries of the project are Kano and Anambra States (LBCEP, 2013). Administrative challenges in the Ministry and security challenges in the country delayed prompt commencement of the project on the expected date of 1st of August 2010. Also, delay in the allocation of land by the state government for the project slowed implementation of the project components in Anambra State.

1.3 Project Objective

The main objective of the Less Burnt for a Clean Earth Project is to enhance human health and environmental quality by reducing releases and exposure to unintentional persistent organic pollutants (UPOPs) originating from unsustainable municipal and agricultural waste operations (UNDP, 2010).

The aim of this project is to lower the barriers for introducing non-burning waste management for municipal waste and demonstrate BAT/BEP approaches for wide replication throughout the country. Assuming effective replication of the project's incremental input to improve UPOPs reductions under the national IMSWM programme, future UPOPs activities could reduce nationwide municipal waste burning by 20%, resulting in a 20% overall reduction in UPOPs releases from open burning of MAW which is equivalent to 1,060 g I-TEQ a year reduction of PCDDs and PCDFs (UNDP, 2010).

1.4 Project Implementation Structure

The LBCE project is being executed through the project management unit (PMU) and a project steering committee (PSC). The project management unit is responsible for the overall coordination, management, implementation, monitoring, evaluation and reporting of all project activities to UNDP. The members of the PMU include the Project Manager/Technical Director, two Monitoring and Evaluation Officers, Project Accountant and Project Secretary/Technical Assistant.

The project steering committee is responsible for making all necessary decisions and providing guidance for effective implementation of project activities including approval of the overall project work plan and budget revisions when necessary. The composition of the Project Steering Committee is as follows:

- Representative of the Federal Ministry of Environment – Chairman;
- Representative of the Federal Ministry of Agriculture;
- Representative of Federal Ministry of Finance;
- Representative of Kano State Ministry of Environment;
- Representative of Anambra State Ministry of Environment;

- Representative of Kano State Ministry of Agriculture;
- Professor Mohammed Danyaro Magaji (Agronomist) – Agricultural Research Council of Nigeria; and
- Dr. Obi Anyadiegwu, Waste Management Expert.

1.5 Terms of Reference (TOR)

The terms of reference for this mid-term assessment exercise mandated a comprehensive assessment and mid-term review of the Less Burnt for a Clean Earth Project since inception in April 2011 and up to 30th of June, 2013. This is necessary in order to proffer recommendations for successful execution and prompt implementation of the remaining project activities in the final half of the project towards enhancing human health and environmental quality by reducing releases and exposure to UPOPs primarily originating from unsustainable MAW operations.

1.6 Methodology of Assessment

The following methodology was adopted for the mid-term assessment of the Less Burnt for a Clean Earth project. Review of all relevant documents, interview with relevant stakeholders at both the Federal and Pilot States levels and fieldwork assessment of project outputs undertaken. A focus group discussion was conducted (UNDP, 2006), the principal officers in the LBCE project management unit and some of the project steering committee members were interviewed and documentation collected. In addition, a field visit was undertaken to the Compost Facility in Kano in order to gather more information from the workers and community stakeholders. Field visit was conducted to the Pilot States.

Furthermore, interviews and discussions were held with some stakeholders that attended the ‘On the Farm Training Workshop and Demonstration of the use of Crop Rotation as a Means of Suppressing Agricultural Waste/Elimination of Residue Burning’ at the Federal Ministry of Agriculture and Rural Development (FMARD)’s Sub-Station, Dan-Hassan, Kano on 15th of July, 2013 in order to elicit direct information from the farmers, cattle rearers, livestock feed producers and compost workers with full participation in the proceedings of the workshop.

1.7 SWOT Analysis

SWOT (strengths, weaknesses, opportunities and threats) analysis is a structured assessment method used to evaluate the strengths, weaknesses, opportunities and threats involved in a project. Strengths and weaknesses are often internal while opportunities and threats generally relate to external factors (Wikipedia, 2013). This method was also utilized in assessing the outcome performance of the LBCE project.

1.8 Structure of the Report

This final report consists of five chapters. An outline of the background of the project is presented as introduction in chapter one. Chapter two is devoted to the three components of the project and the associated deliverables. A comprehensive evaluation of the project is presented in chapter three. Findings, outcome analysis and lessons learnt are discussed in chapter four. The last chapter, chapter five, summarizes the conclusion and recommendations for moving the project forward in the next two years. In addition; acknowledgements, table of contents, list of figures, list of tables, abbreviations/acronyms and executive summary are presented before chapter one while references are listed in the report after chapter five.

CHAPTER TWO

PROJECT COMPONENTS AND DELIVERABLES

2.1 Project Components

The three components of the LBCE project are:

- Legislative strengthening and policy development;
- Reduction of UPOPs emissions through new practices/approaches in municipal waste handling; and
- Reduction of UPOPs emissions from agricultural land clearing.

2.2 Project Deliverables

The specific deliverables for each of the three components of the project are stated below.

2.2.1 Component 1: Legislative Strengthening and Policy Development

The main deliverables for legislative strengthening and policy development component of the project are:

- Demonstration of inventory of UPOPs sources and releases in two pilot sites in Kano and Anambra States;
- Interactive website for monitoring status of UPOPs at pilot states;
- National policy on municipal and agricultural waste management;
- National UPOPs reduction strategy and guidance notes;
- Technical by-laws covering UPOPs reductions in waste management; and
- Strengthened enforcement capacity in UPOPs minimizing MAW management practices.

2.2.2 Component 2: Reduction of UPOPs Emissions in Municipal Waste Handling

The main deliverables for UPOPs reduction through new practices and approaches in municipal waste handling component are:

- Introduction of waste separation at selected communities in Kano and Anambra States;
- Establishment of composting programme and collection of compostable waste at communities in the two pilot states;

- Developed market for composted matter in the pilot areas; and
- Replication of the approaches in other States in Nigeria.

2.2.3 Component 3: Reduction of UPOPs Emissions from Agricultural Land Clearing

The main deliverables for measuring achievement of reduction of UPOPs emissions from agricultural land clearing component are:

- Clarification and elaboration of UPOPs challenges in the agricultural sector with a focus on Kano State;
- Increase level of farmer and agricultural officials awareness of the impact of burning farm fields, both from an agronomic and UPOPs perspective; and
- Introduce alternative approaches to stubble burning at pilot sites in Kano and replicate in other farms.

2.3 Project Implementation Activities

Highlights of activities carried out under the three components of the project from inception on 20th of April 2011 to date are stated below.

2.3.1 Component 1: Legislative Strengthening and Policy Development

Activities carried out by the project management unit in strengthening legislation and developing policies include, amongst others:

- Trained 50 relevant stakeholders from Kano and Anambra states on the use of the United Nations Environment Programme (UNEP) standardized toolkits for the identification and quantification of dioxin releases from open burning sources;
- Carried out inventory of sources and quantified baseline data on dioxin emissions from open burning of municipal waste in Kano and Onitsha which was done through the expert working groups under the guidance of the national UPOPs inventory expert and these inventories will be updated annually;
- Developed draft national municipal and agricultural waste (MAW) management policy which has been reviewed and endorsed by stakeholders across the country in the workshop of August 2012;
- The MAW policy is currently being processed for presentation to the Federal Executive Council (FEC) by the Honourable Minister of Environment for approval; and

- Developed draft national UPOPs reduction strategy and guidance notes on reducing open burning of MAW. These documents were reviewed and adopted by the stakeholders in August 2012.

2.3.2 Component 2: Reduction of UPOPs Emissions in Municipal Waste Handling

Activities carried out in this component include:

- Trained 91 key stakeholders from waste management organizations (public and private), Ministries of Environment, Scavengers Association and Community Leaders from the two pilot states on municipal waste sorting, material recovery and composting process;
- Carried out public awareness and sensitization campaign on community based waste sorting and composting, occupational health and safety issues of UPOPs in Kabuga-Jambolo community, Gwale Local Government Area (LGA) of Kano State;
- Established a community-based waste sorting and collection programme at household level in Kabuga community, Kano;
- Distributed three colour-coded waste bins to each of 250 households in the community for the sorting of their wastes into compostable (green bin), recyclable (blue bin) and others (brown bin);
- Established a community-based waste composting windrow system and plastic recycling plant in the community with the plant currently producing an average of 3.7 metric tonnes of compost per month from the community's waste;
- Packaged the compost in 5kg and 10kg bags for sale to the public; and
- Arrangement is being finalized with the Anambra State Government (ANSO) for the commencement of the waste sorting and composting programme in Onitsha by August 2013.

2.3.3 Component 3: Reduction of UPOPs Emissions from Open Burning of Farmlands

Activities carried out in this component include:

- Inventory of sources and quantified baseline data on dioxin emissions from open burning of agricultural waste in Kano;
- Trained 80 stakeholders comprising practicing farmers, agricultural extension workers and others on alternative approaches to open burning of agricultural residue and waste;

- Carried out public awareness and sensitization campaign in farming communities and among farmers on the impact of burning on farm fields, UPOPs problems and alternative approaches to open burning of agricultural wastes through a Non-Governmental Organization (NGO) – Centre for Education and Leadership Development (CELD), Kano;
- Procured eight (8) motorized crop residue shredders and demonstrated to 93 farmers the use and maintenance of the shredders for the shredding of crop residues to animal feeds/mulching and compost materials at the two pilot sites in Kano (Doguwa and Danbatta); and
- Trained 65 farmers on slash and mulch agricultural practices to increase soil fertility and moisture, reduce soil temperature and control weeds in Doguwa as alternative to open burning of agricultural residues and demonstrated the approach to farmers, which were replicated in six farms in Doguwa, Danbatta, Kura and Wudil LGAs.

2.4 Some Project Activities Executed

This project has been sustained by intensive meetings of the PMU and PSC as well as several workshops geared towards achieving its objective of minimizing dioxin emissions from open burning sources in Nigeria in a timely manner. A brief summary of some projects executed by the LBCE project management unit within the first two years is presented in Table 2.1 below.

Table 2.1: Less Burnt for a Clean Earth Project Activities

S/N	Project Activity	Date	Venue
1	Inauguration of Project Steering Committee by the Honourable Minister of Environment, Mr. John Odey	20 th of April, 2011	Honourable Minister's Conference Room, Mabushi, Abuja
2	Project Inception Workshop	26 th of May, 2011	FMENV Lagos Zonal Office, Games Village, Surulere
3	Training Workshop on Toolkit for Identification and Quantification of Dioxin Releases from Open Burning Sources in Nigeria	12 th – 16 th and 19 th – 22 nd Dec, 2011	FMENV Lagos Zonal Office, Games Village, Surulere
4	Second Project Steering Committee Meeting	22 nd Dec. 2011	FMENV Lagos Zonal Office, Games Village, Surulere
5	Training and Capacity Building for Waste Management Stakeholders (Regulators, Managers and Collectors)	15 th – 17 th and 22 nd – 25 th March 2012	Ramat Library, Kano and Onitsha South LGA, Onitsha
6	Inventory of Sources and Quantification of UPOPs Emissions from Open Burning of Agricultural Waste	July 2012	Kano
7	National Stakeholders Workshop on Review of Draft National Policy on Municipal and Agricultural Waste	28 th – 30 th Aug. 2012	FMENV Lagos Zonal Office, Games Village, Surulere
8	Third Project Steering Committee Meeting	31 st Aug. 2012	FMENV Lagos Zonal Office, Games Village, Surulere
9	Training on Alternative Approaches to Open Burning of Agricultural Waste/Residue	2 nd – 5 th Oct. 2012	Kano State University of Science and Technology (KUST), Wudil, Kano
10	Inventory of Sources and Quantification of UPOPs Emissions from Open Burning of Municipal Waste	October 2012	Kano and Onitsha
11	Public Awareness and Farmers Sensitization Campaign on Negative Effects of Open Burning of Agricultural Waste	27 th Oct. – 11 th Nov. 2012	Danbatta and Doguwa LGAs, Kano
12	Distribution of three colour-coded waste receptacles to 250 households in Kabuga community	1 st – 14 th Nov. 2012	Dorayi, Kano
13	Construction of compost plant, training of compost workers and test running of the plant	Sept. – Dec. 2012	Dorayi, Kano
14	Commission/Hand-Over of Compost Plant in Dorayi, Kano to REMASAB	13 th Dec. 2012	REMASAB, Kano
15	Fourth Project Steering Committee Meeting	29 th Nov. 2012	FMENV Lagos Zonal Office, Games Village, Surulere
16	Demonstration on Use of Crop Shredder as an Alternative Approach to Open Burning of Agricultural Waste/Residue	28 th – 29 th and 30 th – 31 st Jan. 2013	Danbatta and Doguwa LGAs – Crop Residues Shredding Centres
17	Demonstration on Use of Slash and Mulch as an Alternative Approach to Open Burning of Agricultural Waste/Residue	29 th – 30 th April 2013	Food Crop Technology Centre, Kura LGA, Kano
18	Workshop on Review of Draft National UPOPs Reduction Strategy, Guidance Notes and Awareness Raising Brochure on Reducing Open Burning of Municipal and Agricultural Waste	25 th – 26 th June 2013	FMENV Lagos Zonal Office, Games Village, Surulere
19	Passive Air Monitoring	Dec. 2012 – Date; Ongoing	Kano
20	Passive Air Monitoring	July 2013 – Date; Ongoing	Onitsha

CHAPTER THREE

PROJECT ASSESSMENT

3.1 Project Appraisal

The project is aimed at enhancing human health and environmental quality by reducing releases and exposure to UPOPs originating from unsustainable waste management operations (UNDP, 2010; LBCEP, 2013). Emission of UPOPs into the environment is measured in g TEQ/annum. The annual release of UPOPs inventory in Nigeria, using the UNEP 2001 standardized toolkit for the identification and quantification of dioxin and furan releases as well as the 2005 edition of the toolkit, shows that total emission of dioxins and furans released into the air, water, land, product and residue are 2783.984, 0.034, 2521.427, 0.00 and 34.417g TEQ/a, respectively giving an overall total emission of 5339.862g TEQ/a (FMENV, 2009). Open burning of wastes is the most important source of UPOPs releases to air and residues. (FMENV, 2009)

At the beginning of the project, the baseline value for Onitsha is 94.9g TEQ/a from open burning of collected waste at dumpsites and 7.12g TEQ/a from open burning of uncollected waste (UNDP, 2010). Outcome target for Onitsha is 20% reduction in open burning of collected waste at dumpsites and 100% reduction in open burning of uncollected waste such that at the end of the project 19g TEQ/a reduction from collected waste burning and 7.12g TEQ/a reduction from open burning of uncollected waste would have been achieved.

During the project's first year, the inventory of UPOPs emission from open burning of collected waste at dumpsite was calculated as 164.5 g TEQ/a while that from uncollected waste was 41.06 g TEQ/a. However, the second year figures show UPOPs emission from open burning of collected waste at dumpsites as 156.57g TEQ/a and from uncollected waste is 11.89g TEQ/a. This shows a reduction from last year figures by 4.8%, that is, 7.93g TEQ/a in open burning of collected waste at dumpsites and 71%, that is, 29.17 g TEQ/a in open burning of uncollected waste. These inventory figures are listed in Table 3.1 and graphically presented in Figure 3.1 showing a reduction from 2012 year figure of 4.8% (7.93g TEQ) in open burning of collected waste at dumpsites and 71.0% (29.17g TEQ) reduction in open burning of uncollected waste in Onitsha. This achievement was made possible because the Anambra State Government provided centralized waste bins in all the streets in Onitsha and collected them daily for disposal at the designated dumpsites.

Table 3.1: UPOPs Emission Inventory for Onitsha (in g TEQ)

Type of Waste	Baseline (2007)	Year 1 (2012)	Year 2 (2013)
Collected Waste	94.9	164.5	156.57
Uncollected Waste	7.12	41.06	11.89
Total	102.2	205.56	168.46

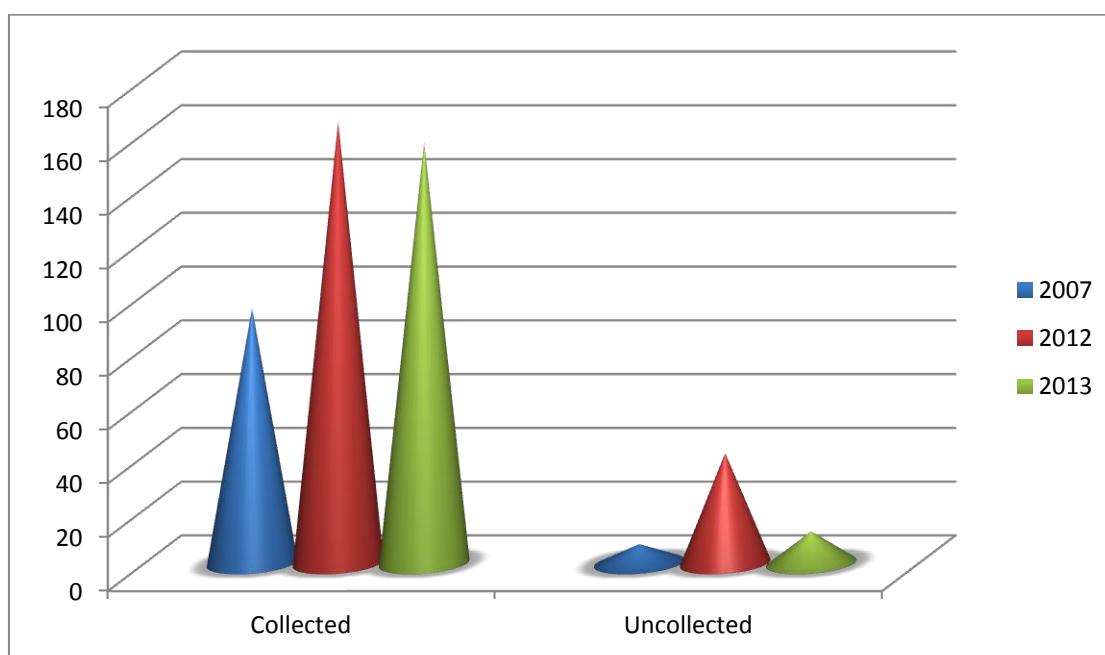


Figure 3.1: Graphical Presentation of UPOPs Emission Inventory for Onitsha

Baseline value for Kano is 394.2g TEQ/a from open burning of collected waste at dumpsites and 78g TEQ/a from open burning of uncollected waste. Outcome target for Kano is 20% reduction in open burning of collected waste at dumpsites and 100% reduction in open burning of uncollected waste, that is, 78.8g reduction from collected waste burning and 78g TEQ/a reduction from open burning of uncollected waste at the end of the LBCE project in 2015.

In the first year of the project, UPOPs emission from open burning of collected waste was 187g TEQ/a and 124g TEQ/a for uncollected waste, however, at the end of the second year the status of UPOPs emission from open burning of collected waste at dumpsites is 182.59g TEQ/a and from uncollected waste is 47.37g TEQ/a. These UPOPs emission figures are

presented in Table 3.2 and graphically shown in Figure 3.2 revealing a reduction from previous year figure of 2.4% (4.41g TEQ) in open burning of collected waste at dumpsites and 61.8% (76.63g TEQ) reduction in open burning of uncollected waste in Kano.

Table 3.2: UPOPs Emission Inventory for Kano (in g TEQ)

Type of Waste	Baseline (2007)	Year 1 (2012)	Year 2 (2013)
Collected Waste	394.2	187	182.59
Uncollected Waste	78	124	47.37
Total	472.2	311	229.96

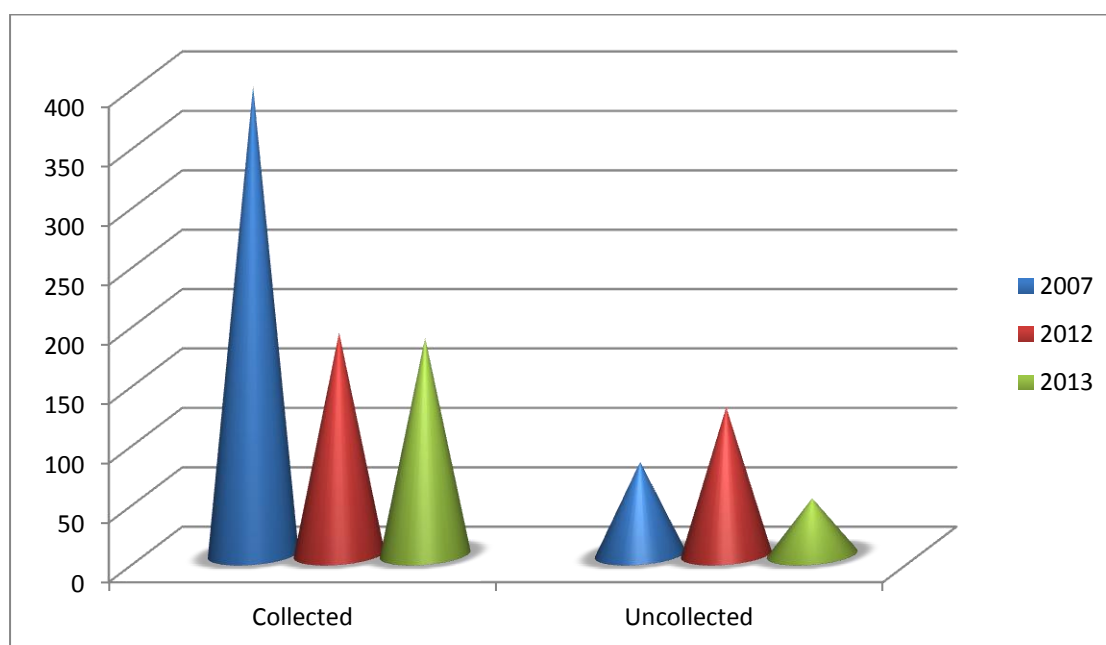


Figure 3.2: Graphical Presentation of UPOPs Emission Inventory for Kano

Assessment of the status of expected outcomes involves analyses of the appropriateness of the outcome indicators, review of the outputs and assessment of the extent to which the outputs are making progress towards the achievement of expected outcomes. The relevant activities for achieving the expected outcomes of the LBCE project are being carried out in the Federal Ministry of Environment (FMENV) and the two pilot states of Kano and Anambra in partnership with the United Nations Development Programme (UNDP).

Mid-way into the life of the projects, notable excellent achievements have been recorded with some of them surpassing the targets in the project document. In general, the programme is designed to reduce dioxin emissions and the specified activities are the right ones to solve this MAW management problem. However, due to the delay in securing land for the project in Onitsha by the Anambra State Government, the progress being made is far less than that in Kano.

3.2 Outcome Evaluation of Legislative Strengthening and Policy Development

Assessment and quantification of baseline data on UPOPs generation from open burning of MAW was carried out by stakeholders from the two pilot states. Data on sources of UPOPs emission from open burning of MAW and UPOPs emission figure has been established in Kano and Anambra states and have been updated to date. The Federal Ministry of Environment will incorporate the data into its submission to Stockholm Convention Secretariat.

Demonstration of inventory of UPOPs sources and releases in the two pilot sites was carried out in December 2011 with 50 people from relevant stakeholders' institutions in the two pilot states and at Federal level trained in the use of United Nations Environment Programme (UNEP) toolkit for the identification and quantification of dioxin emissions from open burning of municipal and agricultural waste. The trainees all demonstrated ability to conduct inventory. This activity surpassed the target of at least 10 staff/persons each in Anambra and Kano States with test scores above 80%.

Monitoring and reporting mechanisms are in place and operational. Website for the project, www.upops.org.ng, was developed and hosted but is currently undergoing reconstruction. Online reporting format is yet to be available for each state to fill in online and there has not been any interactive website tracking UPOPs reporting from different Nigerian states.

The two pilot states (Kano and Anambra) have submitted data on UPOPs emissions from open burning of MAW, therefore the mid-term target of 10 states was not achieved. This was not extended to other states probably due to the unavailability of funds as revealed by the project management unit. However, concerted efforts should be put in place to source for funds in order to ensure that 20 states submit annual emission reports at the end of the third year in 2014 in order to meet the project target.

Towards effective legislation on MAW, federal waste management policy has been adopted and national UPOPs reduction strategy for open burning of MAW has been developed, reviewed and endorsed by stakeholders. Draft national policy on MAW management has been developed, reviewed and adopted by stakeholders. Twelve states comprising Niger, Benue, Abia, Kwara, Ekiti, Ondo, Nasarawa, Oyo, Kano, Anambra, Kebbi and Taraba have endorsed the national policy on MAW management and more states should be encouraged to endorse the policy in order to meet the target of 15 state EPA by the end of third year in 2014. The draft policy was completed by end of the first year, stakeholders review completed by end of the second year. The policy is currently undergoing processing for presentation to the Federal Executive Council (FEC) by the Honourable Minister of Environment.

Five members of the national committee for waste management were trained on MAW UPOPs source and release issues thus met the target that every member of committee should be trained by the end of year 2.

Kano State Refuse Management and Sanitation Board (REMASAB) has an existing by-law on sanitation but the recently adopted national policy and the guidance on MAW are yet to be incorporated into the by-law. The by-laws have not been drafted at the LGA level because of the initial absence of policy and guidance note on waste management covering UPOPs issues. However, with the development of these pre-requisite documents by the project, arrangement has been concluded for the inauguration of the by-laws drafting committees in the two pilot states by July 2013. The targets that the by-laws should be drafted by end of year 1 and the by-laws adopted at mid-term have not been met as the national policy has not been adopted by the Federal Executive Council (FEC).

In order to increase Federal and state municipal waste policy setting and enforcement capacity, the target of 20 officials in each pilot state completing training with measurably improved knowledge and skills was delayed for the finalization of the national UPOPs reduction strategy, guidance notes and the by-laws for a comprehensive assessment of training needs. The PMU intends to commence this activity in August 2013.

Towards strengthening capacity in UPOPs minimization and MAW management practice, training needs assessment is being undertaken and training workshops on enforcement with UPOPs reducing waste management practice have been held with some of them listed in

Table 2.1 above. It was targeted that the training needs assessment should have been completed by the end of the first year, training programme 50% completed by mid-term and 100% completed by end of the third year in 2014. 40% of major stakeholders in waste management (waste generation, storage, transportation and dumping) in the pilot states are now familiar with IWM and UPOPs reduction principles. This activity will be intensified in order to surpass the 60 – 75% target required at the end of the project.

3.3 Outcome Evaluation of UPOPs Reduction in Municipal Waste Handling

The Less Burnt for a Clean Earth project is designed to reduce UPOPs through best available practices in municipal waste handling. For reduction of UPOPs emissions through improved sorting of municipal waste, the project team selected one community each from the pilot states (Kabuga-Jambolo in Kano and Fegge in Onitsha) for the establishment of community-based waste sorting and composting programme. A community-based waste sorting at household level and collection programme was established in Kabuga-Jambolo, Kano. The project distributed three colour-coded waste bins to each of 250 households in the community for the sorting of their waste into compostable (green bin), recyclable (blue bin) and others (brown bin). Total volume of wastes collected so far in Dorayi at mid-term is 258.49 tonnes with about 180.9 tonnes (70%) sorted at household levels in the community. Replication of the project in Onitsha has been scheduled to start by August 2013 as the State Governor has promised to provide the project with land for establishment of a composting facility before end of July 2013.

In order to strengthen baseline IWM strategies with UPOPs-specific priorities and practices involving best available technology and best environmental practice (BAT/BEP), the project is in the process of incorporating the provisions of the recently endorsed national UPOPs reduction strategy and guidance notes on reducing open burning of MAW into the IWM strategies. The project is currently upgrading one of the major dumpsites in Kano, covering 30.2 hectares, to a simple landfill site where burning will not be possible and that of Onitsha has been scheduled to take-off in August 2013 in order to meet the target of at least 10 dumpsites covering at least 70 hectares upgraded to reduce and prevent burning by end of project.

The project introduced waste separation at selected communities in Kano with 250 households and 15 restaurants already participating in the programme. The target of 10% of

residential estates, commercial and government institutions in pilot states with separation programme in place in first year of the project could not be met in Onitsha as waste separation programme implementation has not taken off due to the delay in securing a dedicated parcel of land for the composting facility.

Community level awareness of UPOPs in Kano has risen by 40% while that of Onitsha rose by 20%. An awareness raising brochure on UPOPs and open burning of MAW has been developed and adopted in June 2013 and the PMU is planning to print and possibly translate into the main local languages for distribution to the populace. The target increase in awareness at mid-term is 30%. The project targets that at least 10 environmental protection agency (EPA), waste management authority (WMA) staff and community 'block leaders' are trained in waste sorting in each pilot state and at least 20 community leaders in each pilot LGA. At mid-term, 54 stakeholders were trained in 'train the trainer on UPOPs reduction sorting and composting' in order to cover the target of 25% of key stakeholders in IWM (state/local government, civil societies, media, private investors).

A sorting and composting programme is going on in Kabuga-Jambolo, Kano and the Kano State Government (KNSG) has made financial provision in 2013 state budget for the replication of the programme in eight (8) LGAs in the State. The same strategy is to be adopted when the project commences in Onitsha by August 2013. The target is that there should be sorting and composting programmes in the 8 LGAs of Kano Metropolis and the 2 LGAs in Onitsha by the end of the project. Sorting and composting activities are also being carried out in the following communities: Ilokun, Erinfun/Emirin Ado-Ekiti, Ekiti State and Rumuokpolu, Elioju, Port-Harcourt, Rivers State through the intervention of the National Environmental Standards and Regulations Enforcement Agency (NESREA).

At Dorayi quarters, Kabuga-Jambolo, Kano, colour-coded waste bins for source sorting of waste was given to householders and waste collection system using the community youths was established. A compost plant (three-bin system) and a plastic shredder were installed in the community, which is currently producing an average of 3.7tonnes of compost per month from the community waste. The compost is bagged as 5kg and 10kg for sale. This achievement surpassed the target of bagging compost at end of the third year of the project. However, this output has not been in place in Onitsha due to administrative challenges. In

addition, 15 restaurants are currently participating in the composting programme in Kano compared with the target of at least 10 by mid-term and 40 at the end of the project.

One of the outputs of the project is to develop market for compost produced in pilot areas. Currently in Kano, 800kg of compost is being sold quarterly to farmers and horticulturists. Concerted efforts is being made to expand the market and quantity of compost sold through more awareness outreach on the benefits of using the compost so as to meet the sale target to commercial buyers of at least two tonnes per quarter making 8 tonnes/year.

The project is designed to ensure that five out of the states participating in Federal Government's integrated municipal solid waste management (IMSWM) replicate BAT/BEP practices in their respective domain for reduction of UPOPs emissions. At mid-term, four states comprising the two pilot states, Kwara and Ekiti states have adopted the guidance notes on UPOPs-reducing integrated waste management (IWM) practices. The project targets five states and cities adopting the by-laws and guidance notes on UPOPs-reducing IWM practices at the end of the project. This has been achieved for the guidance notes but yet to be achieved for the technical by-laws.

Training in UPOPs reducing practices for non-pilot states has not been done but the PMU proposes to commence this in August 2013 bearing in mind the target of at least 100 people by the end of the project. So far, the project has developed a BAT-BEP procedure in two places in Kano for UPOPs reduction as against the target of five by the end of the project. The PMU intends to replicate this procedure on commencement of operations in Onitsha in order to meet the target before end the project in 2015.

3.4 Outcome Evaluation of UPOPs Reduction from Agricultural Land Clearing

Alternative approaches to agricultural waste burning has been introduced in 120 and 165 hectares (ha) of farmlands in Danbatta and Doguwa, respectively, to reduce open burning of stubble on farm fields. This achievement surpasses the 20ha target for each of Danbatta and Doguwa and this was recorded before the target of end of the project in 2015. Currently, 175 farmers in Kano, consisting of 100 in Danbatta and 75 in Doguwa, did not burn their croplands in preparation for the 2013 planting season. This milestone surpassed the target of 10 farmers in the project document. An estimate of croplands stubble burned in Kano State in

2011/2012 was 406,653 hectares which was reduced by about 40% to 243,560ha in 2012/2013 through this project intervention, which surpassed the 20% reduction target.

On clarification and elaboration of UPOPs challenges in the agricultural sector with a focus on Kano state, the following data on the area of lands per crop burnt were obtained at year one of the project: sorghum - 153,041ha; millet - 108,342ha; maize - 30,157ha; rice - 30,308ha; cowpea - 84,803ha and sugarcane - 420ha. These figures were updated in the second year as follows, the total areas of land per crop burnt are: sorghum - 104,007ha; millet - 26,960ha; maize - 30,895.5ha; rice - 21,697.5ha and sugarcane - 60,000ha.

The project has elevated the level of awareness of farmers, agricultural extension officials and agricultural practitioners of the impact of burning farm fields, both from an agronomic and UPOPs perspective. Public awareness and sensitization campaigns were carried out in farming communities and among farmers of the impact of burning on farm fields and UPOPs problems/alternative approaches to open burning of agricultural wastes through an NGO – Centre for Education and Leadership Development, Kano and the Hausa service of D/welle Radio Germany.

Farmers' awareness level on alternative uses of their crop residues rather than burning has increased significantly to about 35% from the various training and awareness programmes undertaken by the project. As at 30th of June 2013, four training/demonstration workshops have been held for stakeholders comprising practising farmers, agricultural extension workers and others on:

- alternatives to open burning of agricultural waste and the advantages of such alternatives, i.e. elimination/reduction of UPOP emissions, pest control, soil fertility, weed control etc.;
- implication of farmland burning on soil fertility, human health and alternative methods to open burning;
- use and maintenance of crop shredder for the shredding of crop residues into animal feeds/ mulching/compost material; and
- the use of crop residues for mulching to increase soil fertility and moisture, reduce soil temperature and control weeds and replicated in 4 additional farms.

One shredding centre for crop residues was established in each of the two pilot sites in Kano State; Danbatta and Doguwa LGAs, with motorized shredding machines which are being used by farmers to shred their crop residues either at the centre or on their farms. Many farmers and other stakeholders have indicated their interest in buying shredders to be used on their farms and for commercial purposes. Some have actualized this interest with a notable livestock farmer that has about 1,000 goats producing 20 bags of feeds from agricultural waste per day and also a retired civil servant that has a shredder in his domain. The project introduced alternative approaches to stubble burning in pilot sites in Kano and replicated in 6 farms in Kura and Wudil LGAs of Kano State compared with replication target for at least 20 additional farms across Kano by the end of the project.

CHAPTER FOUR

MID-TERM PROJECT ASSESSMENT ANALYSIS

4.1 Findings

Generally, the LBCE project proceeded relatively smoothly and most of the project components have been delivered even before target dates. The coordination of the implementation has been very strong. The implementation of the project in Anambra State has been slower than anticipated for a variety of reasons, including delays in releasing land by the Anambra State Government.

The Federal Ministry of Environment and the United Nations Development Programme adopted a participatory approach in the implementation of the project activities, involving partners and stakeholders in the design and development of the project components through stakeholder workshops at both Federal and State levels. Respondents in the pilot states were satisfied with the features of the project approach and the levels of ownership and sustainability that resulted from it giving them economic upliftment.

The United Nations Development Programme made very significant contributions to the project activities through both the non-programme and programme activities. Respondents were very thankful to the UNDP that sponsored the project for emancipating them from their former state of non-awareness of the economic and environmental benefits that could be derived from agricultural wastes that they used to burn before the inception of the LBCE project.

In project implementation and coordination, it was found out that there is adequate capacity, clarity of responsibilities, involvement of all stakeholders, adequate orientation and training, regular monitoring/evaluation and prompt delivery of project activities. Mid-way into the life of the LBCE project, satisfactory achievement has been recorded. As of now, considerable progress was being made towards achieving all targeted components in Kano State while implementation has tended to be slow in Anambra State.

Both documentary and interview evidence suggest that, so far, the LBCE project implementation has been participatory in the two pilot states with adequate involvement of partners and stakeholders. Respondents in the two states were generally satisfied with the

participatory approach employed by the PMU in the implementation of the project. They gave the PMU and PSC an excellent rating. There is no element of a top-down approach as there is sufficient participation of all stakeholders involved in this project in the pilot states, consequently some other states like Taraba, Jigawa and Zamfara have indicated their readiness to replicate this project in their respective domain.

Ownership and sustainability elements were built in to the project implementation as efforts were made to create a sense of ownership as well as replication of some components of the project by individual farmers and cattle rearers for the establishment of their private facilities to drive the process. Most respondents believe that the participatory approach to project design has created a sense of ownership and are confident that the LBCE project is sustainable. It is evident that the training provided by the project was adequate and in line with the project components focusing on reduction of dioxin emissions through open burning of agricultural and municipal wastes.

4.2 Outcome Analysis

The strengths of this project lie within the available personnel and financial resources revolving round the two pilot states, the PMU in FMENV and the sponsor GEF through the UNDP. The creation of a separate unit fully dedicated to the achievement of the goal of reducing UPOPs emission from open burning sources in Nigeria is a big advantage which has been fully utilized by the PMU and the PSC with the active participation of all stakeholders up to the grass root level in the various communities in the two pilot states. This prevents unnecessary distractions and reduces political interferences in the course of execution of project activities. The passion that each member of the team has exhibited really strengthened the project towards sustainability and eventual ownership by the various communities.

The weaknesses of the project in terms of the negative issues that can derail the achievement of the project objective as viewed in the management and implementation of project activities have not really been manifest in the PMU but are those beyond their control which are internal issues in the overall project team. This has been exhibited in the delay in the acquisition of a suitable parcel of land for the compost facility in Onitsha primarily due to the bureaucratic process. There is actually a way forward now that the ANSG has allocated some portion of land in Fegge, Onitsha for the commencement of the operations which the PMU intends to pursue and facilitate execution of project activities starting from August 2013.

The opportunities that this project could exploit to its advantage include the readiness of the communities to buy-in into the social, health, economic and sanitation needs to ensure environmentally sound practices towards waste management and the general awareness of the populace in environmental sustainability issues as evident in the various discussions and interviews with notable stakeholders in the project. It has been gathered that more states in the Northern part of the country that rely primarily on farming are interested in being part of this reduction of open burning of agricultural wastes which has been viewed as a waste to wealth programme reducing their consumption of the common inorganic fertilizers in their farmlands with more productivity in the livestock section and making their environment clean with better living conditions of good health.

In terms of the threats which are external elements in the environment that could cause trouble for the project, it has been identified that such elements include the recipient states and communities not interested in having the project in their domain. Such threats do not manifest in this project as the two recipient states and associated communities welcomed the projects in their respective localities. However, the real cause of the delay in commencement of the compost facility in Onitsha is official bureaucratic issue involved in land acquisition in Anambra State.

The SWOT analysis has revealed that the impacts of the advantages inherent in this project in terms of the internal strengths and external opportunities have been utilized to their maximum while the disadvantages in internal weaknesses and external threats have been reduced to their minimum. The performance rating for the Less Burnt for a Clean Earth project at mid-term is therefore satisfactory.

4.3 Performance Evaluation of the Project

Table 4.1 shows the simple ratings for the performance of the project activities based on the deliverables listed in the project document. Generally, the project has performed satisfactorily well in all the deliverables. This is in agreement with the outcome analysis discussed above.

Table 4.1: Performance Evaluation of the Project

Deliverables	State		Remarks
	Anambra	Kano	
Component 1: Legislative Strengthening and Policy Development			
Demonstration of inventory	Yes	Yes	Achieved target
Interactive website	No	No	Target not achieved
National policy	Yes	Yes	Achieved target
National reduction strategies	Yes	Yes	Achieved target
Technical by-laws	Yes	Yes	Achieved target
Strengthened enforcement capacity	No	No	Target not achieved
Component 1 Performance	67%	67%	Satisfactory
Component 2: Reduction of UPOPs Emissions in Municipal Waste Handling			
Introduction of waste separation	Yes	Yes	Achieved target
Establishment of composting programme	No	Yes	Target not achieved
Developed market for compost	No	Yes	Target not achieved
Replication in other states	Yes, in two states		Achieved target
Component 2 Performance	33%	100%	Fair
Component 3: Reduction of UPOPs Emissions from Agricultural Land Clearing			
Clarification and elaboration of UPOPs challenges in Kano state agriculture	N/A	Yes	Achieved target
Increase level of farmer and agricultural officials awareness	N/A	Yes	Achieved target
Introduce alternative approaches to stubble burning in Kano sites and replicate	N/A	Yes	Achieved target
Component 3 Performance	N/A	100%	Very satisfactory
Overall Performance: Components 1 + 2 +3	50%	89%	Satisfactory

For components 1, 2 and 3; the ratings are satisfactory, fair and very satisfactory, respectively. Performance of the second component of the project on reduction UPOPs in municipal waste handling in Anambra state is quite unsatisfactory primarily due to non-allocation of land for the establishment of composting facility at mid-term of project life.

Reduction of UPOPs from agricultural practices, which exclusively focussed on Kano State, has shown excellent performance of project activities towards zero burning of agricultural farmlands. All the deliverables were accomplished and even surpassed the targets.

Performance in legislation strengthening and policy development has been very good as evident in the adopted national policy on MAW and reduction strategies but remaining the

by-laws to be inculcated into LGAs by-laws and enforced for compliance. This activity cuts across the two pilot states.

The real problem lies with the implementation of the second component on reduction of UPOPs in municipal waste management hindered by ANSG consequent upon the non-release of land for the compost and shredding operations. Therefore, the performance in this regard has been below compliance but still fair.

4.4 Lessons Learnt

The project manager/technical director operates a sound leadership role in the day-to-day management of programmes and activities through a functioning up-to-date management system for coordination, dialogue, fostering of synergies, coherence and partnerships with all stakeholders. The project demonstrated closer cooperation with all the stakeholders involved in the project.

Coordination among stakeholders on technical issues have proven effective in this project as necessary information is shared, options discussed and pressure is brought to the bare on each other and partnerships are fostered. The project design involve a people-centred and sustainable development approach with more recognition given to the farmers, extension workers, civil society organizations, NGOs and more cooperation with them in delivering programmes to the people. There is effective decentralization and devolution of power in the implementation of project activities.

The compost facility in Dorayi, Kano is now a research centre for about eight tertiary institutions conducting studies in waste management, community waste, sorting of wastes, compost, livestock feed and agriculture-related issues. Some of these institutions include Bayero University Kano (BUK); Ahmadu Bello University (ABU), Zaria and Kano State University of Science and Technology (KUST), Wudil. Others include School of Hygiene, Kano; School of Environmental Studies, Kano and School of Environmental Studies, Jaun in Jigawa State. In addition, secondary school and environmental club students have been coming to the facility on excursion visits.

Many states in the Northern part of the country are already in consultation with REMASAB with a view to replicating the pilot compost and livestock feed project in their respective

states. Some of these states include Jigawa, Kaduna, Zamfara, Katsina, Taraba and Yobe, amongst others.

Many traders from neighbouring countries including Mali, Sudan, Niger and Chad have seen the benefits of the LBCE project in terms of the components including non-burning of agricultural wastes, production of organic fertilizers and livestock feeds. They have therefore requested from their counterparts in Kano to procure some of the related equipment that will be taken to their respective countries for sound environmental performance and economic improvement through high livestock yields and sustenance.

All the eight LGAs in Kano State have put necessary facilities in place for the project with 75% of them already provided land for the construction of compost and livestock feed facility which has reflected in Kano State 2013 Appropriation Bill.

Kano State REMASAB expresses its gratitude to the FMENV and the UNDP for selecting Kano State as one of the beneficiaries of the project. Open burning has drastically reduced in Kano State but not yet zero burning. A radio station 'Manowa' Radio Agriculture has been established in Kano State and exclusively dedicated to agricultural issues, events and news.

Individuals, livestock farmers and organizations involved in waste disposal in Kano State have procured shredders for use in their respective farms for shredding cornstalk for production of livestock feeds. Burning of bushes and agricultural wastes is becoming an unpopular practice in Kano State as hardly would one see any farmland being burnt as against the former traditional practice in preparation for planting season. This is against the former traditional practice.

An estimate of 398 households of Doguwa cattle rearers that used to migrate down south have now reduced to about 28 as a result of the positive impact of the project that is now making livestock feeds available through shredding of agricultural waste. This has reduced the Hausa/Fulani conflicts that used to be caused by invasion of Fulani cattle rearers grazing their animals on farmlands. Indeed, one stakeholder was extremely thankful to the project as he has been able to procure a shredder that he uses to shred an average 20 bags per day of feeds being used in his livestock farm of over 1,000 goats.

The project has really impacted on the community stakeholders due to the report that zero tillage is now being combined with zero burning in Danbatta, Kano. A retired Comptroller of Prisons has established a facility in Kano for shredding of agricultural wastes mixing leguminous ones with cornstalk for nutritional elevation. The recycled pelletized plastic generated from the plastic component of the sorted wastes by the project facility in Dorayi, Kano are being sold to a plastic manufacturing company in Kano.

There has been reported collaboration between the project and some NGOs in Kano State. Specifically, discussion is going on with the Department for International Development (DFID) of the United Kingdom (UK) in Nigeria on possible intervention to assist some agricultural cooperative organizations in replicating the projects in all the 44 LGAs in Kano State.

Many stakeholders in Kano State advocated for possibility of allocation of additional shredders to them for further implementation of project activities. The project has resulted in increase in the number of cattle as a prominent stakeholder reported that his number of cattle has increased from 2 to 5 due to the impact of the project in his small household.

Private Sector Participant (PSP) operators in Kano State Municipal Waste Management (MWM) collection are interested in having compost facility in their domain and some of them have even secured landed property to actualize their dream in acquiring the shredder and the compost plant for economic activities towards enhancement of their social life.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This assessment has shown that considerable progress and prompt delivery of project components have been achieved in many measurable deliverables even before the target dates. The PMU and the PSC have recorded substantial contributions to the achievement of the project components and that the partnership strategy with all stakeholders and the implementing agencies was appropriate and very effective.

A significant reduction in open burning of both collected and uncollected waste is expected through the implementation of IMSWM together with UPOPs LBCEP targeting activities. The project has demonstrated the waste-to-wealth concept through sales of recyclables and organic fertilizers. The more the agricultural wastes are utilized, the less the burning. The project has considerably reduced migration of cattle rearers and the attendant conflicts with crop farmers. Open burning has drastically reduced in Kano State but not yet zero burning.

UNDP has made significant contributions to the project both through its soft interventions and through the programme outputs and activities. However, the slow progress in Anambra State was actually due to the bureaucratic bottlenecks in securing a dedicated parcel of land for the project in Onitsha.

5.2 Recommendations

Suggestions for prompt delivery of project activities within the next two years include:

- The Onitsha site development should be pursued with extra vigour in order to meet the set targets in view of the late commencement of activities in Anambra State;
- The PMU should expedite action to ensure that all the targets that have not been achieved mid-year should be delivered before the end of life of the project;
- Project implementation should continue to be all-inclusive;
- There should be continued proper coordination between PMU and UNDP from planning to execution of project activities during the next two years of project life;
- Partnership among all stakeholders in this project should continue to be strengthened;
- Ownership benefits of the programme with all stakeholders should continue;

- The strong coordination and implementation of programme activities should be maintained at all levels;
- Concerted efforts should be put in place to ensure that more states submit annual UPOPs emission data and endorse the national policy/UPOPs reduction strategy;
- Proactive measures should be put in place to ensure that the Federal Cabinet endorses the national policy on MAW before the target of end of year three;
- The impact of the project should be extended to neighbouring states through more awareness activities in the print and the electronic media;
- The PMU should consider the possibility of allocation of more shredders to other communities in Kano State;
- Necessary machineries should be put in place to ensure that the remaining targets are accomplished before the end of life of the project;
- Training needs assessment and all trainings related to the project should be completed within the next one year;
- The PMU should consider the possibility of assisting individuals and organizations in the procurement of waste management facilities for reduction of open burning and utilization of MAW;
- The compost facility should continue to offer research support to students and academics in the quest for knowledge; and
- The PMU should facilitate the reconstruction of the project website to allow interactive website tracking on UPOPs reporting from different Nigerian states.

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