

Proceedings (Report) of the Final
Project Steering Committee (PSC)
Meeting of Africa LDCs project;
Vienna, Austria, 12-13 November, 2018

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1. Introduction

The Final (10th) PSC Meeting of the Africa LDCs project was held in Vienna, Austria during the period of November 12-13, 2018. POPs Focal Points from seven COMESA and SADC countries took part in the meeting. Burundi and Sudan did not attend the meeting. Ms. Erlinda Galvan, the project manager, Dr. Ramdev from RENPAP-India, and Mr. Nouri Abdalla, Regional Coordinator for SADC and COMESA sub-regions represented UNIDO, and Mr. James Mulolo represented Africa Institute. Similarly, Mr. Lwembe Mwale represented COMESA Secretariat. Countries from COMESA that participated in the meeting were Ethiopia, Rwanda and Uganda whereas participants from SADC sub-region were Lesotho, Mozambique, eSwatini and Tanzania. Additionally, Mr. Ameha Dagnaw from Ethiopia, and Dr. Hamisi Tindwa from Tanzania also participated in the meeting, and they made presentations on Textile, and contaminated sites pilot projects, respectively. *See Annex-1 for the list of participants.*

2. Objectives and Expected outcomes of the Final PSC Meeting

The Final PSC Meeting has the following main objectives:

- Review project's outputs and discuss success stories, lessons learned and main challenges of project implementation since project's inception to date;
- Discuss the Project Manager's report on implementation of the project and its expenditure;
- Interviews to take place between the final evaluation team of the project and representatives of the participating countries.

Expected outcomes of the Final PSC meeting include:

- The Project Manager's report on implementation of the project and its expenditure approved by participating countries;
- The preliminary findings of the projects' final evaluation achieved.

3. Proceedings of the meeting

3.1 Day-1 (November 12th)

The first day of the meeting, (Nov. 12) was dedicated to having one-on-one meetings between the POPs Focal Points of the participating countries and the terminal evaluation team (Mr. Robert Yive and Mr. Francesco Cuda). The evaluation team interviewed each participating country's representative separately (POPs Focal Points), including those involved in the implementation of the pilot demonstration projects in Ethiopia (Mr. Ameha Dagnaw) and Tanzania

(Dr. Hamisi Tindwa). The evaluation team also interviewed Mr. Mwale from COMESA Secretariat and Mr. James Mulolo from Africa Institute. The evaluation team has already interviewed Mr. Nouri Abdalla, Regional Coordinator for SADC sub-region during their visit to Tanzania in November 7th.

3.2 Day-2 (November 13th)

Mr. Klaus Tyrkko, Division Chief, Stockholm Convention Division-UNIDO, kicked off the second day (Nov. 13th), by welcoming the participants to Vienna and praised the participating countries in implementing the activities of the project. He (Mr. Tyrkko) also talked about the experience gained in implementing such project and how countries can take advantage of the relationship developed with the regional partners to help them integrate action plans into their (countries') national programmes. He, further, acknowledged the challenges that faced the partners during the implementation of such multi-tasked project in individual countries. He would also like to see regional partners, like Africa Institute and the Economic Commissions, to take a more active role in helping countries to implement future projects. Mr. Tyrkko highlighted GEF's priority for developing projects for its next cycle (GEF-7) as the focus shifted towards promoting issues of entrepreneurship and investment and using industries like the textile industry to implement circular economy concept which will certainly benefit the Africa region.

Ms. Enid Turyakayo, POPs Focal Point for Uganda talked on behalf of Dr. Okurut, Deputy Director of the National Environmental Management Authority (NEMA), Uganda who could not travel to Vienna to attend the meeting. She (Enid) thanked UNIDO and Linda for being instrumental in helping Uganda in executing the activities of the project.

A group photo was taken prior to the start of the meeting's presentations.

3.2.1 UNIDO presentation on summary outputs and outcomes of the projects

Ms. Linda Galvan, the project manager of the project, presented a summary of outputs and outcomes of the two projects (COMESA and SADC) since their inception in 2011. After providing a snapshot of the budget and expenditure for both projects, Ms. Galvan detailed what had been achieved for each outcome and its associated outputs for the two projects during the past seven and half years of their implementation.

Outcome 1: Introduction of BAT/BEP in Industrial production processes indicated in Annex C of Article 5 of the Convention

After it was established in 2012 during the AMCEN meeting in Arusha, Tanzania; the Regional Forum on BAT/BEP, and through its action plan, the following projects/proposals were developed/initiated:

- A project on open burning of wastes for SADC (1st priority) was approved by GEF in 2016;
- A proposal for SADC e-waste was developed and technically cleared in 2016 (will be resubmitted for the GEF-7);
- A proposal for COMESA open burning will be developed during GEF-7.



BAT/BET Forum for Africa Region

A number of regional and national workshops were conducted under Outcome 1, which included:

- Regional training workshop for developing a regional action plan on BAT/BEP (January 2012, Addis Ababa);
- Regional Workshop in BAT/BEP for textile dyeing and finishing, May 2012, Kampala, Uganda;
- Regional workshop in BAT/BEP for leather dyeing and finishing, May 2013, Gaborone, Botswana;
- National awareness raising campaigns for informal sector (2013 – 2014);
- Global BAT/BEP Forum in Vienna, Austria, November 2014.

For the above-mentioned activities, 17 females, and 64 males were trained for the regional workshops, whereas; 300 females and 450 males were trained/targeted for national activities.



Regional Training workshop on BAT/BPE on Textile dyeing and finishing- Kampala, May, 2012

The project intervention for the regional pilot demonstration of BAT/BEP in textile dyeing and finishing at Kombolcha Textile Share Company in Ethiopia included:

- Feasibility Study conducted by *Textile Industry Development Institute (TIDI)*, Addis Ababa in 2013;
- Validated by *Environmental Concepts Exchange Association (ECEXA)*, Austria in 2014;
- Procurement of equipment: *roller padder* and *data color machine for textile processing* were procured in 2016;
- Sampling and analysis conducted by *Tshwane University of Technology (TUT)*, Pretoria, South Africa in May 2018;
- Procurement of alternative chemicals was concluded in August 2018.

Results of pilot project on textile include:

- Cost of production is reduced by approx. 10 Birr per sample of order;
- The data color system is 12.5% cheaper than the manual one.

Sampling and analysis done at KTSC for the textile pilot project and here are some of the results of the study:

- Hexachlorobenzene and the isomers of Permethrin were mainly detected in the raw cotton samples;

- Major degradation product of DDT, p'p'-DDE as well as Hexachlorobenzene were detected in the sludge sample;
- PCB 52 was detected in the analysed wastewater effluent sample;
- Presence of dioxin and furan group of compounds in the dye and pigment samples used in KTSC is confirmed;
- The concentration range of the congeners are significantly higher than the permissible level of 5 pg/g, permitted for agricultural soils.



Kombocha Textile Sharing Company- Ethiopia- New equipment and new dyes procured

As for the project intervention for the regional pilot demonstration of BAT/BEP in leather dyeing and finishing at Al Amatong Tanning Industry Company in Khartoum, the intervention include:

- Feasibility study prepared by National Leather Technology Centre (NLTC) of the Industrial Research & Consultancy Centre (IRCC) in 2014;
- The study was validated by RESPONSIFY, Sweden in 2016 where replacement of equipment to reduce releases of uPOPs were recommended;
- In 2017, equipment such as stainless polypropylene drums, stainless testing drums, roller coating machine, automatic mixing color machine, hand color spectrometer and digital balances were procured;
- Installations of the above will be completed in November 2018.



Al Amatong Tanning Industry Company in Sudan and new equipment procured

Outcome 2: Reduction of exposure to POPs

Regional training workshop on Municipal Solid Waste Management was held in September 2013 in Durban, South Africa and the regional training workshop on production and application of bio-botanical pesticides was held in Manzini, Swaziland in September 2015. A total of 11 females and 70 males were trained in both regional workshops. As for the national training workshops conducted during 2014 – 2017 on Municipal Solid Waste Management and Production and application of bio-botanical pesticides at the participating countries' level; a total of 290 females, and 450 males were trained/targeted in both sub-regions.

The regional strategy on biopesticides developed by RENPAP/COMESA Secretariat and validated in Lusaka, Zambia in 2016 and a study tour to India had been conducted in July 2016, whereby fourteen participants from the two sub-regions took part in the study tour.

In collaboration with COMESA Secretariat, the regional pilot demonstration project on production and application of bio-botanical pesticides (NEEM) has been implemented in Rwanda and Uganda since 2017. The equipment will be installed and become operational by mid-December 2018.

A Consultant from Tanzania revised the guidance manual on cleaner healthcare waste management prepared by UNDP and also developed the Cleaner Healthcare Waste Management Strategy for COMESA and SADC in 2017.

Tshwane University of Technology (TUT), Pretoria, South Africa has been established as regional training center for sampling and analysis of POPs. As the result, three training of trainers' symposiums were conducted by TUT for participants from COMESA and SADC sub-regions. A total of thirteen females; and twenty males participated in these training workshops.

National activities undertaken in 2014-2017 to formalize and scale up to macro and small enterprises have taken place in the participating countries of both sub-regions. These activities include:

- Informal management practices of PCBs;
- Solid and liquid waste;
- Plastic waste management including reuse and recycling of plastic bags as raw material for various articles;
- Used paper and e-waste.

A quadripartite arrangement was agreed upon between UNIDO, Africa Institute, Group II (private company) and the Government of the Mountain Kingdom of Lesotho to develop an E-waste management system that would see all the collected waste repaired or sent for material recovery in the neighbouring country, South Africa.



Regional and national workshops on municipal solid waste management, and production, and application of pesticides

Outcome 3: Identification and assessment of Contaminated Land / sites

Regional training workshop using UNIDO toolkit on contaminated sites management conducted in Addis Ababa in August 2012. Eighteen experts were trained (four females and fourteen males).

GIZ, Germany conducted two training workshops on Legacy Contaminated Sites Management in March, 2012 and December 2012 in Maputo, Mozambique where twenty four experts were trained (seven females and seventeen males).

National training using UNIDO toolkit on contaminated sites management conducted in Arusha, Tanzania in 2014. A total of two females and eight males were trained. The aforementioned individuals also participated in the surface and profile sampling conducted at PPO-Tengeru site by a UNIDO team.

Countries national Awareness raising campaigns on the health risk associated with exposure to POPs contaminated sites for COMESA and SADC Sub-regions conducted in 2013 through 2014 for both sub-regions. A total of 182 females, and 340 males were sensitized.



Regional and national training workshops on contaminated sites management using UNIDO Toolkit

Regional pilot demonstration project to verify effectiveness of the low cost remediation technology of POPs contaminated sites was undertaken in Tanzania at:

- Plant Protection Office (PPO) in Tengeru, Arusha Region, Tanzania;

- National Housing Corporation (NHC) Site, Morogoro, Tanzania.

Preliminary Site Investigation, Stage 2 (PSI-S2)- Surface sampling and Detailed Site Investigation (DSI)- profile sampling were conducted at PPO-Tengeru in 2014 and at NHC-Morogoro in 2015.



PPO-Tengeru site- Surface and profile sampling conducted in August, 2014

Additionally, a greenhouse experiment was conducted at NHC-Morogoro site in 2016, whereby a number of plants were grown in soil with high and low levels of DDT.



NHC-Morogoro site- Surface sampling and Greenhouse experiment conducted in 2015

Phytoremediation/bioremediation was also initiated in both pilots' sites. A set of plants were grown in both sites to verify the effectiveness of these plants to uptake both Lindane (PPO-Tengeru) and DDT (NHC-Morogoro). Samples from these plants were sent to TUT in Pretoria, South Africa, and the results of the analysis of these samples is still pending. It is expected to receive the report from TUT by the end of November, 2018.

Challenges in implementing the Africa LDCs project include:

- Project activities are focused on several thematic issues - too complicated to implement with too many stakeholders involved;
- Institutional and technical capacity mostly lacking in some participating countries (e.g. reliable laboratories to conduct analysis of POPs chemicals);
- Changes in personnel in countries affected continuity of project activities;
- Co-financing commitment are mostly in-kind;
- Limited to non-existent participation of SADC Secretariat;
- Language barrier in interacting with some countries.

3.2.2 Pilot project on BAT/BEP on Textile dyeing and finishing, Ethiopia

Mr. Ameha Dagnaw presented, in details, the outcomes of the pilot demonstration project on BAT/BEP on textile dyeing and finishing which is hosted by Kombolcha Textile Sharing Company (KTSC) in Kombolcha, Ethiopia. The highlights of his presentation included:

Activities undertaken at the pilot site at KTSC:

❖ **Substitution of chemicals**

- ✓ Identification of all chemicals used in the company.

It was found that a total of 61 different kinds of chemicals (dye stuffs and pigments) were used in KTSC;

- ✓ Identification of those chemicals which contain chloranil as dioxin precursor and analysis of the specific properties.
- 10 among 61 chemicals were proved to be dioxin precursors due to their chemical composition (chloranil content);
- However, eight of these chemicals are not currently available in store and KTSC is no more in a position to purchase;
- Two of these chemicals (Aquarine Violet 4B & Pigmacolor blue kbt) were considered.
 - ✓ Identification of chloranil free chemicals that can potentially substitute the dioxin precursors;
 - ✓ Based on their chemical composition and color, a mixture of Euromin red & Aquarine blue was proposed as a substitute for aquarine violet.

Similarly, Dutex Blue was proposed as a best substitute for pigma color Blue kbt.

- ✓ Conduct experimental works to substitute the dioxin precursors

In both cases laboratory tests were conducted with the proposed substitute chemicals and nearly similar shades of fabrics were obtained.

❖ **Waste management**

- Liquid waste
 - ✓ Well treated in a modern and efficient effluent treatment plant
- Solid waste (sludge)
 - ✓ No well established and standardized solid waste management system
- Current international experience is to use the sludge for production of non-load bearing building blocks

❖ **Laboratory equipment (Data color) installed as per the recommendation of the feasibility study.**

Results obtained:

- Fabrics of nearly similar shades were obtained using the substitute chemicals and even better results can be obtained through further R&D works;
- Bricks of sufficient strength for non-load bearing purpose were produced with the chemical sludge;
- Institutional and human resource capacity building in applying BAT/BEP to reduce POPs release;
- Chemical consumption is reduced by about 60 gm per sample of order;
- Cost of production is reduced by approx. 10 Birr per sample of order;
- The data color system is 12.5% cheaper than the manual one.

Outcomes of the pilot project:

- Increased awareness of POPs and related hazardous chemicals, better understanding and implementation of chemical management techniques and practices;
- A dynamic shift in purchase of chemicals from any available source to certified (GOTS, REACH) and internationally accepted chemical manufacturers (brands);
- Enhanced efficiency and good laboratory practice in reducing release of POPs through controlled application of dye stuffs and pigments;
- Implementation of BAT/BEP practices in order to control/reduce POPs release and ensure sustainable industrialization.

Challenges faced pilot project's implementation

- Lack of information about details of some chemicals (MSDS & TDS).
- Poor laboratory practice and non accurate equipments;
- Incompatibility of the different chemicals for preparing pastes and dye stuffs;
- Lack of organized data about the quantity of chemicals used per day/month/year/ unit of production;
- Unavailability of chemicals locally for trial/ research purpose during preparing chemicals for substitution;
- Lack of competent laboratories & skill locally to analyze POPs content of samples from industries.

3.2.3 Pilot project on BAT/BEP on Leather dyeing and finishing, Sudan

Mr. Nouri Abdalla, Regional Coordinator for SADC sub-region presented the pilot demonstration project on BAT/BEP on leather dyeing and finishing hosted by Al-Amatong Tanning Industry Company in Sudan as the POPs Focal Point for Sudan did not travel to Vienna to attend the meeting:

- The Pilot project started in 2016;
- Al Amatong Tanning Industry Company Ltd, in Khartoum, Sudan selected to host the pilot project;
- The Feasibility Study was conducted by Sudan Leather Technology Center (SLTC) in Khartoum;
- Feasibility Study validated by Responsify of Sweden;
- Based on validation from RESPONSIFY, the new equipment for Al Amatong were purchased in 2017. These equipment include: stainless polypropylene drums, stainless testing drums, roller coating machine, automatic mixing color machine, hand color spectrometer and digital balances were procured;
- Installations of the above will be completed in November 2018.

3.2.4 POPs contaminated sites pilot project, Tanzania

Dr. Hamisi Tindwa from Sokoine University of Agriculture in Morogoro, Tanzania presented the outcomes of the pilot demonstration project on POPs contaminated sites at PPO-Tengeru and NHC-Morogoro sites. The highlights of his presentation included; which focused on the final phase (bioremediation/Phytoremediation):

Bioremediation activities for both sites

In the two identified and selected pilot project sites of PPO Tengeru and NHC Morogoro, the following was sought out: (i) Demonstrate usability of *Phytoremediation* in clean-up of gamma-hexachlorocyclohexane, (γ -HCH), (a.k.a Lindane) at PPO Tengeru and (ii) Demonstrate usability of both *phyto- and micro-remediation* to remove DDT from soils at NHC Morogoro site.

❖ ***Methodological Approach at PPO-Tengeru site for growing plants at the site (Phytoremediation)***

- Select from a list of pre-tested domesticated plants/crops;
- Establish them according to standard agronomic practices;
- Monitor vegetative performance;
- Sample for laboratory analysis of POPs bioaccumulation;
- Rank the test plants based on amount per unit mass of pesticide removed from medium.

The site was tilled, removed the polyethylene sheet and seedbeds prepared for crop establishment. Then the following plants were grown in these seedbeds: Simsim, Chilli, Lettuce, Collard, Wheat and Caster Plant.

❖ ***Preliminary observations for PPO Tengeru site***

- Differential seed germination and seedling growth was observed;

- Collard , lettuce and chilli pepper were comparatively weaker on germination and vegetative growth;
- One month later, Simsim did appear to struggle in addition to chilli, lettuce and collard;

❖ ***Comparative observation on vegetative performance at PPO-Tengeru***

- Chilli pepper plants visibly disfigured, became bushy and unusually branched
- Collard suffered severe wilting and premature leaf dropping
- Both collard and chilli pepper had retarded growth

The plants were allowed to continue with the vegetative growth for up to 45 days, and they were then harvested, separated below-ground and above-ground biomass and submitted to laboratory for POPs quantification.



Phytoremediation experiment at PPO-Tengeru site conducted May-July, 2017

❖ ***Methodological approach for NHC-Morogoro for growing plants at the site (Phytoremediation) is similar to PPO-Tengeru***

- Preliminary studies in potted soils from NHC-Morogoro site showed that
 - A select list of plants can not only withstand high levels of DDT, but also bio-accumulate the pesticide in the biomass;
 - These included calabash, sweet potatoes and pumpkins.

❖ **Field scale bioremediation activity at NHC-Morogoro**

- Following indicative capabilities of some plants to bio-accumulate DDT in potted soil experiments:-
 - A list of plants guided by the preliminary experiment and literature were introduced in field for actual bioaccumulation tests;
 - They included pumpkin, calabash, sweet potato, Irish potato, finger millet, Chinese cabbage and carrots.

❖ **Vegetative performance observation at NHC-Morogoro**

- Calabash and pumpkins showed the highest biomass production with no visible symptoms of stress;
 - Sweet potatoes, Chinese cabbage also performed well
- But:
- Carrots failed to germinate in all three replicates;
 - Irish potatoes did germinate but growth was severely retarded;
 - Finger millet's performance was intermediate.





16S rRNA PCR product of five best DDT- tolerant microbial isolates, whose DNA products were submitted for sequencing and eventual molecular identification to Inqaba Biotec

Sample ID	Identical to	(%) identity
4	<i>Streptomyces sp.</i> RM535	99
9	<i>Streptomyces sp.</i> RM365	97
17	<i>Streptomyces muensis</i> strain	85
20	<i>Streptomyces sp.</i> strain EAJJ-R19	99
23	<i>Streptomyces iakyrus</i> strain JF35	99

Phytoremediation and Microremediation experiments at NHC-Morogoro site conducted February, 2018

❖ **Micro-remediation trials at NHC-Morogoro**

This was about using capable microorganisms to biodegrade on DDT and its metabolites to environmentally safe, non-toxic levels

Procedures included:

- Drawing samples of soils from high DDT contaminated spots;
- Follow the serial dilution technique to isolate resident microorganisms;
- Presumably these isolates can either tolerate high DDT levels or be able to detoxify it for their own survival;
- Expose the isolates repeatedly in DDT environment (we used soil extract solution);
- Characterize the promising isolates by molecular means to species level;
- Candidates can then be deployed back to site for bioremediation.

❖ **Major challenge at both sites:**

- The laboratory analytical step took far too long. Both PPO Tengeru and NHC Morogoro plant and soil samples stayed for 9 month due to a dysfunctional analytical equipment at TPRI;
- 2. They have also stayed for 5 month at TUT where the analytical process is on-going.

3.2.5 Pilot facility on Neem based Biopesticides; Production and Application

Dr. Ramdev, a UNIDO consultant from RENPAP-India presented the findings of the pilot project on production and application of Neem-based biopesticides. Following conducting of the regional training workshop on Production and Application of Bio-botanical Pesticides in Manzini, eSwatini which was held in August 30- September 3, 2015, an assessment mission was undertaken by Dr. Ramdev, accompanied by a representative from COMESA Secretariat, to eSwatini, Rwanda, Mozambique, Zambia and Uganda. Thereafter, UNIDO decided to conduct two pilot projects on production and application of Neem-based biopesticides in Rwanda and Uganda.

Neem-based pesticides promise an effective and safe alternative to chemical pesticides, especially for the resource-poor farmers. Neem offers the following advantages:

- Easy availability of raw material;
- Low cost;
- Safety to farmers and consumers;
- Harmlessness to beneficial species of insects;
- Less prone to pest resistance;
- Environment-friendly attributes.

Additionally, a Skill Development Training Programme on Production and Application of Neem was held in India, in July 25-29, 2016. Fourteen participants

from Benin, Burundi, Ethiopia, Lesotho, Mozambique, Rwanda, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda and Zambia (COMESA) undergone extensive training.

In the end, UNIDO engaged COMESA through a contract to execute pilot project in Uganda and Rwanda. COMESA in turn sub-contracted institutions and experts in Uganda and Rwanda to execute the project covering the following activities:

- Establishment of Neemshed and Pilot facility;
- Bio-efficacy of neem based biopesticides against pests;
- Awareness raising programmes/workshops were held in four countries, and they are as follows: eSwatini (conducted in March, 2018), Rwanda (conducted in December, 2017), Tanzania (conducted in August, 2018) and Uganda (conducted in December 2017) were conducted.



Training workshops on production and application of Neem-based biopesticides held in Uganda, Rwanda, eSwatini and Tanzania

Outcome of the pilot project on Neem-based biopesticides in Rwanda and Uganda

- Pilot machinery exported from India to both countries and arrived at the pilot sites;
- Pilot facility (civil construction/building) provided by recipient countries;
- Technical capacity of Agricultural Universities have been enhanced through technology transfer and participation in phyto-toxicity and bio-efficacy studies;
- Bio-efficacy results proved the effectiveness of neem based biopesticides against important pests;

- Capacity of the extension officers, agriculture officers, researchers, farmers & NGO strengthened ;
- Farmers have been empowered through technology-dissemination, training and skill development to produce their own low-cost organic neem-derived bio-pesticides.



Equipment for production of Neem-based biopesticides- dispatched to pilot facilities in Rwanda and Uganda

3.2.6 COMESA Secretariat's presentation on pilot project on Neem-based biopesticides

In addition to Dr. Ramdev's presentation on Production and Application of Neem-based biopesticides, Mr. Lwembe Mwale from COMESA Secretariat also presented the Secretariat's presentation on the two pilots on production and application of Neem-based biopesticides. The highlights of his presentation included:

- Awareness was raised among policy makers and crop scientists on Persistent Organic Pollutants (POPs) and information was provided on effective options for Neem-based technologies into existing farming techniques in Rwanda and Uganda;
- Capacity of smallholder farmers, extension workers/agents and other relevant stakeholders was strengthened in formulation and application of Neem-based biopesticides in Rwanda and Uganda;
- Neem Centres were identified and assessment on availability of neem seeds for production of neem based pesticides was conducted in readiness for installation/commissioning of low cost technology by UNIDO;
- Bio-efficacy and phyto-toxicity studies on the application of NKAE on different crops were conducted and will be finalized by 30th November 2018;
- Neem has now been integrated into the research agenda of the University of Rwanda i.e. 3 students are doing Masters degree programs with focussed research on neem

Bio-efficacy Tests- Uganda

- Bio efficacy studies were conducted 3 times at Owilai Village, Agora parish, Kamuda subcounty Soroti District using cowpeas.

Results

- It was evident that all neem extracts and the synthetic cypermethrin reduced aphids and whiteflies populations, and this increased with the concentration of the neem extract;
- The average aphid population reduction where neem oil was used was 76% compared to 85% with the synthetic cypermethrin, while for white flies the average population reduction was 93% compared to 85% with the synthetic cypermethrin. The reductions were higher where seed kernel extract (93.7%) or leaf aqueous extract (93.2%) was used. In all cases, 5ml/L neem extracts and 3ml/L cypermethrin treatments were equally effective in reducing the population of aphids and whiteflies.

Challenges during implementation of pilot projects in Rwanda and Uganda

- Project implementation stalled mainly due to logistical challenges:
 - The delay in clearing the equipment from customs the completion of bio efficacy studies, field trails as well as disbursement of funds to both countries.

Lessons learned

- At design stage, the multi-stakeholder approach and anchoring of the pilot projects in government agriculture institutions was key to ensure sustainability of the pilot projects post the UNIDO-COMESA support (e.g. in

Rwanda; Karama Agriculture Research Centre, the University of Rwanda, the Rwanda Agricultural Board, Rwanda Environment Management Authority and the Rwanda Natural Resources Management (RNRM), Pelum Rwanda etc);

- Involvement of academia was key to obtain quality data from the bio efficacy tests;
- Training and sensitization of farmers and policy makers was a good initiative to ensure ownership and government buy-in;
- COMESA has integrated biopesticides into the Uganda pilots on CSA.

Recommendations

- To ensure sustainability of the projects, there is need to train more farmers on the production and application of neem based biopesticides;
- There is need for deliberate government policy coupled with incentives to boost the production and use of biopesticides;
- There is need for private sector (agro dealers) involvement to boost production of biopesticides as an alternative to chemical pesticides. Neem needs to be commercialised in the region, just like in India;
- The project needs to be replicated in other countries to encourage the adoption of biopesticides in the COMESA Region. COMESA also needs to strengthen policy formulation and implementation on food safety e.g there are great opportunities for biopesticides in the Eswatini and Seychelles pilots where they are producing speciality baby vegetables for hotels and supermarket chains and biopesticides are more desirable
- COMESA already has a programme on Sanitary and Phyto sanitary measures. Therefore, the two projects can be linked especially that both have common interests such as promoting:
- **Agricultural productivity, Public health and Environmental protection.**

3.2.7 Presentation on Sampling and Analysis for the pilot projects

Nouri Abdalla, Regional Coordinator for SADC sub-region presented the presentation on sampling and analysis for the pilot projects.

Contaminated sites pilot project at PPO-Tengeru site

For the surface sampling at PPO-Tengeru site

- Lindane detected in one sample of the 27 samples analyzed- exceeding the Tanzania Environment Management Regulations (TEMR) PLs;
- Also detected are: DDT, fenthion and diazinon. All are higher than both TEMR PLs and CEPA PLs;

- Very high concentrations of fenthion, exceeding both the TEMR and CEPA were detected near the new pesticide storage.

For profile sampling at PPO-Tengeru site

- None of the profile soils was contaminated by Lindane, whereas most top 2m depth samples were contaminated by DDT and its metabolites and they both exceed the CEPA PLs but below TEMR PLs;
- Other agrochemicals (i.e. fenthion and diazinon) were not found in any profile soils;
- The exceedance levels of DDT and its metabolites turned out to be the major concern at this site;
- Not only the surface soil samples were contaminated with DDT, but also, the sub-surface profile soil samples were also contaminated with DDT to a depth of 2m at the PPO-Tangaru site.

Recommendations for remediation at PPO-Tengeru site

- Since the PPO-Tengura site staff has suffered from the chemical odor emitted from the former storage areas, it is recommended that phytoremediation (especially because of the presence of DDT at 2m depth) be combined with phyto-containment should be implemented to manage the site.

For the surface sampling at NHC-Morogoro site

- The main compounds detected in surface soil samples at NHC Morogoro site were DDT and its metabolites (v.high), Aldrin, Dieldrin, Fenthion, Simazine, and Endosulfan to a lesser concentration.

For samples collected from plants grown at a greenhouse at NHC-Morogoro site

- 72 samples were collected from 6 different plants (pumpkin, alfalfa, Irish potatoes, sweet potatoes, carrot and calabash);
- The plant species were planted in potted soils with high and low concentrations of DDT collected from the site;
- Generally, calabash, carrot, alfalfa and pumpkin showed high absorption and/or accumulation ability of DDT in both high and low levels of DDT in the soils used.

Recommendations for remediation at NHC-Morogoro site

- Plants that showed high accumulation of the pesticides can be used in phytoremediation;
- The plants that are neither human food plants nor livestock feed (e.g. calabash) should be given a priority;

- Intercropping of the most efficient plants should be explored to maximize better remediation results.

Sampling and analysis at Kombolcha Textile Sharing Company- Ethiopia

The analysis of the samples collected from KTSC reveals the following:

- Hexachlorobenzene and the isomers of Permethrin were mainly detected in the raw cotton samples;
- Major degradation product of DDT, p'p'-DDE as well as Hexachlorobenzene were detected in the sludge sample;
- PCB 52 was detected in the analysed wastewater effluent sample;
- Presence of dioxin and furan group of compounds in the dye and pigment samples used in KTSC is confirmed;
- The concentration range of the congeners are significantly higher than the permissible level of 5 pg/g, permitted for agricultural soils.

Recommendations for the pilot project at KTSC

- There is, certainly, a need to change to alternative and better dyes and pigments at the dyeing and finishing stages.

Sampling and analysis at Al Amatong Tanning Industry Company- Sudan

- Samples collected from Al Amatong facility in May 2018;
- Analysis of samples collected from Al Amatong Tannery Industrial Company Ltd in Khartoum, Sudan are still pending.

Training workshops on sampling and analysis at TUT, Pretoria

- Three symposiums organized by Tshwane University of Technology (TUT) to train experts from the participating countries in the two sub-regions on sampling, extraction and analysis of POPs chemicals;
- 1st symposium held in Pretoria, SA in April, 2015, 20 experts trained; 7 females and 13 males.
- 2nd Symposium held in Pretoria in 03-07 October, 2016; Six experts trained- 3 females and 3 males;
- 3rd Symposium held in Pretoria in 03-06 October, 2017; Seven experts trained- 3 females and 4 males;
- TUT conducted two training workshops at KTSC in Ethiopia, and at Al Amatong Tanning Company in Khartoum-26 experts trained- 16 females & 10 males.

3.2.8 Africa Institute Presentations

Africa Institute presented three reports, and they are as follows: (i) the Monitoring & Evaluation final report, (ii) Lesotho E-Waste project, and; (iii) A proposed E-Waste project document for SADC participating countries.

The final report on M&E

To what extent did the project make a significant contribution to reducing the effects of POPs on human health and the environment?

The GEF framework for M&E

- According to section 2.5 of the GEF M & E Policy: “The GEF Agencies are responsible for developing M&E plans and performance and results indicators for projects and programs, and for adequately monitoring project and program activities, production of outputs, and progress toward outcomes.
- To ensure that results can be analyzed across Agencies in a consistent manner, project logical frameworks align with GEF focal area results frameworks, as applicable”

Relevance

- The activities of this project remain relevant:
 - They contribute immensely to the implementation of the Stockholm convention, capacitating the countries to further take up their commitments to MEAs.
 - Until an adequate capacity is built and technology transfer optimized in developing countries, especially the LDCs, the project activities will remain relevant in the region.
- The challenge remains that of the absorptive capacity; almost all the participating countries are not able to absorb and utilize the capacity as it is built, nor are they able to change their programs flexibly.
 - This leads to very low impact of projects in general, as personnel trained become redundant, impatient and thus demotivated.

Effectiveness

- The objective of the project is being achieved through participation and maintenance of dialogue issues of the convention and will likely lead to absorption of required initiatives in participating countries.
 - Project provided the much needed assistance to LDCs, whom otherwise would not be able to start up these activities.
 - Real effectiveness can only be judged on the impacts.

Efficiency

- Extent to which the results have been delivered with the least costly resources possible maybe in question.
 - Most LDCs have limited financial resources, their co-financing is mainly in kind.
 - Achievement of the objectives would be seen through a cost effective manner, seed program need to be taken advantage of.
- Efficiency in the management practices is however questionable:
 - Many activities could run concurrent – needs proper planning.
 - Activities needing deeper preparations could be started earlier.

Results

- There are tangible and intangible project results the short to medium term that reflect the extent to which the future results shall be turned into long term impacts.

Sustainability

- The likelihood of project intervention to continue to deliver benefits for an extended period of time after completion is highly dependent on:
 - Absorptive capacity of individual countries
 - Priority position of waste issues in the LDCs
 - Awareness levels of the stakeholders

Lessons learned

- Involvement of stakeholders in project design contributes to higher ownership and more focused solutions as real needs are identified.
- Adequate time for activity planning and transfer of funds, as well as procurement and delivery of equipment, including time for transportation and for customs clearance, in project planning helps avoid delays.
- A consistent, high commitment of all stakeholders contributes to effective implementation.
- Support and follow-up is necessary to document co-finance figures of the participating countries
- Support and follow up is also necessary for national activities in order to document real project impacts.

Recommendations

- Partners in the environmental management **MUST** increase awareness raising activities to the decision makers with special emphasis on **HOW** environmental management contribute in the fight against poverty and increase level of economic activity.

- This will assist mainstreaming such project activities with government business.
- Funding that flows to the LDC MUST be tagged with requirements for increased public participation.
 - An increased local NGO participation would ensure increased awareness of communities to such initiatives.
- The project execution agency management should be in touch regularly, not only with national focal persons but also with their supervisors or directors in their ministries.
 - This is to foster continued commitment and support of the project implementation in the ever changing country circumstances.
- There should be more and regular interaction between the various sub regional executing agencies; the UNEP and UNIDO agencies;
 - This may be done be through sharing the quarterly progress reports submitted to UNEP and UNIDO.
- For countries that have challenges with funds transfer like Rwanda and Lesotho, an independent consultant should be identified
 - Who can serve as the project coordinator and technical person, through whom funds would be transferred as contracted for all national activities.
- All outputs of the project-reports, prepared documents and reports should be delivered to the M & E Team as soon as their first drafts are produced
 - This will allow real time tracking and identify hiccups in time for evaluation of performance.
 - Failure to do this leads to the risk of partial evaluation in time for any feedback and remediation which in turn will affect the performance of the project.

Lesotho E-Waste Project- Africa Institute

Lesotho E-Waste project objectives

- First attempt by Lesotho to develop an E-waste management system that would see all the collected waste repaired or sent for material recovery in the neighbouring country, South Africa.
- It was a quadripartite arrangement between UNIDO, Africa Institute, Group II (private company) and the government of the Kingdom of Lesotho.
- The project used a wheel-and-spoke drop-off model. This meant that 3 nodes created would gravitate towards a single hub, the facility at Group II.
- These nodes were setup at places that have high population activities

Project Activities

- Project coordination
- Awareness raising
 - Launch

- Video documentary
- Cabinet endorsement
- Training

Conclusion

- To achieve success, a change in mind set which can only be achieved through targeted and relentless public campaigns.
- The political will demonstrated in this project gives an encouraging signal that the government of Lesotho is committed to this idea.
- Since this project was organized in a PPP model, if the response from the government, private sector and the public increases the collection volumes, a sustainable industry in E-waste management in the country may be spawned.
- The pilot project was a positive stimulus that managed to galvanize all the key stakeholders in the country around the topic of waste management.
- The project provided an opportunity to divert some waste streams that would end up in open burning thereby minimizing the emissions of more POPs in the country.

Recommendations

- Public campaigns must be enhanced by reaching out to other waste management companies in the country
- The collection points or nodes need to be increased to cover more high-density areas in the city
- More receptacles at collection points are needed
- Drop-off nodes must be inspected regularly
- Working group established under the pilot must continue to meet with government providing meeting venue at no cost
- Extended producer responsibility model must be considered as a possible sustainable vehicle to support growth of the industry

E-Waste project for SADC participating countries- Africa Institute

A draft project document was submitted to UNIDO by Africa Institute. The draft project document will be submitted by UNIDO to GEF for the GEF-7 cycle.

3.3 General discussion during the presentations

Mr. Robert Yive from the terminal evaluation team inquired about if a new set of samples have been or would be done from pilot site for textile at Kombolcha following the purchase of the new equipment and the use of new chemicals. Mr. Ameha Dagnaw replied by saying that, a new set of samples is scheduled to take

place soon, that way, the results can be compared with those which were taken prior to installing the new equipment and change over to the new chemicals.

One of the questions brought by one of the participants (Mehari of Ethiopia) during the phytoremediation presentation were that, how to avoid not having the plants, grown at the POPs contaminated site, to be consumed by humans and/or animals, and how to dispose of these plants once they are fully grown. Dr. Hamisi, indicated that non-edible plants will be used, e.g. Calabash which is similar to pumpkin but not edible. Fencing the site using Lurkina plant or barbwire could also be an option. In case of disposing of the plants grown at POPs contaminated sites, an incinerator could be the best solution. The contaminant of concern at the two pilot projects in Tanzania (PPO-Tengeru and NHC-Morogoro), are DDT which is very immobile, whereas Lindane is quite mobile.

Mr. James Mulolo of Africa Institute inquired about if cleaning up of contaminated sites can be added to the curriculum at universities for obtaining a Master's degree or PhD. Dr. Hamisi did not think is doable at the present time.

Ms. Enid of Uganda inquired about having the profile sampling at PPO-Tengeru site went for 7 meters deep, how would that affect plant growth. Dr. Hamisi indicated that, the reason for conducting profile sampling is to prevent seepage of the contaminant into the ground water, more so than, considering plants growth and how deep can plants grow into the soil.

Dr. Ramdev inquired about how many cycles would be needed to uptake a site that is heavily contaminated with DDT using phytoremediation technology and whether it is worth using this technology in such cases. He (Dr. Ramdev) also suggested bioremediation might be a better alternative. Dr. Hamisi confirmed that it would take a long time to clean up such site using phytoremediation and bioremediation could certainly be a better option. However, bioremediation may only work with some pesticides, and in such cases, phytoremediation would be the only option.

Mr. Robert Yive from the terminal evaluation team wondered (during COMESA presentation) if the production of Neem-based biopesticides will phase out other POPs chemicals pesticides as the latter will still be in the market. Mr. Mwale of COMESA Secretariat responded by saying that, switching to Neem based biopesticides can help not only small-scale farmers, but also commercial farmers as well. That way, the new Neem-based products could be commercialized outside of the continent, e.g. Europe.

3.4 Conclusion and countries statements

At the end of the final PSC meeting, countries' representatives made short statements spelling out their experience implementing the Africa LDCs project.

Lesotho

Mr. Thabo Tsasayane, POPs Focal Point for Lesotho started by saying that, it has been a pleasure working with UNIDO in implementing the project. From the presentations presented, he wanted to see sustainability and continue to engage all stakeholders and keep a high team spirit to overcome the issues of POPs.

Ethiopia

Mr. Mehari Taye, POPs Focal Point for Ethiopia was happy to be a part of this project, a wide range of stakeholders now knows POPs issues, and Ethiopia is now in the process of banning plastics. Ethiopia is looking forward to being a part of future projects on POPs issues.

Mozambique

Mr. Sidonio Contage, POPs Focal Point for Mozambique thanked UNIDO for supporting the project in Mozambique and he looks forward to continue working with UNIDO on other projects.

Tanzania

Ms. Magdalena Mtenga, POPs Focal Point for Tanzania thanked everyone present at the meeting and she said that we are now a family as we have been working on this project for seven years. She wanted to see a project on banning the use plastics.

Uganda

Ms. Enid Turyahikayo, POPs Focal Point for Uganda, expressed her happiness to being a part of the project and she would continue her cooperation with UNIDO to phase out POPs issues.

Rwanda

Mr. Eleizer Rusakana, POPs Focal Point for Rwanda thanked UNIDO for helping Rwanda implementing the Africa LDCs project. He also mentioned that, Rwanda started working with UNIDO since 2002 and the latter helped Rwanda to prepare the NIP in 2013, and updating the NIP document as well. He hoped to see UNIDO to continue with its support and implement future SC activities. He also inquired about the open burning of waste project for COMESA countries. Linda replied by

saying that, the open burning of waste project for COMESA is in the pipeline and it should be submitted to GEF for next cycle (GEF-7).

eSwatini

Mr. Mduduzi Dlamini from eSwatini thanked UNIDO for implementing the project and he indicated that, the impact of implementing the project had been felt on the ground in eSwatini. He also hoped that, lessons learned from this project to be sustained, eSwatini is now gradually integrating the action plans of this project into the country's national strategies, and he wanted regional centers to be involved to guarantee sustainability.

Africa Institute

Mr. James Mulolo from Africa Institute said that he was sent to the meeting on behalf of the institute to show Africa Institute's appreciation to UNIDO and the institute is always available to lend support to implement other projects.

COMESA Secretariat

Mr. Lwembe Mwale from COMESA Secretariat praised UNIDO for involving the Secretariat in implementing project's activities. COMESA should continue to fill the gaps and help countries to implement future sustainable development projects and beyond.

In the end, Ms. Linda Galvan, the project manager, thanked the countries for their kind statements and indicated that UNIDO's mandate is to support the Least Developed Countries and Countries with their economies in transition, to fulfil their obligation and implement the SC on POPs. She also praised the participating countries for their commitment and in helping UNIDO to implement this project.

Annex-1: LIST OF PARTICIPANTS- Final PSC meeting for Africa LDCs project, Vienna, 12-13 November, 2018

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