Project Evaluation Series

Terminal evaluation of the project "Disposal of persistent organic pollutants and obsolete pesticides and implementation of sound pesticides management in Benin"

GCP/BEN/056/GFF
GEF ID: 4756

Annex 2. List of good practices and knowledge applied or generated by the project

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1. **Inventory of obsolete pesticides.** The pesticide inventory followed a methodical and participatory process based on informing stakeholders, collecting their data and opinions, and observing and verifying them on site. The process began with the training of 90 agents, including six heads of phytosanitary surveillance and agricultural input control services and 84 communal phytosanitary inspection and plant protection agents, carried out by CropLife International on awareness-raising materials. Holders of obsolete pesticide stockpiles and empty pesticide containers were identified and declared their stocks. The results from the stock declaration were shared with all parties involved in pesticide management during a national workshop on 10 December 2015. Subsequently, a follow-up inventory was planned and conducted in the field to verify the accuracy of the information identified during the stock declaration, especially at the level of new stores/depots, and to conduct a comprehensive assessment of the obsolete pesticide stockpiles that had been built up.

2. **Drafting of the Environmental Management Plan (EMP) for the safeguarding and disposal of 213 tons of POPs and obsolete pesticides.** Among other things, this EMP carried out an environmental risk assessment and proposed the strategy for safeguarding/disposing of POPs, obsolete pesticides and related wastes, as well as the organization and implementation of operations to safeguard these stocks. The EMP also identified the factors favouring the accumulation of POPs and obsolete pesticides.

3. **Exploration and prioritization of contaminated sites.** Sites highly contaminated with POPs and other obsolete stockpiles were identified during inventory activities conducted in 2012. Four sites had been prioritized for further investigation: Djassin and d'Oganla in Porto Novo, Malanville in Alibori, and a site in Bohicon. The selection of these four contaminated sites considered the persistent toxicity in soil and the contaminants' odour which deteriorate health and generate environmental risks for communities living near these sites.

4. **Risk reduction and decontamination.** The project developed/updated site-specific EMPs for Oganla and Bohicon, Malanville, and Djassin that were initiated/developed under project GCP/BEN/055/JPN. Decontamination operations at the Djassin site will only take place after the top layer of the depot has been removed by VEOLIA, the company responsible for safeguarding and disposing of POPs and obsolete pesticides. The decontamination of the Oganla, Malanville and Bohicon sites was successfully completed in accordance with the EMP and using the African approach of risk reduction with soil remediation: landfarming is carried out with plant species such as vetiver and jatropha that have detoxification powers. These operations also include the installation of warning signs.

5. **Design, testing and validation of a management plan for empty pesticide containers.** The project developed, tested and validated a management plan for empty pesticide containers (EPCs) that includes awareness raising, training, pre-treatment through triple rinsing and destruction from below, tracking to collection points and finally to village or communal stores, where they will be stored and later on collected by the non-governmental organization (NGO) in charge of final recycling. This progress was consolidated by the signing of Order No. 097/MAEP of 18 December 2018, setting the arrangements for the management of empty pesticide and biopesticide containers as well as the arrangements for the distribution of related costs.

6. **Identification and capacity building of a waste collection, treatment and recycling structure.** The project supported the capacity building of the NGO Bethesda and the upgrading of its waste treatment and agricultural production centre to meet standards, which allowed for the safe treatment and recycling of transported EPCs. Bethesda's new capacity was used to collect, process and safely recycle 5 465 EPCs from ten villages in the Borgou and Alibori regions. While this amount of recycled EPCs is far below the project document (ProDoc) target of 150 000 EPCs

processed and recycled in Year 4, the operation allowed the EPC management plan to be tested and lessons learned to be capitalized upon to ensure the scaling up of the plan and the entire management system, including its financing. Indeed, the project chose to focus its efforts and resources on developing a national plan for sustainable EPC management rather than conducting a large-scale collection without ensuring its sustainability.

7. **Awareness raising and capacity building on the risks related to using EPCs and prevention measures.** The project built capacity and raised awareness among trainers, farmers, women and youth and other stakeholders on the risks of empty pesticide containers and risk reduction options (triple rinsing and perforation, pilot recycling plan testing) in the cotton and maize production areas. Trained farmers adopted the proposed processing, collection and storage system and began outreach to other community members.

8. **Development of a support document to set up a national system for empty pesticide container management.** The project developed a support document to set up a national EPC management system in Benin, including a business model and a feasibility study. However, this very informative document has not yet been shared with and approved by the government to install and operate the proposed management and financing system. The proposed independent and non-profit system works in favour of all importers (and resellers) and should therefore be financed by importers using the polluter pays principle and the regulatory provisions in force in Benin. This system is responsible for information management; awareness raising; coordination of EPC collection, transport and processing; environmental and social safeguards for each stage of the system; residues, possible EPC recycling; reporting; finance; and stakeholder training. Options for sustainable financing of EPC management have been studied by the project and recommendations made to the Government.

9. **Harmonization of national laws and regulations related to pesticide registration and control, in line with international obligations and the CILSS-ECOWAS-UEMOA common regional system.** The project identified weaknesses in Benin's regulatory pesticide framework and proposed priority actions to strengthen the regulatory framework and promote its enforcement. The National Coordinator, her assistant and the project's legal experts were involved in the review of documents made available to the Drafting Committee. They participated in the reading, exchange and amendment sessions and meetings, in the validation workshop and in sessions for finalizing the decrees and orders.

10. **Development of a National Strategy / Action Plan and a budget for pesticide inspection and quality control.** The project conducted inspection activities and diagnostic studies for the post-registration management of pesticides and proposed actions and strategies to be implemented to fill the gaps and promote compliance in the pesticide value chain in Benin.

11. **Strengthened national capacity for post-registration inspection and control.** The project proposed an improved quality control system for pesticides in Benin, including the role of analytical and sampling procedures in the inspection process. This control system was validated during a workshop held on 19 July 2019 in Cotonou. The project has undertaken to test/implement the strategies for consolidating post-registration activities.

12. **Effectiveness testing of one biopesticide in the laboratory and two biopesticides in the farming environment.** In the laboratory, the project demonstrated the effectiveness of two isolates (out of four tested) of the fungus *Beauveria bassiana* on the cabbage aphid, *Lipaphis erysimi*. However, due to a lack of financial resources, the test was not conducted in semi-real and farmer settings but should be continued. In the farming environment, the effectiveness of the fungus *Metarhizium anisopliae* (isolate Met 31) and the Nuclear Polyhedrosis Virus (HaNPV) was

tested on the caterpillars of *Helicoverpa armigera* (a major pest of cotton and tomato) and other carpophagous and phyllophagous caterpillars. The cotton testing showed that the two biopesticides tested can reduce the densities of the different target pests and may be more effective in an integrated pest management program, combining other management methods for other (stinging-sucking) pests.

13. **Experiments and promotion of alternative systems in the vegetable crop farmer field schools (FFS).** The results obtained in facilitator field schools and farmer field schools (FFS) indicate a general advantage of good agricultural practices over peasant practices and show the need for further research to consolidate the results. Economic analysis of onion production in the facilitator field schools indicates a gross margin surplus of about XOF 300 000 per hectare in plots under good agricultural practices compared to plots under peasant practices.

14. **Experiments and promotion of alternative systems in cotton and maize FFS**. FFS tested the effectiveness of neem oils on cotton plants against *Helicoverpa armigera*, *Sylepta derogata*, *Earias spp*, *Dysdercus* and tested the control of fall armyworm on maize. Cotton production on the different FFS plots harvested in 2018 is highly variable across FFS. Yields on plots under good agricultural practices are generally higher than the national average of around 1 000 to 1 200 kg/ha. The results of the fall armyworm control experiments show that the yields of plots under good agricultural practices 1 and good agricultural practices 2 are about one-third higher than the yields of plots under peasant practices. Cotton experiments demonstrated that it is possible to obtain reasonable yields of maize and seed cotton if synthetic chemical pesticides are reduced to their recommended quantity and if they are replaced by natural or less toxic alternatives. Information gathered from second year FFS farmers indicates that many farmers have adopted some of the good agricultural practices tested in FFS and are already applying them in their own fields. These include the preparation and use of food sprays, the increased use of organic matter in cotton growing, and the adoption of neem oil. This is the case for 40 percent of farmers in the Wara and Pèdè FFS, who now use neem oil as their main pest control product for cotton. As concerns corn, some farmers have adopted the manual *Psodoptera frugiperda* management method, which involves collecting caterpillars, mashing them, and then applying the resulting substance on corn sheaths and stalks.

15. **Data management and communication.** One of the positive aspects of this project is the reporting and good documentation of activities. Almost all of the activities carried out, including the workshops and missions conducted under the project, resulted in reports. A count of documents generated by the project between 2016 and 2017 indicates no less than 43 consultant activity reports, 14 workshop and mission reports, 22 quarterly reports (see Annex 3). The project has developed a "Communication Strategy" document, published in November 2019, to guide and support communication for stakeholders and the different stakeholders and beneficiaries in the chain of management and use of pesticides and related wastes, including EPCs. This document presents two major areas of intervention: institutional communication on the one hand and advocacy, social mobilization and communication for behavioural change on the other. It outlines the gaps that need to be filled as well as the targets, channels and tools for communication per target and the communication plan. However, the strategy was developed too late, which prevented the project from implementing it. The project developed and used various communication materials (posters and manuals) to raise communities' awareness on the hazards associated with the use of EPCs, build the capacity of both facilitators on the FFS approach and farmers on integrated production and pest management (IPPM), chemical pesticide reduction and the triple rinse method of EPCs, while strengthening the instruction of plant health inspectors on good inspection practices. These theoretical trainings were combined with practical trainings.

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