

## Darwin Initiative Main/Post/D+ Project Half Year Report (due 31 October 2016)

<b>Project Ref No</b>	21-005
<b>Project Title</b>	Pesticide plants for organic cotton, livelihoods and biodiversity in Mali
<b>Country(ies)/Territory(ies)</b>	Mali
<b>Lead Organisation</b>	RBG, Kew
<b>Partner(s)</b>	Institut d'Economie Rurale (Mali); FENABE (Mali); Natural Resources Institute (UK)
<b>Project Leader</b>	Dr Paul Wilkin
<b>Report date and number (e.g., HYR3)</b>	13/1//2017 2 <sup>nd</sup> HYR 2: delayed due to change request to DEFRA
<b>Project website/ Twitter/ Blog/ Instagram etc</b>	
<b>Funder (DFID/Defra)</b>	DFID

**1. Outline progress over the last 6 months (April – Sept) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up to end September).**

**1. Pesticidal plants identified and authenticated (Output 1)**

N/A (pesticidal plants already identified)

**2. Active compounds/key ingredients of plant pesticides used by the producers of organic cotton identified (Output 2)**

Pest insects have been collected on farmers' cotton plots and identified.

In August 2016, in the regions of Bougoula and Yanfolila of Mali, tests were performed to study the effectiveness of two different biopesticide solutions (from *Cassia sieberiana* and *Euphorbia paganorum*) against the collected pests. Solutions containing biopesticides and controls (i.e. with no biopesticides) were employed on organic cotton fields of 5 farmers' square-plots in each region. The monitoring of pests such as *Helicoverpa armigera*, *Earias biplaga*, *Diparopsis watersii*, *Pectinophora gossypiella*, *Sylepte derogate*, *Spodoptera littoralis*, *Anomis flava* and *Cryptophlebia leucotreta* and *Dysdercus sp.* revealed the presence or absence (and if so the number of individuals) of pests in treated and untreated plots. A statistical analysis of the results in relation to the effectiveness of the treatments by bio-pesticides is under way.

At Kew plans were made for the next round of extractions in which we will replicate simple methods that could be used by farmers as alternatives to the current formulations. For this, dried pesticidal plant material and neem seed (for bioassays) have been sent from Mali and the protocol for the extraction of *Carapa procera* and *Balanites aegyptiaca* oils. A sample of oil of *Balanites aegyptiaca* was sent by IER. We will compare the chemical constituents extracted into methanol, water and boiled water. During the next reporting period we plan to prepare field formulations under laboratory conditions, compare the chemical constituents extracted and test the efficacy of all the samples in toxicity tests against cotton bollworm.

### **3 Installation of small units for production of organic pesticides and the training of producers to provide biological pesticides at optimal standards to all of their network (Output 3)**

In Mali, at Zikorodougou, support was provided for the monitoring and the packaging of fruits of *Carapa procera*. IER has also been involved in the installation of the Madina-Diawara cooperative and the provision of necessary equipment for oil extraction.

### **4. Community demonstration plots to strengthen the capacity of target communities to cultivate pesticide plants installed (Output 4)**

The coordinates and altitude of 15 organic cotton plots have been made available by IER (6 in Yanfolia, 5 in Kolondjèba and 4 in Bougouni) in order to facilitate the report on climate change mitigation.

In August 2016, two plots were replanted with seedlings of pesticidal species where plant mortality had occurred according to the following table:

Used species	Zone Bougouni	Zone Bla	Total/species
<i>Adansonia digitata</i>	870	150	1,020
<i>Khaya senegalensis</i>	900	360	1,260
<i>Parkia bigloboza</i>	0	255	255
<i>Tamarindus indica</i>	500	360	860
<i>Ziziphus mauritiana</i>	0	50	50
<i>Carapa procera</i>	700	360	1,060
<i>Faidherbia albida</i>	400	0	400
<b>Total</b>	<b>3,370</b>	<b>1,535</b>	<b>4,905</b>

To further the production of materials of pesticidal plants, research has been carried out including on the vegetative propagation of *Euphorbia paganorum*.

A study of the physiology of seed germination and multiplication of *Cordyla pinnata* and *Cassia nigricans* has also been performed. A full report will be available at the end of January 2017 and will be included in the Y3 annual report.

Research on the physiology of seed germination and multiplication of *Cordyla pinnata*, *Lannea microcarpa*, *Cassia nigricans* and *Ximenia americana* is currently under way with three students involved.

### **5. Information and awareness of the use of natural pesticides for the production of organic cotton with policy makers in Mali increased (Output 5)**

A workshop was organised in Bougouni on 28<sup>th</sup> July 2016 to disseminate the results of the 2015-2016 activities. The following were presented:

- The results of the ethnobotanical surveys carried out in 2014 and 2015 as well as the literature review.
- Data on seed collection, plant identification and overall data generated by the project. This included 26 species and the different parts of the plants that are the most commonly used (e.g. roots, bark, leaves, fruits, seed, sap, flower, tuber or rhizome) and the level of use (from frequently to occasionally).
- The localisation of the active components and ingredients for 7 plant-based pesticides (*Euphorbia paganorum*, *Capsicum annum*, *Allium sativum*, *Carapa procera*, *Balanites aegyptiaca*, *Khaya senegalensis* and *Chamaecrista nigricans*).

- The efficacy, action and concentration of the biopesticides against different cotton pests in laboratory conditions for *Euphorbia paganarum*, *Capsicum annum*, *Allium sativum*, *Carapa procera* and *Balanites aegyptiaca*
- Examples of demonstration plots set up by different farmers
- Examples of units of oil production
- Examples of nurseries for plant production
- The next steps of the project

**2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.**

At IER:

- difficulty in supplying certain cooperatives with raw materials (fruits of *Carapa procera*, *Balanites aegyptiaca*) due to (i) a decrease in production in stands, (ii) irregular fruiting of *C. procera* and (ii) the distance from the *B. aegyptiaca* settlements (in the Sahelian region, at least 500 km away)
- Three demonstration plantations had to be closed down due to the proximity of dwellings
- The vegetation study will be finalized by the end of October 2017.

At Kew we have had difficulty obtaining a reliable supply of insects, which has delayed bioassays. However, we are actively seeking sources from Asia and Australasia. In the absence of insects we will prepare a library of pesticidal plant extracts that will be ready to test once insects are located.

**2b. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?**

Discussed with LTS:	No, but the issues behind the change request submitted on November 21 have been.
Formal change request submitted:	Yes
Received confirmation of change acceptance	Yes, 16/12/16

**3a. Do you currently expect to have any significant (e.g., more than £5,000) underspend in your budget for this year?**

Yes  No  Estimated underspend: £

**3b. If yes, then you need to consider your project budget needs carefully.** Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary.

**4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?**

No

**If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.**

**Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but **should also** be raised with LTS International through a Change Request.**

Please send your **completed report by email** to Eilidh Young at [Darwin-Projects@ltsi.co.uk](mailto:Darwin-Projects@ltsi.co.uk) . The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message e.g., Subject: 22-035 Darwin Half Year Report**