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CRISE ACRIDIENNE



MADAGASCAR

**Response to the locust plague in
Madagascar
Campaign 2014/15**

**FINAL REPORT
September 2014 – August 2015**

TABLE OF CONTENTS

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| ACRONYMS AND ABBREVIATIONS..... | 3 |
| SUMMARY | 4 |
| 1 INTRODUCTION | 4 |
| 1.1 General information | Error! Bookmark not defined. |
| 1.2 Presentation of the Three-year Programme | 5 |
| 1.2.1 Objectives | 5 |
| 1.2.2 Beneficiaries..... | 5 |
| 1.2.3 Components..... | 6 |
| 1.2.4 Budget..... | 6 |
| 1.3 Donor response | 7 |
| 2 IMPLEMENTATION OF THE 2014/15 CAMPAIGN | 8 |
| 2.1 Presentation of the second campaign..... | 8 |
| 2.1.1 Objectives | 8 |
| 2.1.2 Strategy..... | 8 |
| 2.2 Results obtained and activities conducted..... | 8 |
| 2.2.1 Component 1: Strengthening of national capacities for the monitoring and analysis of the locust situation | 9 |
| 2.2.2 Component 2: Strengthening of national locust control capacities..... | 14 |
| 2.2.3 Component 3: Preservation of human health and protection of the environment | 20 |
| 2.2.4 Component 4: Implementation and coordination of the Programme..... | 24 |
| 2.2.5 Component 5: Assessment of the effectiveness of the locust control campaign and of the impact of the locust crisis on crops and pastures..... | 26 |
| 2.3 Working method | 27 |
| 2.3.1 Implementation arrangements..... | 27 |
| 2.3.2 Reports, communication and visibility | 27 |
| 2.4 Difficulties encountered | 28 |
| 3 IMPACT OF THE 2014/15 CAMPAIGN..... | 30 |
| 3.1 Overview of the locust and anti-locust situation | 30 |
| 3.2 Impact of the locust plague on crops and pastures | 31 |
| 4 CONCLUSIONS AND RECOMMENDATIONS..... | 31 |
| ANNEXES | 33 |
| Annex I Maps of locust situations in September 2014 and September 2015..... | 33 |
| Annex II Successive locations of the aerial bases over the course of the second campaign and related survey and control activities..... | 34 |
| Annex III Training delivered during the second campaign | 35 |
| Annex IV Field expertise planned and carried out during the second campaign | 37 |
| Annex V List of inputs supplied | 39 |
| Annex VI Table of expenditures during the second campaign, by donor and by component (in USD) | 41 |

ACRONYMS AND ABBREVIATIONS

| | |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| AGPMM | Locusts and Transboundary Plant Pests and Diseases Team - <i>Groupe « Acridiens et ravageurs et maladies transfrontières des plantes »</i> - (FAO) |
| CALAT | Support Unit for Anti-Locust Ground Control - <i>Cellule d'appui à la lutte antiacridienne terrestre</i> - (Madagascar) |
| CCE | Environmental specifications - <i>Cahier des charges environnementales</i> |
| CERF | Central Emergency Response Fund |
| CFSAM | Crop and Food Security Assessment Mission (FAO/WFP) |
| CIPA | Locust Control Coordination Unit - <i>Coordination des interventions parallèles antiacridiennes</i> - (Madagascar) |
| CNA | National Anti-Locust Centre - <i>Centre national antiacridien</i> - (Madagascar) |
| CSAI | Infrastructure and facilities management branch (FAO) |
| DRDA | Regional Directorate for Agricultural development - <i>Direction régionale du développement agricole</i> - (Madagascar) |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| GIS | Geographical Information System |
| GPS | Global Positioning System |
| MoA | Ministry of Agriculture (Madagascar) |
| PCN | National Coordination Post - <i>Poste de coordination national</i> - (Madagascar) |
| PGSE | Human Health and Environmental Management Plan - <i>Plan de gestion sanitaire et environnementale</i> |
| PNUA | National Locust Emergency Plan - <i>Plan national d'urgence acridienne</i> |
| PPD | Plant Protection Directorate (Madagascar) |
| PSMS | Pesticide Stock Management System |
| SAS | Early Warning and Survey Branch - <i>Section avertissement et surveillance</i> - (CNA) |
| SSB | Single-side band |
| TCE | Emergency and Rehabilitation Division (FAO) |
| ULV | Ultra-low volume |
| WFP | World Food Programme |

SUMMARY

The current Malagasy Migratory Locust plague began in April 2012. Crops (mainly rice) and pastures were at risk of considerable damage from this locust plague, which could have had a significant negative impact on domestic supply and grain prices. In view of the scale of the plague, it was estimated that the food security of 13 million people (60 percent of the population) could be affected without large-scale locust control operations. To tackle this catastrophic situation, the Food and Agriculture Organization of the United Nations (FAO) and the Ministry of Agriculture (MoA) of Madagascar developed jointly a Three-year Emergency Programme in response to the plague in December 2012.

The first anti-locust campaign of the Three-year Programme (September 2013 – August 2014) was a success: more than 30 million hectares were surveyed, making it possible to control locust populations over more than 1.2 million hectares while respecting human health and the environment. The specific objective of this campaign, which aimed to stem the dynamics of the plague whilst protecting crops and pastures, was thus achieved.

Despite some difficulties obtaining the necessary funding in time during the second anti-locust campaign (September 2014 – August 2015), the required funds were obtained making it possible for FAO to conduct the campaign successfully. The specific objective of this second campaign, which aimed to support the decline of the plague while limiting damage to crops and pastures, was also achieved. Following survey operations, locust populations were controlled over more than 640 000 hectares and no incidents affecting human health and the environment were reported.

These results were obtained thanks to the implementation of large-scale aerial survey and control operations in all infested areas from two aerial bases, the locations of which changed depending on the evolving locust situation. From 9 October 2014 to 12 July 2015, almost 1 540 flying hours were used by two helicopters to carry out survey and control operations in infested areas. In total, during the campaign, more than 256 000 litres of pesticides and 366 kg of biopesticide (spores of the fungus *Metarhizium acridum*) were used for control operations, most of which (72.3 percent) during barrier treatments with Insect Growth Regulators.

As was the case with the 2013/14 campaign, the 2014/15 campaign also made a significant contribution to strengthening national capacities through specific trainings planned and provided in various technical fields (Annex 4), supplemented by on-the-spot practical training continuously delivered by experts in the field (Annex 5).

So in order not to compromise the results obtained during the first and second campaigns, it is crucial to complete the 2015/16 campaign and the Programme in order to return to a locust recession situation in June 2016 (Three-year Programme objective), thus bringing to an end a cycle of locust crises and avoiding the deterioration of an already-pronounced food insecurity situation.

1 INTRODUCTION

1.1 Background

The current plague of the Malagasy Migratory Locust began in April 2012 in a context in which food insecurity and malnutrition rates were already high. Crops (mainly rice) and pastures were at

risk of considerable damage from this locust plague, which constituted a significant risk for domestic supply and cereal prices as well as for the food security of approximately 13 million people. To tackle this catastrophic situation, the Ministry of Agriculture (MoA) of Madagascar officially declared a locust state of alert and proclaimed a situation of public calamity throughout the country on 27 November 2012. On 5 December 2012, it requested assistance from the Food and Agriculture Organization of the United Nations (FAO) to draw up a response to the locust plague, ensure the mobilization of financial resources, implement the defined programme and guarantee its coordination.

1.2 Presentation of the Three-year Programme

1.2.1 Objectives

In response to the locust plague, an emergency response Programme for three successive anti-locust campaigns (2013-2016) was jointly prepared by FAO and the MoA in December 2012.

The overall objective of the Programme is to contribute to safeguarding the food security of the most vulnerable rural populations in Madagascar.

1.2.2 Beneficiaries

1. The Plant Protection Directorate (PPD) of the MoA, with the establishment of a Locust Watch Unit (LWU) to improve the capacity to monitor and analyse the locust and anti-locust situations in the country.
2. The National Anti-Locust Centre (*Centre national antiacridien* [CNA]) as well as the Support Unit for Anti-Locust Ground Control (*Cellule d'appui à la lutte antiacridienne terrestre* [CALAT]) since October 2014, and, since May 2015, the Coordination of parallel anti-locust interventions (*Coordination des interventions parallèles antiacridiennes* [CIPA]), to strengthen capacities to respond to the locust threat.
3. Approximately 13 million people in Madagascar whose livelihoods are threatened by the locust plague.

1.2.3 Components

The Three-year Programme consists of five components and numerous activities:

| Table 1 – Components and activities of the Three-year Programme | |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Component | Activity |
| 1 Strengthening of national capacities for the monitoring and analysis of the locust situation | 1.1. Strengthening of human capacities in data collection, analysis, and information management |
| | 1.2. Support to survey operations |
| 2 Strengthening of national locust control capacities | 2.1. Human capacity building for locust control |
| | 2.2. Support to locust control operations |
| 3 Preservation of human health and protection of the environment | 3.1. Strengthening of human capacity for human health preservation and protection of the environment |
| | 3.2. Support impact monitoring (of treatments) on human health and the environment |
| | 3.3. Construction of a pesticide storage facility |
| 4 Implementation and coordination of the Programme | 4.1. Implementation of the National Locust Emergency Plan |
| | 4.2. Coordination of the Programme |
| 5 Assessment of the effectiveness of the locust control campaign and of the impact of the locust crisis on crops and pastures | 5.1. Assessment of the effectiveness of the locust control campaign |
| | 5.2. Assessment of the impact of the locust crisis on crops and pastures |

1.2.4 Budget

The budget of the Three-year Programme (2013-2016) was initially estimated at USD 41.5 million and was to be revised annually to reflect the development of the locust situation, the requirements of each anti-locust campaign and the exact market costs of inputs and services. Adjusted a first time at the beginning of the first campaign, in September 2013, then in June and December 2014, and then again in June 2015, the below table was updated in December 2015 to take into account the real cost of the first and second campaigns and the provisional cost of the third campaign. It provides an indicative breakdown of the Three-year Programme's budget by component and by campaign.

| Table 2 – Total budget of the Three-year Programme (December 2015) in USD million | | | | |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------|
| COMPONENT | CAMPAIGN 1 (2013/14) | CAMPAIGN 2 (2014/15) | CAMPAIGN 3 (2015/16) | TOTAL |
| Component 1: Strengthening of national capacities for the monitoring and analysis of the locust situation | 5.07 | 2.8 | 1.9 | 9.77 |
| Component 2: Strengthening of national locust control capacities | 12.13 | 4.45 | 3.15 | 19.73 |
| Component 3: Preservation of human health and protection of the environment | 0.18 | 0.13 | 1.01 | 1.32 |
| Component 4: Implementation and coordination of the Programme | 2.78 | 1.59 | 1.63 | 6.00 |
| Component 5: Assessment of the effectiveness of locust campaigns and the impact of the locust crisis on crops and pastures | 0.05 | 0.06 | 0.07 | 0.18 |
| TOTAL | 20.21 | 9.03 | 7.76 | 37 |

1.3 Donor response

Donor response to the resource mobilization efforts made by FAO for the Three-year Programme has been positive, despite some difficulties during the second campaign to obtain the necessary funds in time. As of 15 August 2015, a total of USD 34 million had been made available for the Programme by the Central Emergency Response Fund of the United Nations Office for the Coordination of Humanitarian Affairs (CERF); FAO via the Technical Cooperation Programme (TCP); the European Union (EU); and the Governments of Austria, Belgium, France, Italy, Japan, Madagascar (through World Bank and International Fund for Agricultural Development loans and a funding from Turkey), Norway and the United States of America.

The cost of the first campaign was USD 20.21 million. The cost of the second campaign amounted to USD 9.03 million from an estimated budget of USD 14.17 million. The remaining funds at the end of the second campaign enabled FAO to launch the third campaign and will enable FAO to conduct aerial survey and control operations until the end of March 2016. When it was launched on 26 August 2015, the third anti-locust campaign was still underfunded and FAO had begun negotiations with donors to obtain the necessary funds.

2 IMPLEMENTATION OF THE 2014/15 CAMPAIGN

2.1 Presentation of the second campaign

2.1.1 Objectives

With the overall objective being to contribute to protecting the food security of Madagascar's most vulnerable rural populations, the specific objective of the second campaign, effectively implemented from 9 October 2014 to 15 August 2015, was to support the decline of the Malagasy Migratory Locust plague and thus limit damage by locusts to crops and pastures.

2.1.2 Strategy

The 2014/15 campaign was in line with the strategy defined for the entire Three-year Programme, i.e. identifying locust population hotspots, regularly monitoring their dynamics to establish diagnoses and forecasts that are as accurate as possible and being capable of deploying and making the best use of available control means in accordance with best practices in agriculture, human health and the environment. Crucial tactical adjustments were made to take into consideration the results obtained, recommendations made and lessons learned during the 2013/14 campaign, as well as the development of the locust and anti-locust situations.

Therefore, during the second anti-locust campaign, it was planned to treat locust infestations over an area of 500 000 to 800 000 hectares to support the decline of the plague, protect crops and pastures and thus reduce the threat to the livelihoods of rural populations already affected by the locust plague as well as by other factors such as cyclones, drought, political instability, etc.

2.2 Results obtained and activities conducted

The second anti-locust campaign of the Three-year Programme covered the period from 9 October 2014 to 15 August 2015.

The campaign began with the first aerial survey operations, having received the first helicopter on 8 October 2014. This was possible because, in addition to the operations at the end of the first campaign conducted during the winter period, preparatory activities for the 2014/15 campaign had been carried out from June to October 2014. This period was mainly characterized by:

1. The purchase of essential goods and services for survey and control operations (flying hours and associated services, pesticides as well as survey, control, camping, communication and personal protective equipment).
2. The identification, recruitment and deployment of key staff to coordinate and implement the anti-locust campaign.

Aerial operations continued until 12 July 2015 and ground operations until 15 August 2015, which marked the end of the Three-year Programme's second anti-locust campaign.

The following paragraphs give a detailed presentation of the activities conducted and results obtained during the 2014/15 campaign.

2.2.1 Component 1: Strengthening of national capacities for the monitoring and analysis of the locust situation

Expected outcome: Capacity to monitor and analyse the locust situations is strengthened, making it possible to monitor and understand the dynamics of locust populations, implement the locust control strategy, make the necessary tactical adjustments during the campaign and identify targets for large-scale control operations.

Indicators:

- 300 survey flying hours¹ between September/October 2014 and August 2015 and 22 million hectares surveyed² in the infested (or likely to be infested) areas.
- Spatial-temporal, quantitative and qualitative dynamics of locust populations known and documented: number, size, density, developmental stage and phase status of hopper and adult populations (swarms) identified in infested areas; swarm movements described and mapped; etc.
- Ten-day and monthly bulletins describing the locust and anti-locust situations published by the Locust Watch Unit (LWU) (with FAO technical support and validation), no later than 15 and 30 days respectively after the reference period.
- Number of technicians trained in data collection, analysis and information management (surveyors and members of the Locust Watch Unit).

Results obtained: *during aerial operations carried out between 9 October 2014 and 12 July 2015 during the second campaign, the two helicopters flew more than 749 hours for survey operations. These aerial surveys, supplemented with ground surveys, made it possible identify the most infested areas, monitor the dynamics of locust populations, determine where to best deploy the bases and identify targets for control operations.*

From October 2014 to August 2015, 25 ten-day bulletins and four monthly bulletins were prepared by the LWU, presenting the spatial-temporal developments of locust populations and their habitats, the means implemented to monitor situations, the details of control operations, agro-economic information, etc. These bulletins were published on the [FAO Website](#) devoted to the locust emergency in Madagascar. As of 15 August 2015, a total of 52 ten-day bulletins and 21 monthly bulletins had been prepared and published by the LWU since it was established in February 2013.

In total, 19 technicians were trained to monitor and analyse locust situations as part of this component. The table in Annex III presents a summary of training given during the second campaign.

Activities:

¹ Before the start of an anti-locust campaign, it is not possible to give a precise forecast of the number of flying hours needed to conduct anti-locust operations. FAO indicates a global number of hours for both survey and control operations.

² This indicator, as emphasized in the report on the evaluation of the first campaign prepared by Mr Ghaout, was not objectively verifiable because of practical difficulties encountered in assessing the volume of areas effectively surveyed by air.

Activity 1.1: strengthening human capacities in data collection, analysis and information management

- Locust Watch Unit (LWU)

✓ Purpose and composition of the LWU and data used for bulletins issuance

The purpose of the LWU, established in February 2013, is to collect, manage and analyse data on weather and ecology, locust and anti-locust situations, agriculture and socio-economics. In September 2014, as the quality of the work of the Agricultural/Socio-economic data expert did not meet FAO standards; it was therefore decided to restructure the composition of the LWU in order to improve its performance. The tasks for which he was responsible were divided between the two other entomologists. Since then, the LWU is composed of three members: two entomologists, one being responsible for locust and agricultural/socio-economic data and the other for processing weather, ecology and anti-locust data, and a national expert in Geographical Information Systems (GIS) responsible for mapping weather conditions (rain and wind) and survey and control operations for the ten-day and monthly bulletins, written press and website.

During this campaign, the LWU used data from information sheets completed during aerial survey operations for its analyses in addition to those supplied by the ground survey teams working with the bases and by the team of motorcycle scouts, set up in October 2014 in strategic geographical areas to monitor the dynamics of locust populations.

✓ Supervision and support from the international agronomist to the LWU

Throughout the second campaign, the international agronomist, who arrived in June 2014, continued to supervise directly the work of the LWU, provide support on a daily basis to the production of the ten-day and monthly bulletins and to data collection, management and analysis. Since her arrival and thanks to her support, a considerable improvement has been observed in the quality and rigour of the work carried out by the LWU members in their respective fields and the relevance of the bulletins they prepare; communication with and discussion between LWU members were also greatly facilitated. During the 2014/15 campaign, the international agronomist also carried out three field missions, each lasting approximately six days: the first mission took place in October 2014 on Base 1, during which she presented to base staff and helicopter crew the bulletins produced by the LWU in order to demonstrate the importance of transmitting timely and high quality data; during the second field mission carried out in March 2015 with the Campaign Coordinator she: (i) participated in a working session with all staff present at Base 2 in Sakaraha to discuss possible tactical adjustments and to establish the action plan for the following days and (ii) participated in working sessions with various National Anti-Locust Centre (CNA) departments in Toliara. This second part of this mission made it possible to clarify certain points with regard to pesticide management and transmission of reliable and timely information, to present LWU activities and those of the Early warning and survey branch (*Section avertissement et surveillance*) of the CNA, and to exchange operational data with the Technical Department of the CNA; the last field mission took place in August 2015 with the Operations Officer to participate in the concluding workshop for the second campaign organized by the CNA in Betioky.

✓ **Assistance/specific training at the LWU from the international GIS expert**

In January 2015, the LWU benefited from technical assistance and on-the-spot training delivered by the international GIS expert during his one-month mission to Madagascar (the third mission since the Programme was launched). The aim of this mission was to (i) reinforce knowledge gained during the two previous training courses; (ii) improve and develop the geo-referenced database in view of the growing volume of data on weather and ecological conditions, locust population dynamics and control operations; (iii) assist with the development of GIS tools; and (iv) create diagnostic maps in order to make forecasts of likely development trends for locust situations in correlation with available rainfall data, weather forecasts and vegetation maps to further strengthen the LWU's mapping and forecasting capacities. When not on mission in Madagascar, the international GIS expert continues to provide the LWU with long-distance online support for data management, analysis and mapping.

✓ **Support and refresher training at the LWU from senior locust experts and the Three-year Programme Coordinator**

Throughout the second campaign, the LWU team benefited from the continuous long-distance support of the Three-year Programme Coordinator (based in Rome) and a senior locust expert (based in France). Since the start of the 2014/15 campaign, the team has also benefited from refresher on-the-spot training delivered by the Campaign Coordinator during his four missions carried out between September 2014 and July 2015 and by the Deputy Campaign Coordinator. In addition to these technical refresher trainings, the three LWU members also had private lessons to improve their French reporting and writing skills from July 2014 to January 2015.

✓ **Number of bulletins produced by the LWU**

From 9 October 2014 to 15 August 2015, 25 ten-day bulletins and four monthly bulletins were prepared by the LWU and published on the [FAO website](#) devoted to the locust crisis in Madagascar and shared with all partners in Madagascar. These bulletins presented the spatial-temporal developments of the locust populations and ecological and meteorological conditions, the means implemented to monitor situations, details of survey and control operations, flying hours and the quantity and nature of pesticides used, agro-economic information, difficulties encountered and field trips carried out by experts on mission in Madagascar along with rainfall and wind maps as well as maps displaying survey itineraries and base locations, treatment stations and treated blocks.

- **Motorcycle scouts**

Motorcycle scouts were trained by the LWU Locust Data Expert with support from the Deputy Campaign Coordinator during their field missions in early October 2014. This training focused on the objective of surveys; the use of the new survey/reporting form and of the additional control form on locust mortality; planning and implementation of ground surveys ; assessment methods (identity, behaviour, appearance, developmental stage, phase status and density of locusts; nature and development of vegetation; soil moisture and density; and damage to crops); and completion and submission of survey forms.

- **Locust expertise ensured**

National and international technical locust assistance continued to be provided for the entire duration of the 2014/15 campaign. The national locust expert, Deputy Campaign Coordinator,

worked in close collaboration with the Campaign Coordinator and the Programme Coordinator to provide support supervising the day-to-day activities of the anti-locust campaign.

The need for the permanent presence of at least one FAO expert at each aerial base became apparent during the first campaign to ensure the smooth running of all operations, the immediate reporting of any incident and the daily transmission of any locust and anti-locust information. Four junior locust experts, three of whom made available by Morocco's National Anti-Locust Centre and one by Chad's National Anti-Locust Agency, were therefore recruited for different periods from October 2014. Their expertise in locust bio-ecology, their reporting skills and their knowledge of new technologies made it possible for them to provide scouts and base managers with effective support.

Activity 1.2: Support to survey operations

- Procurement and delivery of vehicles and equipment required for survey operations

With the exception of expendables, the equipment procured during the 2013/14 campaign such as trucks, vehicles, radios, etc. (listed in the [interim](#) and [final](#) reports of the first campaign) was made available for use by survey and control teams during field activities for the 2014/15 campaign.

Following competitive tenders, FAO procured and delivered to Madagascar all the additional equipment and material necessary for the smooth implementation of field activities during the second campaign, as follows: survey equipment (entomological/scientific equipment); camping equipment (tents, sleeping bags, camp beds, tables, etc.); IT equipment (computer, scanner, etc.); 20 VHF radios; 10 motorcycles; and two four-wheel drive vehicles, including one double-cabin pickup (to replace the vehicle damaged during the 2013/14 campaign) and one single-cabin pickup, on the deck of which was installed the second AU 8115 sprayer. This equipment was delivered to the aerial bases.

- Mobilization of aerial bases and flying hours for survey operations

Before the start of the 2014/15 campaign and following a competitive tender process, FAO signed a contract with an aircraft company to provide two helicopters, skilled pilots and related logistics services for aerial survey and control operations in Madagascar.

To confirm that the helicopters and their equipment complied with the contract requirements and technical specifications and to ensure their reception, an aircraft logistician was recruited in September 2014. This logistician was responsible for ensuring the safety and logistic supervision of aerial operations and providing staff involved in aerial operations with refresher training in safety procedures to be respected. From October 2014 to January 2015, the logistic supervision of the aerial operations at the two aerial bases was continuously ensured by a second aircraft logistician. From 25 January to 28 June 2015, the international spraying systems expert was responsible for aircraft logistics.

The first helicopter was delivered on 8 October 2014. Extensive aerial survey operations began the next day in western Madagascar from Mahajunga to Toliara. The aim of these surveys was to locate locust populations that had survived the winter period, assess their size and determine their characteristics in order to specify the deployment sites of the two aerial bases.

The first base was established in Tsiroanomandidy in the mid-west on 13 October and the second in Ihosy on 20 October after the delivery of the second helicopter on 18 October.

Each aerial base had three teams: one responsible for running the base; one for collecting locust and environmental data; and a third team responsible for control operations. The aerial bases were mobile and redeployed depending on the findings of aerial surveys conducted throughout the campaign that provided a comprehensive overview of the locust situation, making it possible to identify the most infested areas and those requiring control operations, and, if necessary, to decide to redeploy the aerial bases. After a survey, whether by ground or air (extensive or intensive), the scout is required to complete the survey/reporting form with the following information: date and place (name of the closest village and exact geographic coordinates provided by a GPS); soil and vegetation characteristics; locust species; developmental stage (hopper instar, state of maturity, number of egg-pods laid, etc.); phase status of locust populations; type of population (scattered or grouped); density; surface concerned; and the nature of any possible damage. The map in Annex II shows the successive locations of the aerial bases during the second campaign.

The two aerial bases were demobilized on 29 May and 12 July 2015 respectively. Indeed, with the end of the rainy season and the gradual onset of winter, whose weather and ecological conditions are unsuitable for Malagasy Migratory Locusts development, and thanks to the results obtained from the control operations carried out since the beginning of the second campaign, locust activity was greatly reduced and field needs no longer justified maintaining operating aerial bases. Maintaining even basic aerial capacity during this period would have involved considerable effort in terms of human and financial resources. Furthermore, maintaining aerial capacity would have had only a limited impact on locust populations because of their very erratic nature and characteristics, and would have led to a very negative ratio between the number of survey and control hours. Consequently, with the exception of ground teams, national CNA personnel were also demobilized and, on their return to the CNA, were responsible for the cleaning, maintenance, repairs and storage of equipment used during the second anti-locust campaign so that it was ready for the third one.

In total, over the course of the second campaign, the two helicopters flew just over 749 hours to survey infested areas and areas likely to be infested. The map in Annex II presents a summary of aerial surveys conducted during the second campaign.

Following the demobilization of the helicopters and during the winter period, the ground teams from the former Bases 1 and 2 continued to conduct ground survey and control operations until 15 August 2015, when they were demobilized.

- **National logistic expertise ensured**

During the 2014/15 campaign, a team comprising four national logisticians was responsible for the following tasks depending on the needs identified by the Campaign Coordinator and the team in charge of running the Programme: monitoring imports, taking delivery of equipment at various delivery points (airports and ports), monitoring customs formalities, distributing equipment to final reception sites (storage facilities, aerial bases, etc.), supervising the fleet of vehicles (maintenance, logbook monitoring and good management of vehicles with regard to safety and consumption, etc.), paying field teams, etc.

The four national logisticians were supervised from the start of the second campaign by the international logistician and were given training in the field on the procedures and tools to be used for logistics-related activities.

Furthermore, a logistics assistant was recruited in December 2014 to help the logistics team with: (i) collecting, entering and classifying information regarding vehicles and their position in Madagascar in order to facilitate monitoring; (ii) administrative procedures for all mission departures of drivers and experts (United Nations security clearance, mission orders, etc.); and (iii) managing the FAO warehouse and maintaining up-to-date stock records for each item and entry and exit coupons.

- **Ground surveys to support aerial surveillance**

Ground surveys may be necessary to supplement aerial surveys, especially in areas close to bases or in view of ground control operations. Ground surveys are carried out by the CNA staff assigned to ground teams working at the aerial bases. Their operating costs (fuel, vehicle maintenance, daily subsistence allowances for mobilized team members, etc.) were funded by the Programme.

The CNA has permanent decentralized bases known as "locust posts" located in the whole Outbreak Area. Each head-of-post carries out ground surveys and transmits information on the locust situation to the CNA Technical Centre, which should make it possible to obtain additional field data when shared with the LWU. However, during the 2013/14 campaign, this information was transmitted in a late, irregular, and often imprecise and incomplete manner. To overcome this problem, a team of five CNA scouts equipped with motorcycles was established in the Outbreak Area for the 2014/15 campaign from October 2014 onwards.

2.2.2 Component 2: Strengthening of national locust control capacities

Expected outcome: National capacity for locust control is strengthened and locust populations are reduced over the course of the 2014/15 campaign in all infested areas. As a result, damage to crops and pastures due to the locust plague is limited.

Indicators:

- Approximately 800 000 hectares treated between October/November 2014 and August 2015.
- Mortality rate of locust populations in treated areas over 85 percent.
- Number of infested locust-regions reduced (see map of 30 June 2014).
- Number of technicians trained in campaign management and aerial and ground spraying techniques.
- Relative significance of damage to crops and pastures.

Results obtained: *From 17 October 2014 to 15 August 2015, a total surface of 640 035 hectares was treated or protected, of which 627 610 hectares were treated by air (representing 98 percent of control operations) and 12 425 hectares by ground (2 percent).*

These treatments were conducted using (i) Insect Growth Regulators to protect 462 920 hectares with a mortality rate for locust hopper populations reaching 85 percent; (ii) conventional pesticides to treat 169 775 hectares with a mortality rate of 95 percent; and (iii) the bio-pesticide Green Muscle® on 7 340 hectares with an average mortality rate of 80 percent two weeks after treatment.

This made it possible to reduce the geographical scope and size of the areas infested and contaminated by the Malagasy Migratory Locust outside the Outbreak Area, as well as the number and size of grouped locust populations (hopper bands and swarms), and to trigger the degregarization of these populations. The reduction of Malagasy Migratory Locust population

numbers during the 2014/2015 campaign in all infested areas made it possible to limit damage to grain production caused by locusts in 2015, which was negligible on a national scale as noted in the Crop and Food Security Assessment Mission (CFSAM) report.

Furthermore, during these control operations, 34 staff were trained in campaign management and aerial and ground spraying techniques.

Activities:

Activity 2.1: Human capacity building for locust control

- Training in spraying system calibration and spraying techniques (aerial and ground)

✓ Aerial treatment teams – aerial bases:

After reception of the helicopters, the international expert in spraying systems provided the aerial base teams with refresher training on the calibration of helicopter spray heads during his three-month mission from October to December 2014. With support from the Campaign Coordinator and the aircraft expert, on-the-spot refresher training sessions continued to be delivered for the duration of control operations and technical support was provided to the teams assigned to the aerial bases.

✓ Ground treatment teams – aerial bases:

With regard to ground control operations, and after mounting and calibrating the second vehicle-mounted sprayer, the international expert in spraying systems also provided refresher training sessions for the two ground control teams in October 2014 to ensure compliance with procedures during field operations. Additional training was also given to these staff in November 2015 to enable them to carry out barrier treatments against hopper patches and bands using Insect Growth Regulators (IGR).

✓ Ground treatment teams - Support Unit for Anti-Locust Ground Control (CALAT) and Regional Directorates for Agricultural Development (DRDA):

In October 2014, training in the calibration and use of backpack sprayers was organized and delivered by the international expert in spraying systems to the 10 leaders of CALAT teams. This training covered: the basics of ultra-low volume (ULV) spraying; use and maintenance of control equipment; spraying quality control; compliance with technical parameters (e.g. speed of the spraying platform, swath width, dose, height of droplet release); suitable weather conditions; and protection of locust control staff and the environment (respecting exclusion and buffer zones). These leaders then trained locust control staff from the 10 Regional Directorates for Agricultural Development involved in CALAT activities.

- Support for inputs/supplies management

Over the course of the second campaign, the international logistician regularly conducted refresher sessions and provided support to CNA staff in the use of input management software, which was adapted from software used at Morocco's National Anti-Locust Centre and installed at

the CNA in Toliara during the first campaign. The international logistician also worked with the teams responsible for logistics on a daily basis to implement and improve the supplies management and monitoring system.

- **Training in aerial base management**

From October 2014 to January 2015, the logistical supervision of aerial survey and control operations at the two aerial bases was ensured on a continuous basis by an aircraft logistician. From 25 January to 28 June 2015, an international expert in spraying systems, made available by the Morocco's National Centre for Locust Control, was responsible for aircraft logistics.

The international aircraft logistician consultants who were responsible for supervising aerial operations also provided on-the-spot training and refresher sessions to the 32 aerial base members to ensure compliance with aerial base management procedures.

Moreover, to ensure the safety of the ground teams working at the aerial bases as well as the effectiveness of the survey and control operations they carry out (on rugged terrain, in isolated areas and sometimes for long periods far from the aerial bases), the international logistician, with the support of the national logistician in charge of the vehicle fleet, provided drivers with refresher sessions regarding: the use of logbooks; daily checks for vehicles; the use of single-side band radios (SSB); safe road transport, delivery and handling of equipment to and at storage facilities, aerial bases and ground teams.

- **Training in the use of biopesticides**

The mobile team devoted to biopesticide treatments, which had been trained by an international expert in biopesticides during the first campaign and continued its activities during the second campaign (from January to May 2015), received refresher sessions in preparing the mixture and spraying biopesticide during the two missions of the international spraying expert from October to December 2014 and from January to June 2015.

- **Raising ground teams' awareness of safety measures to be adopted at an aerial base**

Since the start of the 2014/15 campaign, under the supervision of the Campaign Coordinator and with support from locust experts, the international logistician and aircraft logistician) have been responsible for monitoring the implementation of the procedures put in place during the first campaign (staff movements, safe distance around the helicopter, drum positioning, etc.) to minimize risks linked to operations at aerial bases. They also provided refresher training to staff in the event of non-compliance with safety measures. The human health and environmental monitoring team also ensured that all safety measures were respected.

Activity 2.2: Support to locust control operations

- **Procurement and 'triangulation' of pesticides**

Locust control operations involve the use of various types of pesticides, which are selected following advice from the Pesticide Referee Group brought together by FAO. Pesticides are selected according to their effectiveness, conditions of use and potential impact on human health and the environment (especially with regard to non-target species), their authorization in the country of intervention, the locust targets to be controlled and the locust habitats of control operations.

The strategy adopted to tackle the locust plague in Madagascar includes the use of three types of pesticides, namely: (i) rapid-action conventional chemical pesticides for full-cover treatments

(against adult locusts and late instar hoppers when quick mortality is necessary); (ii) IGRs³ for barrier treatments, allowing rapid protection of large areas contaminated by hopper patches and bands⁴, thus preventing new swarms from forming; and (iii) biopesticides when control operations are required in environmentally sensitive areas.

To meet the requirements of the 2014/15 campaign and taking into account the stocks remaining from the 2013/14 campaign (Cf Table 3 below), FAO procured 30 000 litres of conventional pesticide (Chlorpyrifos 240 ULV) and 78 000 litres of IGR (Teflubenzuron) through a competitive tender process.

The remaining quantity of conventional pesticide (126 000 litres) with Chlorpyrifos as active ingredient in ultra-low volume formulation was supplied by the governments of Morocco (96 000 litres) and Algeria (30 000 litres) through a 'triangulation' process. By making use of pesticides immediately available elsewhere and whose effectiveness is regularly confirmed by *ad hoc* analyses in specialized laboratories, the triangulation process reduces global production of chemical pesticides, thus limiting the environmental risks associated with their prolonged storage (e.g. through leakage) and eventual disposal if not used before their expiry date. Three-year Programme funds allowed FAO to transport these pesticides by sea from north-western Africa to Madagascar with the agreement of all stakeholders involved.

To compensate for the delay in taking delivery of the conventional pesticides procured through the international competitive tender process and so as not to compromise the implementation of locust control operations, the Government of Madagascar, through CALAT and CNA, lent to the Three-year Programme 14 500 litres of a binary product (commercial name Chlorcypex 134 ULV).

The quantities (in liter or kg) of pesticides required, procured/triangulated and used during the 2014/15 campaign are presented in Table 3.

³ The locust's exoskeleton is composed of chitin, which makes it robust; chitin is produced at each moult during the hopper's development (but is no longer produced after the final moult when it reaches adult stage): Insect Growth Regulators (IGRs) disrupt the synthesis of chitin, and hoppers affected by this pesticide become soft and unable to move or feed, usually after the second moult following spraying. Therefore, IGRs cannot be used on last instar hoppers or on adults.

⁴ A hopper, or nymph, is a wingless locust not yet able to fly or breed. Malagasy Migratory Locust hoppers develop in five successive instars separated by moults, whose overall duration is of 30 days during the rainy season, and up to 60 days during the dry season (should breeding occur during that period). The final moult is the fledging that gives rise to the young "imago", i.e. immature winged adult locust.

| Table 3 – Quantities of pesticides required, procured/triangulated/made available and used during the 2014/15 campaign | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------|-----------------------------|----------------------|
| Pesticides | Quantities required for 2nd campaign | Stocks remaining from 1st campaign | Quantities procured/triangulated/made available | Quantities available | Quantity used |
| Conventional Pesticides (l.) | 230 000 | 41 337 | 170 500 | 211 837* | 169 865 |
| Insect Growth Regulators (l.) | 110 000 | 57 350 | 78 000 | 135 350** | 86 680 |
| Biopesticides (kg) | 1 500 | 1 403 | 0 | 1 403 | 366 |

**This figure includes quantities remaining from the 2013/14 campaign (41 337 litres), pesticides purchased (30 000 litres) and triangulated from Algeria (30 000 litres) and Morocco (96 000 litres) as well as those made available by the CALAT (9 500 litres) and the CNA (5 000 litres).*

*** This figure includes pesticides purchased (78 000 litres) and quantities remaining from the 2013/14 campaign.*

- **Procurement and delivery of equipment**

Equipment procured during the 2013/14 campaign for control operations, such as pumps, sprayers, etc. (listed in the [interim](#) and [final](#) reports of campaign 1), was used by control teams during the 2014/15 campaign.

In addition to the above-mentioned equipment, personal protective equipment such as gloves, goggles, boots and masks and one vehicle-mounted sprayer were procured during the 2014/15 campaign. It should be noted that the equipment listed in section “Activity 1.2”, procured during the second campaign (vehicles, radios, camping equipment, etc.), was used for both survey and control operations.

- **Aerial and ground control operations**

Locust control operations began on 17 October 2014. These aerial operations were carried out from bases successively deployed as close as possible to locust “hotspots”⁵, depending on the findings of the extensive surveys and taking into consideration logistical and safety constraints⁶.

⁵ The locations of locust population hotspots change throughout the rainy season, including during exceptional events such as cyclones, which may have a significant impact on distribution or dynamics of locust populations. During campaign 2, these included the passage of tropical storms Fundi and Chedza in January and February 2015, which led to the redistribution of locust populations due to heavy rains and violent winds. In April 2014, high winds associated with Cyclone Hellen swept swarms present in the Mid-West to the Highlands.

⁶ Security constraints have sometimes required establishing temporary filling stations (for pesticides and fuel), and therefore, approach flights, which were not survey or treatment flights in the strictest sense. In order to operate, helicopters and airbases need the support of motorized vehicles on the ground (e.g. all-terrain vehicles for staff movements and for ground survey and control operations, trucks for refuelling with kerosene and pesticides) because of Madagascar’s complex topography, the impracticality of certain tracks during the rainy season, the lack of tracks in some areas and insecurity.

As of 12 July 2015 (when the second helicopter was demobilized), the two helicopters had flown more than 609 hours⁷ to treat 627 610 hectares, and almost 181 hours for the deployment of the helicopters to and between the various aerial base locations.

These aerial control operations were supplemented by localized ground treatments from the aerial bases from 27 October 2014 to 9 August 2015. Each aerial base had a mobile ground control team comprising a team leader and three field staff: one operator and two drivers, all of whom previously trained by the international expert in spraying techniques.

From 11 January to 4 May 2015, another mobile team in charge of biopesticide control operations and comprising three field staff completed the second campaign ground anti-locustset-up.

As of 15 August 2015, ground teams had treated more than 12 425 hectares with conventional pesticides and biopesticide, bringing the total area treated by air and ground to 640 035 hectares.

Table 4 provides a breakdown of areas treated/protected during the second campaign.

| Table 4 – Areas treated/protected (hectares) during the 2014/15 campaign | | | | |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------------------------------|
| Pesticides/type of treatment | Working hypothesis: hectares to be treated from September 2014 to August 2015 | Results | | |
| | | Hectares treated/protected by air | Hectares treated/protected by ground | Hectares treated/protected by air and ground |
| Conventional pesticides/Full cover treatment | 230 000 | 158 920 | 10 855 | 169 775 |
| Insect Growth Regulators / Barrier treatment | 550 000 | 461 750 | 1 170 | 462 920 |
| Biopesticide/Full cover treatment | 20 000 | 6 940 | 400 | 7 340 |
| Total | 800 000 | 627 610 | 12 425 | 640 035 |

As a working hypothesis, the second campaign planned to treat between 500 000 and 800 000 hectares, of which 31 percent with conventional pesticides and 69 percent with Insect Growth Regulators. As of 15 August 2015, 640 035 hectares had been treated in proportions similar to (and even more satisfactory than) those initially planned, with 72.3 percent of areas treated corresponding to barrier treatments (IGR) and 27.7 percent to full cover treatments (conventional and biopesticide), in line with the Three-year Programme strategy encouraging control operations against hoppers.

⁷ This figure includes the time spent on application, time required to fill the helicopter's tank and return to the block to be treated (setting up), as well as time required for cleaning the helicopter spraying equipment.

2.2.3 Component 3: Preservation of human health and protection of the environment

Expected outcome: No incidents affecting human health are reported during aerial control operations or the handling of pesticides. The impact on the environment caused by control operations is limited.

Indicators:

- Number of reported incidents affecting human health during locust control operations or handling of pesticides.
- Number and significance of any possible incident affecting the environment.
- Number of staff trained in human health and environmental monitoring, in the use of drum crusher and in the Pesticide Stock Management System (PSMS).

Results obtained: thanks to human health and environmental monitoring carried out on a regular basis by a specialized team, the findings of which are included in monthly reports, no incidents affecting human health or the environment were reported during the 2014/15 campaign. In total, nine staff members were trained in human health and the environmental monitoring and in Pesticide Stock Management System (PSMS).

Activities:

Activity 3.1: Strengthening human capacity for human health preservation and protection of the environment

- **Training in human health and environmental monitoring**

During his mission from 10 October to 25 November 2014, the international environmentalist delivered training in environmental monitoring (theoretical sessions in Toliara and practical sessions in the field) to four CNA staff. This training focused on the various standard operating procedures (SOP); the methods used to collect and prepare soil, vegetation and water samples for pesticide residue analysis; the procedures to be followed during investigations after environmental incidents thought to be caused by locust control operations; and the drafting of mission reports and minutes.

A week-long first aid training course, organized and conducted by the Malagasy Red Cross, was delivered for the personnel of one aerial base in December 2014.

- **Training in pesticide management**

An international PSMS expert conducted a second mission in Madagascar lasting a month and a half in November/December 2014 (following his mission in November 2013 during the first campaign). During this mission, from 8 to 12 November 2014, a refresher course on the rational use of the PSMS database was delivered to four CNA staff.

- **Training in the use of drum-crusher**

This training was not delivered during the second campaign even though the international expert had been identified. This was because of the delay in the construction of the pesticide storage facility (Cf paragraph 3.3 below). Indeed, it had initially been planned that the training would be delivered once the central pesticide storage facility had been built in Toliara and the drum-crusher installed in it. An alternative solution will be sought by FAO with the support of the CNA

at very beginning of the third campaign to install the drum crusher in a temporary site and to organize the training during the third campaign.

- **Revising Environmental Specifications (CCE)**

Technical assistance to revise the Environmental Specifications, planned within the framework of the Three-year Programme, was postponed to the third anti-locust campaign and will take the form of a brainstorming workshop with all stakeholders.

Activity 3.2: Support impact monitoring (of treatments) on human health and the environment

During the 2014/15 campaign (as was the case during the first campaign), two teams were established: one to monitor the impact of locust control operations on human health and the environment and the other to manage empty pesticide drums. Programme funds cover the teams' operating costs (fuel, vehicle maintenance and repairs if necessary, daily subsistence allowance for team members mobilized by CNA, drivers' salaries, etc.).

- **Human health and environmental management**

During his mission in October/November 2014, the international environmentalist conducted a review of the implementation of the [Human Health and Environment Management Plan \(Plan de gestion sanitaire et environnementale-PGSE\)](#) over the course of the first campaign and at the start of the second campaign. The PGSE aims to reduce the negative impact of locust control operations on human health and the environment. In his report, the international environmentalist noted that the implementation of the various requirements of the PGSE since the start of the Three-year Programme had been satisfactory overall: the direct impact of locust control operations on human health and the environment was monitored regularly, thereby avoiding serious accidents or incidents affecting human health or the environment; safety measures when using pesticides were applied at the different aerial bases; pesticides were transported according to the PGSE's guidelines; and spraying and protective equipment were adequate and properly used. Among his recommendations, he emphasized that the PGSE should be validated at national level to be applied in the country even after the completion of the Three-year Programme.

Over the course of the 2014/15 campaign, the PGSE continued to be duly implemented.

- **Teams for human health and environmental monitoring and pesticide-drum management**

As of September 2014, the human health and environmental monitoring team conducted blood tests to establish reference blood cholinesterase levels for each staff involved in control operations; these tests are conducted before the start of control operations in order to be able to compare levels at a later date and monitor the level of exposure to pesticides. During the second campaign, 70 tests were carried out on personnel involved in control operations and handling of pesticide drums to determine their base cholinesterase levels and 157 tests were conducted to identify variations of the cholinesterase level after contact with pesticides. Between April and May 2015, it was observed that four staff presented temporary cholinesterase inhibition; they have been temporary excluded from conducting control operations so that their cholinesterase levels could return to normal; staff continuing to conduct Programme operations were reminded of the necessary health and safety measures to be observed before, during and after handling pesticides. Following the recommendations of the assessment report on the

respect of World Bank's safeguard policies⁸ published in January 2015, as of April 2015, it was decided to incorporate the services of a toxicologist into the human health and environmental monitoring team to ensure medical assistance for field staff in the event of an incident.

This team is also responsible for verifying the impact of incidents that can occur during locust control operations. After each incident leading to a loss or overdose of pesticide, the team assesses the impact on human health and the environment and, if necessary, applies remedial actions. Over the course of the 2014/15 campaign, of a total of 256 545 litres of pesticide used for control operations, 1.3 percent was lost because of damage incurred during transport due to poor road infrastructure and occasional accidents due to the spraying system and/or non compliance with procedures by the pilot.

Apart from the four staff presenting temporary cholinesterase inhibition, the evaluations conducted by the team during the 2014/15 campaign did not observe any incident affecting human health and the environment.

It should be noted that the monitoring equipment available at the end of the first campaign was sufficient to cover the needs of the second campaign and therefore no additional purchases were required.

- **Pesticide and empty pesticide drum management**

As was the case during the first campaign, the pesticide drum management team was responsible for monitoring and coordinating full and empty pesticide drum movements and updating inventory using the Pesticide Stock Management System (PSMS) database and the internal monitoring system. The team benefited from the support of the international pesticide management expert: from 13 November to 6 December 2014, the expert, accompanied by the pesticide stock management responsible/PSMS focal point and his team, visited the main and secondary pesticide and empty drum storage facilities in order to update PSMS inventory data. This inventory operation made it possible to verify the quantities of pesticide available in each warehouse with manufacture batch number details as well as the number of empty drums stored there.

Once used, all empty pesticide drums were recovered and stored, either in the CNA central storage facility in Toliara or in decentralized CNA or Regional Rural Agricultural Directorates' storage facilities until they can be gathered in the new central pesticide storage facility to be built in Toliara. Once the drum crusher will be installed in the new facility and CNA staff will have been trained in its use, the empty drums will be rinsed and crushed to avoid any further risk to human health and the environment and to reduce their overall volume.

⁸ Because the World Bank's contribution to the Three-year Programme involved the use of large quantities of insecticides, the associated project was classified in the B category in accordance with this institution's classification. The environmental assessment of a category B project consists of examining the project's possible negative and positive effects on the environment and recommending the necessary measures to prevent, minimize, mitigate and compensate for negative effects and to improve the project's environmental performance. The Three-year Programme triggered the application of three policies, namely PO 4.01 (Environmental Assessment), PO 4.09 (Pest Management) and PO 4.04 (Natural Habitats). The World Bank therefore mandated a mission at the end of the 2013/14 campaign with the aim of verifying the application of operational policies in the framework of the Three-year Programme and suggesting actions required to achieve them. When this mission was completed, the World Bank Assessment Report of respect for safeguard policies was published in January 2015.

- **Populations' awareness and prevention/mitigation of risks linked to locust control operations**

With the support of the Three-year Programme Coordinator and the Communication Officer based in Rome, the team responsible for communication at the FAO Representation in Madagascar designed leaflets and posters for people living close to locust control operations illustrating precautionary measures to be observed for populations and livestock before, during and after locust control operations. This awareness-raising material is available in each aerial base and delivered and explained to rural populations during survey operations. Furthermore, messages are regularly broadcasted on local radio stations to raise populations' awareness of precautions to be taken during aerial operations.

Activity 3.3: Construction of the pesticide storage facility

The procurement process for the construction of a pesticide storage facility in Toliara began in October 2013. A contract was signed with a firm of architects based in Rome, who was assisted by a national engineer in Madagascar recruited by the FAO Representation (from February to May and from August to September 2014) under the technical supervision of the Infrastructure and Facilities Management Branch of FAO (CSAI). A tender was launched in March 2014 after the preparation, review, financial evaluation and technical validation of the documentation required. It was closed in April 2014 and four valid offers were received. The supplier that submitted an offer meeting technical specifications at the lowest price was identified in May 2014. However, the signing of the contract was suspended from July 2014 to February 2015, pending the signature of an amendment for a no-cost extension of the project funding this construction. The contract with the construction company was signed by FAO on 20 February 2015 and countersigned by the construction company on 6 March 2015. FAO then recruited a new national engineer to assist the construction company with preparing the preliminary documentation to begin construction work (performance bond, detailed work programme, etc.). However, after signing the contract and despite the active support of FAO, the company did not manage to respect technical and administrative deadlines regarding the site preparation and execution of works, and did not present the performance bond. As a result, following the accumulated delays in beginning construction work and after having informed the MoA, the contract with this company was terminated on 6 August 2015 in accordance with FAO procedures and contractual standards.

FAO therefore launched a new competitive tender process to select another construction company, published on the United Nations procurement platform in September 2015. The selected company will need to guarantee the construction of the storage facility before the end of the Three-year Programme, i.e. before the end of June 2016.

Once completed, the warehouse will be able to store 56 000 litres of pesticides (280 drums each containing 200 liters), making it the largest pesticide storage facility in Madagascar that meets the national standards adopted by the Government and international standards set by FAO. Currently, none of Madagascar's nine larger pesticide storage facilities – with capacities ranging from 14 000 to 150 000 litres – meets the international standards required for this type of facility.

2.2.4 Component 4: Implementation and coordination of the Programme

Expected outcome: The supervision and technical and operational coordination of the Programme as a whole as well as specific field operations are conducted and adjusted if necessary, making it possible to achieve the desired results of the campaign and Programme.

Indicators:

- Supervision and coordination arrangements are efficient and effective
- Anti-locust campaign is implemented according to planning and timetable
- Overall results for the campaign are positive.

Results obtained: *the FAO Plant Production and Protection Division (AGP), the Emergency and Rehabilitation Division (TCE) – both based at FAO Headquarters in Rome – and the FAO Representation in Madagascar (based in Antananarivo, to whom the budget responsibility for the Three-year Programme was transferred as of 1 March 2015) ensured the supervision, technical, financial and operational coordination and the implementation of the second anti-locust campaign. This enabled expected outcomes to be attained and the campaign’s specific objective to be achieved.*

Activities:

Activity 4.1: Implementation of the National Locust Emergency Plan

In September 2013, within the framework of the implementation of the National Locust Emergency Plan (PNUA) approved on 25 September 2013, the Government established the National Coordination Post (PCN) within the MoA in Antananarivo. The PCN was to constitute a tool to facilitate coordination of locust control operations at national level and contribute to the transfer of large-scale anti-locust coordination knowledge in the country. The Head of the PCN was appointed to another position at the end of the first campaign (June 2014) and has not been replaced. The PCN was not involved with Programme coordination during the 2014/15 campaign.

In May 2015, the MoA set up the Locust Control Coordination Unit (CIPA), under its supervision. This Unit is responsible for coordinating stakeholders involved at different levels in locust control in Madagascar and reforming the structure and organization of the CNA in view of the implementation of a preventive control strategy. At the end of the 2014/15 campaign, the CIPA facilitated the provision of conventional pesticides by the CNA and the CALAT for the Programme.

Activity 4.2: Coordination of the Programme

- **Technical supervision, coordination and monitoring of the Three-year Programme**

The technical supervision as well as the coordination and monitoring of the Three-year Programme are handled by FAO’s Plant Protection and Production Division (AGP) in Rome and, more specifically, by the Locusts and Transboundary Plant Pests and Diseases team (AGPMM). This includes: necessary adjustments to the previously established anti-locust strategy; establishment of profiles and terms of reference for international consultants and their identification, their direct supervision and the technical review and approval of their reports; the preparation of technical specifications for the inputs to be procured fitting with the context; the analysis and technical validation of tenders; the monitoring of all technical activities; and support for the preparation of ten-day and monthly bulletins by the LWU, briefing notes, press releases,

interim or final reports for donors, campaign results, all instructive and resource-mobilization documents, etc. and the technical validation of all these documents.

- **Administrative, financial and operational supervision**

The implementation of the Programme, including procurement of inputs and establishment of contracts, pesticide ‘triangulation’, operational and budgetary management, staff management and the monitoring of activities and expenditures was undertaken by FAO’s Emergency and Rehabilitation Division (TCE) in Rome from September 2014 to February 2015. As of 1 March 2015, budgetary responsibility for the Three-year Programme, and consequently all the tasks listed above relating to the Programme’s implementation, were transferred from the TCE to the FAO Representation in Madagascar. Operations consultants from the FAO Representation in Madagascar are therefore in charge of the Programme’s operational and financial management, which includes monitoring the procurement process for inputs (from calls for tender to the delivery of equipment to Madagascar) and pesticide triangulation, drawing up recruitment contracts and managing personnel, monitoring activities and expenditure, and monitoring operations in close collaboration with FAO Headquarters and consultants based in the field (pre-positioning of all inputs, support for international technical experts, etc.). The Deputy Representative and the Operations Officer are responsible for supervising the Programme’s administrative, financial and operational activities, under the overall supervision of the FAO Representative. They continue resource mobilization efforts on a national level and ensure close cooperation with all stakeholders involved in locust plague management (ministries, technical and financial partners in Madagascar, experts in the field, etc.), with the support of the Operations Officer and consultants. Finally, national experts provide support for the operational, administrative, logistical and financial management of field operations.

- **Supervision and coordination of activities in the field**

The implementation of the anti-locust campaigns (in the capital and at field bases) and daily field activities are overseen by an international Campaign Coordinator with the support of a National Locust Expert who was appointed his deputy in September 2014. Since August 2014, an international logistician has been working with the FAO Representation in Madagascar to support the logistics team – composed of four national logistics experts – and to provide training and refresher sessions when necessary. In addition, since the reception of the first helicopter in October 2014, three aircraft logisticians have taken turns in Madagascar to supervise the reception of aircraft and provide continuous supervision of aerial bases’ activities and to ensure that safety procedures are respected.

Weekly and *ad hoc* teleconferences are held between the teams based in Rome and the FAO Representation in Madagascar to discuss the activities that took place during the week, find solutions to any problems that may have arisen, take the necessary decisions to support ongoing activities and provide an update on the latest resource mobilization efforts. In addition, technical and operational missions are organized from Head Office to support the FAO Representation in Madagascar.

2.2.5 Component 5: Assessment of the effectiveness of the locust control campaign and of the impact of the locust crisis on crops and pastures

Expected outcome: The results of the assessment of the anti-locust campaign's effectiveness and the impact of the locust crisis on crops and pastures as well as on the food and nutrition security of affected populations are available to all stakeholders.

Indicators:

- Findings of the assessment of the effectiveness of the locust control campaign and the Programme are available and disseminated in due time to prepare the next campaign.
- Findings of the impact assessment of the locust crisis on crops and pastures as well as on the food and nutrition security of affected populations are available and disseminated

Results obtained:

- *Following the mission to assess the effectiveness of the 2014/15 anti-locust campaign conducted in June/July 2015, the Assessment Report on the effectiveness of the locust control campaign was available and distributed to technical and financial partners on 1 April 2016.*
- *Following the mission to assess the effectiveness of the 2014/15 locust control campaign conducted in July/August 2015, the results of the Crop and Food Security Assessment Mission (CFSAM) were presented to the MoA on 27 October 2015; the report was published on-line the same day.*

Activities:

Activity 5.1: Assessment of the effectiveness of the locust control campaign

The mission to assess the second locust control campaign (2014/15) was conducted from 22 June to 12 July 2015 by Mr Fakaba Diakité, locust expert and Head of Mali's National Desert Locust Control Centre. The final report was distributed to all technical and financial partners on 1 April 2016. It was also published online on the FAO website dedicated to the locust crisis in Madagascar. The findings of this assessment showed that the objective of the second campaign, namely to support the decline of the locust plague and thus limit damage to crops and pastures, was achieved. Thanks to effective (mainly aerial) control operations, locust numbers and the geographical scope of locust populations were significantly reduced. The total surface treated and protected by FAO amounts to 640 035 hectares, a figure in line with the assumptions made (between 500 000 and 800 000 hectares to be treated). Furthermore, no major incidents were reported with regard to human health and the environment. National capacities were strengthened and agro-pastoral resources were protected, benefiting rural populations.

Activity 5.2: Assessment of the impact of the locust crisis on crops and pastures

The Crop and Food Security Assessment Mission (CFSAM) for the 2014/15 rainy season was conducted from 2 July to 8 August 2015 by FAO and WFP in collaboration with the MoA. In line with what had been planned in the second campaign programme document, the mission paid particular attention to the assessment of damage to crops and pastures caused by locusts. A summary report of this mission was presented to the Government on 27 October 2015 in Antananarivo and the report was published on the website the same day. This report, available via this [link](#), indicates that the damage to grain production caused by locusts in 2015 was

negligible on a national scale because the plague had been largely contained thanks to the implementation of the 2014/15 campaign. Although damage caused by locusts was reported, especially in the south of the country (particularly in the Atsimo Andrefana region), the aerial and ground operations of the 2014/15 campaign, in addition to the impact of interventions carried out from September 2013 onwards, prevented significant harvest losses in 2015.

2.3 Working method

2.3.1 Implementation arrangements

FAO is responsible for supervising, coordinating and implementing the Three-year Programme in close collaboration with the MoA.

The implementation of the activities is supervised and coordinated by FAO experts and activities are carried out with the support of CNA staff in the Malagasy Migratory Locust Outbreak Area and staff from CALAT, the Ministry's Plant Protection Directorate and the DRDA (Regional Directorates for Agriculture Development) in the Invasion Area. Since its Director was appointed to another position in June 2014, the PCN (National coordination post) has not been active. However, the Locust Control Coordination Unit (CIPA), established in May 2015 and supervised by the MoA (Antananarivo), contributed to the coordination of the Programme at the end of the second campaign.

2.3.2 Reports, communication and visibility

- Reports, bulletins and other documents

Over the course of the Programme's second campaign, the following documents/reports were produced and published on the FAO website devoted to the locust plague in Madagascar:

- The programme document for the second campaign;
- 25 ten-day bulletins and four monthly bulletins on the weather and ecology, locust and anti-locust situations (in total, 21 monthly bulletins and 52 ten-day bulletins have been published on the FAO website since February 2013);
- Seven "Madagascar Locust Crisis" Situation Updates, to keep technical and financial partners regularly informed of progress made in implementing the campaign;
- Three campaign journals addressed to technical and financial partners;
- 19 ten-day information bulletins;
- Four field stories;
- The Interim Report covering the period September 2014 – February 2015;
- The 2013/14 campaign Assessment Report;
- The 2015 Madagascar Crop and Food Security Assessment Mission Report.

In addition to these reports, financial and narrative reports are regularly provided for each donor concerning their specific contributions if this has been provided for in the agreements made with each of them and in accordance with the modalities described in these agreements.

Mission reports were also prepared by all international consultants deployed to Madagascar.

- **Visibility**

On the FAO website dedicated to the locust crisis in Madagascar (homepage of the [FAO in emergencies Web site](#), available in both [English](#) and [French](#)) all the Programme reference documents (Three-year Programme Document and Annual Plans); “Madagascar Locust Crisis” Situation Updates; ten-day and monthly bulletins prepared by the LWU; international press releases issued at key moments or during the Programme’s major events as well as those issued by the Communication Office of the FAO Representation in Madagascar; interim and final reports of locust control campaigns; as well as photo galleries and audio-visual materials documenting field activities.

With regard to the media, in addition to answers given by FAO upon specific requests from journalists, many articles have been published in the national media, and national press releases were issued. Meetings with journalists – known as “press brunches” – were also held at the FAO Representation to provide more details on issues related to Programme’s implementation. These events served to improve journalists’ understanding of emergency locust control management, thereby improving the general public’s understanding. Moreover, until December 2014, a Q&A column was published weekly in the national press to address the most common questions regarding the Three-year locust control Programme in Madagascar. Since January 2015, this column was replaced by a ten-day “Information bulletin” prepared by the LWU and the Communication Officer at the FAO Representation. This document provides partners, the media and donors with an almost real-time view of the main outlines of the locust situation and the main field activities. In June 2014, the FAO Representation began publishing campaign journals to provide donors with further information about the Three-year Programme. Since November 2014, field stories that enable readers to experience locust control related activities from the inside have been published on the FAO website dedicated to the locust crisis in Madagascar.

At national level, during significant events of the Programme and at the end of each mission carried out by the Campaign Coordinator or the Three-year Programme Coordinator, debriefing meetings were held with financial partners, donors and national institutions and authorities. Furthermore, following on from what took place during the first campaign, meetings were regularly organized with the Group of Donors for Rural Development (*Groupe des Bailleurs de Fonds pour le Développement Rural*) to inform donors and technical and financial partners of the progress of the Three-year Programme’s activities. Numerous bilateral meetings have been held with each donor to discuss the specifics of signed agreements and provide precise information on the anti-locust campaigns.

2.4 Difficulties encountered

The difficulties encountered and actions taken to resolve them included the following:

- Lack of information on the locust situation in the south-western part of the country, which corresponds to the Malagasy Migratory Locust Outbreak Area, where high-quality data should have been collected and then transmitted in almost real time by the CNA: better exchanges and information flows between national stakeholders and the LWU significantly improved this state of affairs. Furthermore, as of October 2014, FAO

established a team of four scouts equipped with motorcycles operating in key locust areas in the Outbreak Area to obtain timely and reliable information on weather, ecological and locust situations, and on the development of these situations.

- Control operations in remote areas or areas hard to access during the rainy season: early on in the second campaign, small depots of pesticides and kerosene were pre-positioned in these areas. This helped offset the relatively limited range of the helicopter when fully-loaded with fuel and pesticides, which does not exceed 80 km when taking into account the time required for spraying.
- Major difficulties encountered with the helicopters, including the non-compliance of spraying equipment mounted on the second helicopter delivered on 18 October 2014: having expressed reservations about the spraying kit (Micronair nozzles and hopper), FAO immediately asked the service provider to replace it so that the helicopter could be used for survey and control operations as stated in the contract. On 24 November 2014, the company replaced the Micronair nozzles but the original hopper was not replaced with a Simplex-type hopper until the end of January 2015. The delayed replacement of the entire spraying kit led to an increased use of flying hours and pesticides and delayed control operations, mainly at the start of the Malagasy Migratory Locust's second breeding in January 2015. Indeed, with only a single helicopter available for control operations, numerous rotations were necessary but nevertheless, this did not enable all the infested areas to be treated in locations that were sometimes far apart from each other. This delay in control operations allowed Malagasy Migratory Locust hoppers to fledge and, instead of conducting barrier treatments with Insect Growth Regulators against hopper patches and bands, it was sometimes necessary to carry out full-cover treatments with conventional pesticides against adult locusts (resulting in an increased consumption of pesticides and flying hours). As of 8 February 2015, when spraying equipment was fully compliant, the two helicopters were finally both operational for survey and control operations. Efforts made after this date, with over 468 000 hectares treated between February and July 2015 (final flight of the last helicopter in service on 12 July 2015), made it possible to make up for the delay and control locust populations of the second generation of breeding and above all, to treat their descendents and thus attain the objective of the second campaign, i.e. to support the decline of the locust plague.
- The passage of tropical storms Fundi and Chedza on the western side of Madagascar in January and February 2015 momentarily disrupted the implementation of field operations and also resulted in a redistribution of locust populations within infested areas, requiring them to be relocalized.
- Delays in receiving the funding required for the 2014/15 campaign and delays in the procurement and delivery of inputs: the Three-year Programme's difficult financial situation from September 2014 onwards meant that it was not possible for FAO to procure all the purchases planned for the second campaign sufficiently in advance. This led to delays in the procurement and availability of certain inputs, particularly pesticides, and difficulties in the contract management of helicopters with the selected subcontractor. FAO engaged in constant communication with potential donors at national and international levels in order to raise funds for the 2014/15 campaign and Three-year Programme as quickly as possible, thus enabling the second campaign and the Programme to be continued and completed. FAO also had to request that the Malagasy Government make available 14 500 litres of conventional pesticide for the Three-year

Programme at the end of May 2015 so that locust control operations and the overall objective of the 2014/15 campaign were not jeopardized.

- The fragility of some metallic drums: the drums containing one of the batches of conventional pesticides procured proved to be too fragile for Madagascar's terrain and were damaged during transport and handling operations (loading and unloading). The contents of the damaged drums were transferred to more resistant drums. Tighter technical specifications for drums were drawn up and will be included in future tenders for pesticide procurement.

3 IMPACT OF THE 2014/15 CAMPAIGN

3.1 Overview of the locust and anti-locust situation

During the 2014/15 locust control campaign, weather and ecological conditions were generally relatively suitable to the Malagasy Migratory Locust, despite the late arrival (in early December 2014) of the first rains in the Outbreak Area and the passage of two tropical storms (Chedza and Fundi) at the beginning of 2015.

At the end of the second campaign, the overall level of infestation had been decreased, as observed in the reduction of grouped locust populations in both terms of the scope of infested areas (28 percent of the country was concerned in 2014/15 compared with 48 percent in 2013/14) and in terms of locust numbers and the change of their phase status, which had generally passed from the gregarious to the *transiens*.

At the end of the second campaign, compared with the same period the previous year (August 2014), a significant reduction in both the number and size of grouped populations observed in the Outbreak Area was recorded. In August 2015, medium-dense swarms and light flights of gregarious adults were present in the midwestern and midsouthern sectors of the central Invasion Area. Because of unfavourable weather conditions, the activity of these swarm populations remained slow. In the midwestern and midsouthern sectors of the central Invasion Area and in the northern and central sectors of the Outbreak Area, scattered heterogeneous populations were present but, in comparison with the previous year, numbers were lower and their density often medium to low (less than 250 adults/hectare). With the observed reduction in numbers and gregariousness of residual populations at the end of the second campaign, its specific objective, which was to support the decline of the locust plague, was thus achieved.

The reduction of the geographical scope and size of areas infested with and contaminated by the Malagasy Migratory Locust outside the Outbreak Area and the number and size of grouped locust populations (hopper bands and swarms) as well as the degregarization of these populations were possible thanks to the considerable control efforts made that, as of 15 August 2015, enabled locust populations to be controlled over a total surface of more than 640 000 hectares.

The third locust control campaign is crucial to build on the gains made over the course of the first two campaigns, i.e. to enable the return to a locust recession situation, as planned, upon completion of the Three-year Programme in response to the locust plague in Madagascar, and thus to protect the food security of rural populations.

3.2 Impact of the locust plague on crops and pastures

According to the Crop and Food Security Assessment Mission (CFSAM, 2015), damage caused by locusts to grain production in 2015 was negligible on a national scale because the plague had been largely contained thanks to the implementation of the 2014/15 anti-locust campaign. Data show that the recorded fall in rice production in 2015 was mainly due to unfavourable weather conditions (drought and the passage of two tropical storms at the beginning of the year). Although some damage by locusts was reported (particularly in the region of Atsimo Andrefana), the 2014/15 campaign's aerial and ground control operations in addition to the impact of anti-locust actions undertaken since September 2013 prevented major harvest losses in 2015.

So as not to jeopardize the results obtained over the course of the first and second campaigns, it is essential to complete the Three-year Programme in order to return to a recession situation in June 2016. This will put an end to a cycle of serious locust plagues and avoid exacerbating the already pronounced food insecurity situation.

4 CONCLUSIONS AND RECOMMENDATIONS

The concerted and well-coordinated efforts of FAO teams in Madagascar and Rome, supported by specialist teams in the field, made it possible to conduct the Three-year Programme's second anti-locust campaign successfully. With locust populations controlled over more than 640 000 hectares in a manner respecting human health and the environment and without crops and pastures suffering serious damage, the specific objective of the campaign, which aimed to support the decline of the plague and protect agro-pastoral production, was achieved.

By the end of this campaign, attaining this objective was reflected in the reduction of the geographical scope and size of areas infested and contaminated by the Malagasy Migratory Locust outside the Outbreak Area as well as in the number and size of grouped locust populations (hopper bands and swarms) and the degregarization of these populations.

These results were obtained by deploying two aircraft for survey and control operations. It should be noted that large-scale treatment operations (necessary to control a plague) could not have been conducted if they had not been preceded by aerial survey operations. The aerial bases were redeployed as often as required to be located as close as possible to locust population hotspots, the positions of which change during the rainy season depending on its characteristics and the locusts' responses to the changes in their environment.

As of 12 July 2015, when the second aerial base was demobilized, more than 1 539 flying hours⁹ had been carried out by the two helicopters. In total, 169 864 litres of conventional pesticide (Chlorpyrifos 240 ULV), almost 86 680 litres of Insect Growth Regulator (Teflubenzuron 50 UL) and 366 kg of biopesticide (Green Muscle®) were used.

The 2014/15 campaign also contributed considerably to the strengthening of national capacities through the specific training planned and delivered in various technical areas. These training sessions were supplemented by on-the-spot practical training given by the various experts in the field on a continuous basis and during specific training sessions.

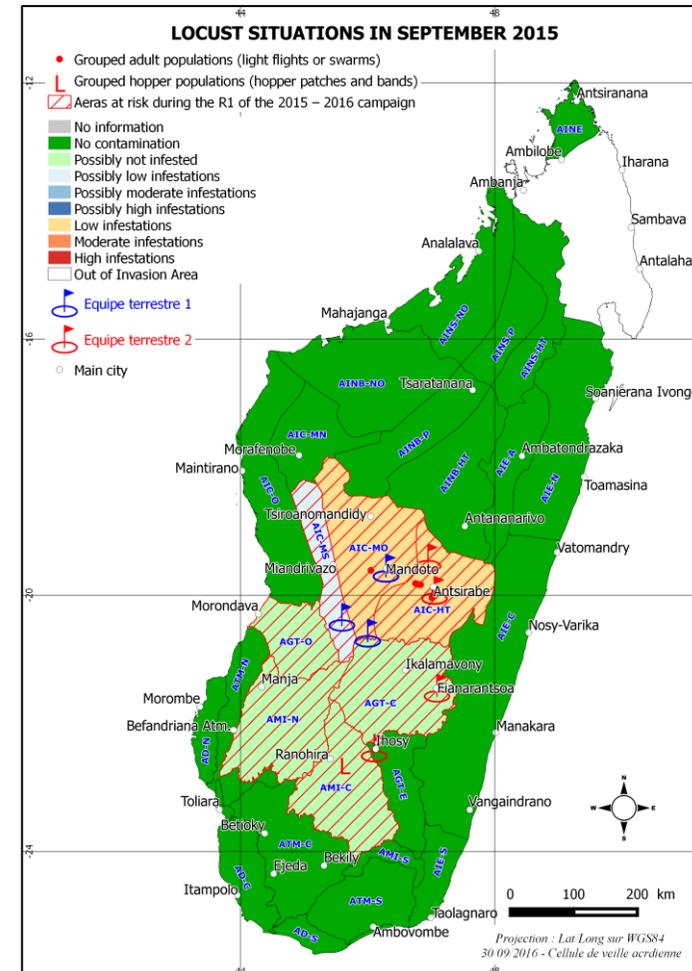
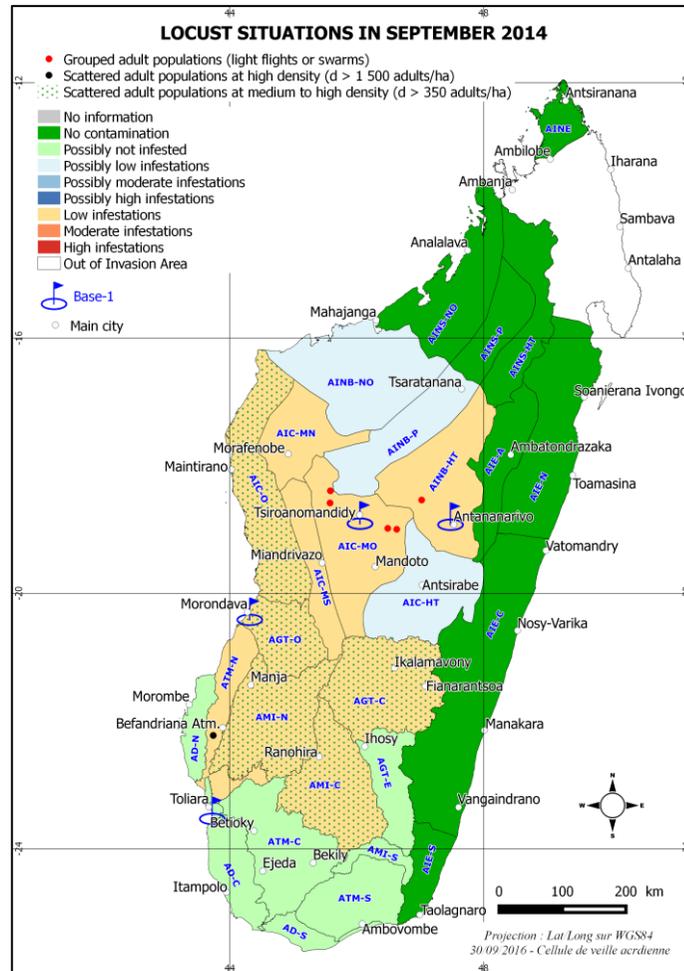
⁹ The 1 539 flying hours correspond to 48.6 percent for survey operations (749 hours), 39.6 percent for spraying (609 hours) and 11.8 percent to deploy the helicopters to and between airbases (181 hours).

The remaining financial resources from the first campaign – along with funding received during the second campaign (with some delay) - enabled the implementation of aerial survey and control operations as well as all planned field activities and training courses.

Three successive and uninterrupted locust campaigns are required to halt the plague, return to a locust recession situation¹⁰ and safeguard the food and nutrition security of 13 million people affected by the locust plague in Madagascar. It is therefore essential that all the required funds be made available on time to implement the Three-year Programme's third and final anti-locust campaign effectively and to complete it. If the third anti-locust campaign cannot be carried out in its entirety and in a timely manner, the return to a locust recession situation cannot be guaranteed in June 2016; a chronic locust upsurge would be likely to prevail and persist (as occurred from 2010 to 2012), potentially developing, sooner or later, into a new locust plague.

¹⁰ Period of deep recession marked by the complete absence of gregarious locust populations.

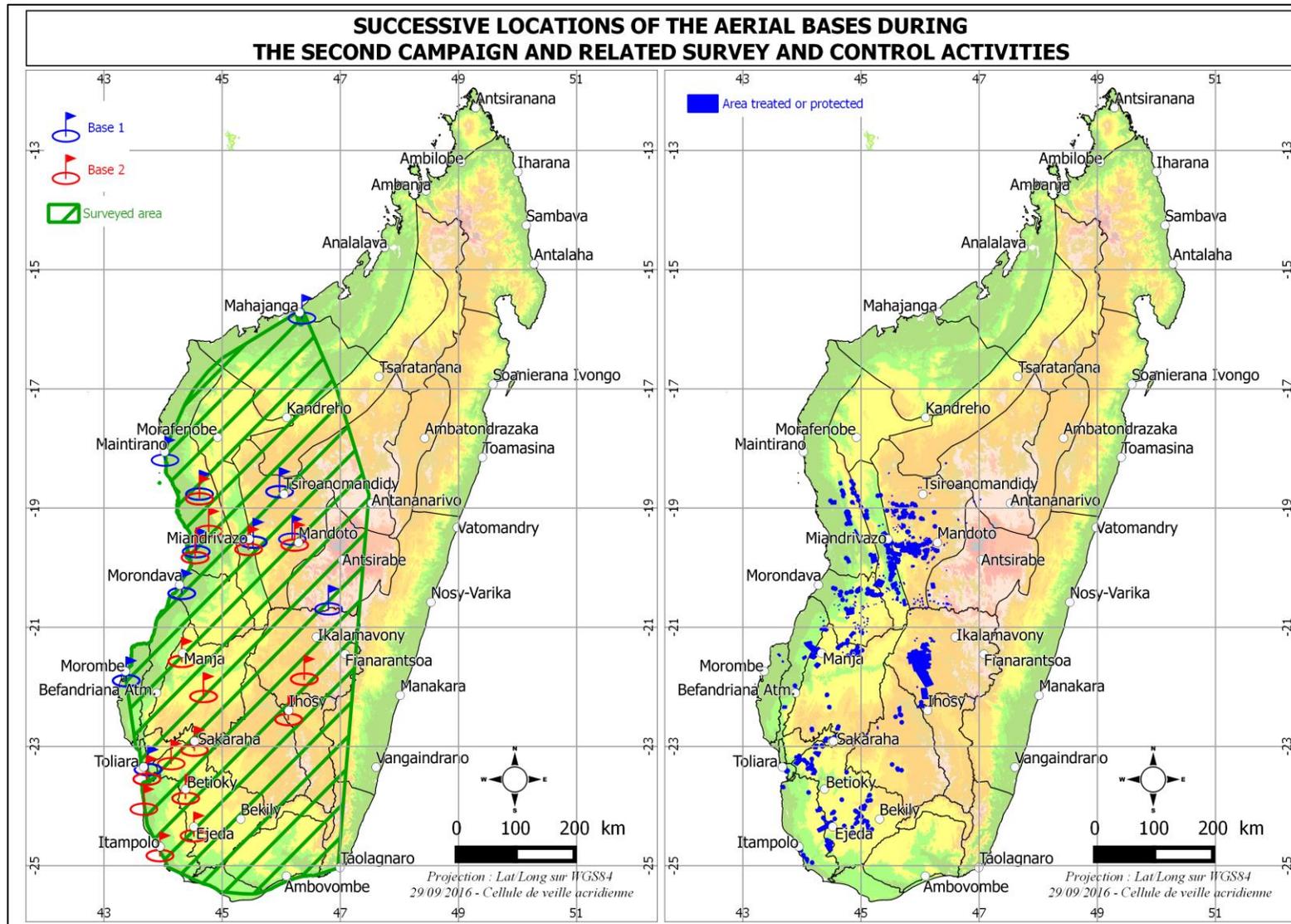
Maps of locust situations in September 2014 and September 2015



¹ Le découpage présenté sur ces cartes est celui des acrido-régions du Criquet migrateur malgache. **AI-Aire d'invasion** : AIE-N-orientale_Nord / AIE-A-orientale_Ankay / AIE-C-orientale_Centre / AIE-S-orientale_Sud / AINE-septentrionale_Extrême Nord-Est / AIN-HT-S-septentrionale_Hautes-Terres Sofia / AIN-P-S-septentrionale_Piémont Sofia / AIN-NO-S-septentrionale_NO Sofia / AIN-HT-B-septentrionale_Hautes-Terres Betsiboka / AIN-P-B-septentrionale_Piémont Betsiboka / AIN-NO-B-septentrionale_NO Betsiboka / AIC-HT-centrale_Hautes terres / AIC-O-centrale-bande côtière / AIC-MN-centrale_Bassin de Morafenobe / AIC-MO-centrale_Moyen Ouest / AIC-MS-centrale_Betsiriry ; **AGT-Aire grégarigène transitoire** : AGT-O-Nord-Ouest / AGT-C-Centre / AGT-E-Est ; **AG-Aire grégarigène** : AMI-N : Aire de multiplication initiale-Nord / AMI-C : Aire de multiplication initiale-Centre / AMI-S : Aire de multiplication initiale-Sud / ATM-N : Aire transitoire de multiplication-Nord / ATM-C : Aire transitoire de multiplication-Centre / ATM-S : Aire transitoire de multiplication-Sud / AD-N : Aire de densation-Nord / AD-C : Aire de densation-Centre / AD-S : Aire de densation-Sud

Successive locations of the aerial bases over the course of the second campaign and related survey and control activities

Both aerial bases were mobile and redeployed depending on the results of the aerial surveys conducted during the campaign, which made it possible to have a comprehensive overview of the locust situation, to identify the most infested areas and those requiring control operations, and, if necessary, to decide to redeploy the aerial bases.



Training delivered during the second campaign

| Training planned in the second campaign PRODOC | Status | Trainer | Period or date | Duration | Beneficiaries |
|-------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Management of Locust, weather and other information | Completed | Locust experts International agronomist in support of the LWU Campaign Coordinator | September 2014/ August 2015 | continuously during missions or remote support | Locust Watch Unit (3 members) |
| Geographical Information System | Completed | International GIS expert | January 2015 (expert's mission) and remotely throughout the campaign | 1 month | Locust Watch Unit (3 members) |
| Surveys and data analysis | Completed | Locust experts at bases | September 2014/ August 2015 | continuously during missions or remote support | Scouts from both bases (2 to 6 people) |
| | Completed | Deputy Campaign Coordinator and entomologist responsible for locust data | October 2014 | 4 days | Mobile scouts with motorcycles (5 people) |
| Campaign management | Completed | Locust experts at bases Campaign Coordinator | September 2014/ August 2015 | continual during missions or remote support | Locust control staff assigned to the aerial bases seconded from the National Anti-Locust Centre and, in the first place, Base Managers (10 people) |
| Spraying techniques | Completed | International expert in spraying techniques and aircraft logisticians | September 2014/ August 2015 | continual during missions or remote support | Locust control staff assigned to the aerial bases seconded from the National Anti-Locust Centre (14 people) |
| | | | October 2014 | 5 days | Staff from CALAT (10 people) |
| | | | November/December 2014 | 15 days | Ground control staff (2 people) |
| Monitoring the impact of treatments on human health and the environment | Completed | International environmentalist | November/ December 2014 | 1 month | CNA staff responsible for monitoring the impact of treatment (4 people) |
| Pesticide Stock Management System (PSMS) | Completed | International PSMS expert | November/ December 2014 | 1 month | CNA staff: Pesticide Focal Point, CNA storekeeper, CNA logistician and international logistician (4 people) |
| Training planned in the | Status | Trainer | Period or date | Duration | Beneficiaries |

| second campaign PRODOC | | | | | |
|-------------------------------------------------------|---------------|---------------------------|---------------|--------|--------------------------|
| Use of drum-crusher | Not Completed | Drum crusher expert | January 2016 | | |
| Use of vehicle-mounted sprayer for barrier treatments | Completed | Spraying systems expert | November 2014 | 4 days | CNA staff (2 people) |
| Warehouses' management | Completed | International logistician | October 2014 | 3 days | Storekeepers (12 people) |

Field expertise planned and carried out during the second campaign

| Field expertise planned in second campaign PRODOC | Mission completed | Position | Dates of mission | | Duration (month) |
|---------------------------------------------------------------------------|----------------------|------------------------------------|------------------|------------|---------------------|
| | | | Start | End | |
| Environmental Expertise | YES | International environmental expert | 10/10/2014 | 25/11/2014 | 1 |
| Locust Expertise | YES | Junior international locust expert | 12/10/2014 | 17/01/2015 | 3 |
| | | Junior international locust expert | 17/10/2014 | 17/01/2015 | 3 |
| | | Junior international locust expert | 12/01/2015 | 28/05/2015 | 5.5 |
| | | Junior international locust expert | 12/01/2015 | 30/04/2015 | 3.5 |
| Aircraft Logistics | YES | Aircraft Logistician | 25/09/2014 | 31/10/2014 | 3.3 |
| | | Aircraft Logistician | 21/10/2014 | 31/01/2015 | 1.2 |
| | | Aircraft Logistician | 27/01/2015 | 28/06/2015 | 5 |
| Logistics | YES | International logistician | 01/09/2014 | 28/05/2015 | 10 |
| | | | 25/06/2015 | 30/08/2015 | 2 |
| Campaign coordination | YES | Campaign Coordinator | 08/09/2014 | 02/10/2014 | 1 |
| | | | 04/11/2014 | 09/12/2014 | 1 |
| | | | 03/02/2015 | 30/03/2015 | 2 |
| | | | 12/05/2015 | 28/06/2015 | 1.5 |
| Coordination of FAO emergency response to the locust plague in Madagascar | YES | Three-year Programme Coordinator | 08/02/2015 | 26/02/2015 | 0.5 |
| Geographical Information Systems | YES | International GIS expert | 10/01/2015 | 08/02/2015 | 1 |

| Field expertise planned in second campaign PRODOC | Mission completed | Position | Start | End | Duration (month) |
|---------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------|------------------|
| Data management (locusts, weather and damage to crops and pastures) | YES | International consultant agronomist in support of the Locust Watch Unit | 01/09/2014 | 01/05/2015 | 8 |
| | | | 16/06/2015 | 31/08/2015 | 2.5 |
| | | Entomologist responsible for locust and agro/socio/economics data | 01/09/2014 | 31/08/2015 | 12 |
| | | Entomologist responsible for weather and locust control data | 01/09/2014 | 31/08/2015 | 12 |
| | | National GIS expert | 01/09/2014 | 31/08/2015 | 12 |
| Pesticide management | YES | International PSMS expert | 04/11/2014 | 12/12/2014 | 1 |
| Elimination of empty pesticide drums | NO | <i>Mission postponed: training will be performed when the construction of the pesticide warehouse is complete.</i> | | | |
| Locust control spraying techniques | YES | International expert in spraying techniques | 03/10/2014 | 18/12/2014 | 2.5 |
| Assessment of the campaign | YES | International consultant – campaign assessment | 23/06/2015 | 12/07/2015 | 0.5 |
| Assessment of the impact of the locust crisis on crops and pastures | YES | International consultant – (CFSAM) | 24/07/2015 | 30/08/2015 | 1 |
| Construction of pesticide storage facility | YES | <i>Architect</i> | <i>No field mission during the second campaign</i> | | |
| | | Engineer | 12/05/2015 | 30/08/2015 | 3.6 |

List of inputs supplied

| Category | Input | Quantities procured |
|------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pesticides | Conventional pesticide | 170 500 litres of organophosphates, of which 30 000 litres Pyrinex 24 UL purchased, 126 000 litres (Chlorpyrifos 240 ULV) donated by governments of Morocco (96 000 litres) and Algeria (30 000 litres) and 14 500 litres of Chlorcypex 134 ULV made available by the Government of Madagascar through the CALAT and the CNA. |
| | Insect Growth Regulator | 78 000 litres of Teflubenzuron 50 UL purchased |
| Vehicles | Double-cabin 4x4 pick-up vehicle | 1 |
| | Single-cabin 4x4 pick-up vehicle | 1 |
| | Whinch | 4 |
| | Motorcycle | 10 |
| Communication equipment | VHF Radio | 20 |
| | Mobile telephone | 1 |
| IT equipment | Computer | 3 |
| | Printer | 1 |
| | Inverter | 8 |
| | Stabilizer | 1 |
| | Cover for computer | 3 |
| | Scanner | 3 |
| | Cover for scanner | 3 |
| Entomological and survey equipment | Locust breeding cage | 10 |
| | Magnifying glass | 100 |
| | Vernier calliper | 30 |
| | Pack of maps | 24 |
| | Collection jar and refill | 120 and 180 |
| | Sweep net and replacement netting | 30 and 60 |
| | Dissection kit | 30 |
| | Insect box | 15 |
| | Chronometer | 30 |
| | Psychrometer | 20 |
| | Box of pins | 20 |
| | Manual counter | 100 |
| | Binoculars | 10 |

| Category | Input | Quantities procured |
|----------------------------------------------------|-------------------------|----------------------------|
| Camping equipment | Camp bed | 200 |
| | Sleeping bag | 145 |
| | Barrel | 4 |
| Personal Protective Equipment | Mask | 500 |
| | Pair of nitrile gloves | 1 700 |
| | Goggles | 800 |
| | Boots | 30 |
| Pesticide drum management | Electric forklift truck | 1 |
| Warehouse | Container | 1 |
| Monitoring human health and the environment | AchE Test | 8 boxes |
| | Oleo-sensitive paper | 500 sheets |

Table of expenditures during the second campaign, by donor and by component (in USD)¹¹

| Donors funding the second year of the Three-year Programme | | | | | | | | | | | | |
|------------------------------------------------------------|----------------|----------------|----------------|--------------------------|--------------|------------------|--------------------------------|----------------|----------------------------------|------------------|---------------------|------------------|
| Components | Belgium | FAO | France | France-AFD ¹² | Italy | Japan | Madagascar (WB ¹³) | | Madagascar (IFAD ¹⁴) | EU | USAID ¹⁵ | TOTAL |
| | | | | | | | Tech. Ass. | Purchases | | | | |
| 1 | 99 656 | 92 075 | 19 357 | - | 372- | 203 3014 | 88 563 | 48 419 | 16 246 | 210 274 | 2 030 108 | 2 808 383 |
| 2 | 490 235 | 288 099 | 32 937 | 466 792 | 838 | 1 013 246 | 1 349 | 399 484 | 438 460 | 995 999 | 320 953 | 4 448 392 |
| 3 | 176 | 4 852 | 11 683 | - | -- | 75 140 | 14 672 | 16 398 | - | - | 2 374 | 125 296 |
| 4 | 496 | 55 496 | 220 254 | - | 1 313- | 356 210 | 65 091 | | 18 218 | 366 673 | 505 016 | 1 588 766 |
| 5 | - | 19 349 | 16 682 | - | - | | | | | | 28 063 | 64 094 |
| SUB-TOTAL | 590 563 | 459 870 | 300 913 | 466 792 | 2 523 | 1 647 909 | 169 676 | 464 302 | 472 924 | 1 572 946 | 2 886 515 | 9 034 931 |

¹¹ This table only includes expenditures relating to the second campaign. Financial pledges still open on 31 August 2014 and expenses relating to the third campaign carried out before 31 August are not included in this table.

¹² French Development Agency

¹³ World Bank

¹⁴ International Fund for Agricultural Development

¹⁵ United States Agency for International Development