Response to the locust plague

Programme – Campaign n° 2
2014/2015

Updated - January 2015

TABLE OF CONTENTS

SUMMARY

Madagascar is prone to natural disasters, including drought, floods, cyclones and locust crises. The current locust plague began in April 2012, following a two-year upsurge that was not addressed owing to insufficient means. Given the extent of the plague, as well Madagascar's high rates of food insecurity and malnutrition, it was estimated that the food security of 13 million people (60 percent of the population) could be affected in the absence of large-scale locust control operations. To cope with this dire situation, the Ministry of Agriculture and Rural Development of Madagascar and the Food and Agriculture Organization of the United Nations (FAO) developed a Three-year Programme (2013-2016) in response to the plague in December 2012.

Given the magnitude and geographical extent of the infested and contaminated areas, it was estimated that at least three successive locust control campaigns would be required to return to a locust recession situation:

- **Locust Campaign 1**: fight against the plague , from September 2013 to August 2014;
- **Locust Campaign 2**: measures to support the anticipated decline, from September 2014 to August 2015;
- **Locust Campaign 3**: towards locust recession and capacity building of the National Anti-Locust Centre, from September 2015 to June 2016.

The objective of the Programme is to contribute to safeguarding food security for the most vulnerable rural populations in Madagascar. Its five components are:

1. Capacity for monitoring and analysis of the locust situation strengthened;
2. Locust control capacity strengthened;
3. Human health preserved and environment protected;
4. Implementation and coordination of the Programme;
5. Assessment of the effectiveness of the locust campaigns and the impact of the locust crisis on crops and pastures.

In December 2012, the budget of the Three-year Programme was estimated at USD 41.5 million. This estimated budget was to be revised on an annual basis to reflect the evolution of the locust situation, the needs of each locust control campaign and the actual cost of the various items. Adjusted for the first time at the beginning of the Programme, in September 2013,the budget of the Three-year Programme was increased to USD 42.9 million in June 2014. In December 2014, the total budget of the Three-year Programme was updated to USD 39.39 million, taking into account the actual cost of the first campaign (2013/14), of USD 20,21 million, and the estimated cost of the second one (2014/215), oof USD 15.28 million .

The first locust campaign has been fully funded and successfully implemented. With more than 30 million hectares surveyed and locust populations controlled on over 1.2 million hectares without any incident affecting human health or the environment and larger damage to crops prevented, mainly in the major rice baskets, the specific objective of the

campaign, aimed at halting the dynamics of the locust plague while protecting crops and pastures, has been achieved.

It is essential that all funds required for the second campaign and, beyond that, for the entire Programme are available in order to return to a locust recession situation in 2016, or all efforts made so far will be in vain. It is also crucial that all funds required are available on time for the implementation of the locust campaigns. If the second and third locust campaigns could not be entirely and timely carried out, the return to a recession situation in 2016 could not be guaranteed; a situation of chronic locust upsurge could prevail (as it happened from 2010 to 2012), worsening sooner or later into a new plague.

This document is perfectly in line with the strategy defined in the Three-year Programme, follows it closely and is a direct result of it. Moreover, it duly includes all necessary technical adjustments made during the course of the first anti-locust Campaign in order to take into account the results and achieved progresses as well as the recommendations made and the lessons learnt. It describes the second locust control campaign, which will be conducted in 2014/15, and its objective of supporting the anticipated decline of the plague through large-scale aerial control operations in the infested areas. The expected results, indicators and activities are described by Programme component. Also presented below are the management modalities carried out by FAO in close collaboration with the Ministry of Agriculture and Rural Development; the technical and operational support provided for Programme implementation; project inputs; the monitoring and evaluation system as well as the periodicity of the reports.

1. GENERAL INFORMATION

1.1. Sectorial context

Madagascar is prone to natural disasters, including drought, floods, cyclones and locust crises. The humanitarian consequences are particularly important because Madagascar is one of the poorest countries in the world, ranking 155th out of 187 countries in the 2014 Human Development Index. The country's widespread poverty and food insecurity particularly affect rural areas: according to the World Bank[1], the proportion of the population living under the poverty line (under two dollars a day) reached 92 per cent in May 2013. The Special Report of the Crop and Food Security Assessment mission to Madagascar conducted by FAO and the World Food Programme[2] pointed out that in July 2013 28 percent of the rural households suffered from food insecurity, i.e. about 4 million people in the 20 regions surveyed[3]. Severe food insecurity was widespread in the southern regions (Androy, Atsimo Atsinanana and Atsimo Andrefana including Ihorombe) and in the food basket region of Alaotra Mangoro, north-east of Antanarivo. About 61 percent of people were at risk of food insecurity across most of the country. Among the causes of food insecurity in Madagascar the Report mentions: the increase in food prices, the low crop production, the impact of climatic factors, especially of cyclone Haruna in February 2013 (Madagascar being the third most vulnerable country in the world to such natural disasters) and the locust plague[4] of the Malagasy Migratory Locust (*Locusta migratoria capito*) since 2012. The last FAO Global Information and Early Warning System's (GIEWS) document on Madagascar, issued in June 2014, indicated that the livelihood conditions of the population have been improving in most regions since May 2014, as food availability (volume of the 2014 harvest) and therefore food access (decreasing rice prices) improved[5]. However, the food security situation remains difficult, particularly in the South.

[1] Website of the World Bank in Madagascar: "Measuring the impact of the Political Crisis", 5 June 2013, http://www.worldbank.org/en/news/feature/2013/06/05/madagascar-measuring-the-impact-of-the-political-crisis

[2] Special Report, FAO/WFP Crop and Food Security Assessment Mission to Madagascar, 9 October 2013.

[3] The regions surveyed are: Alaotra Mangoro, Amoron' I Mania, Analamanga, Analanjirofo, Androy, Anosy, Atsimo Andrefana, Atsimo Atsinanana, Atsinanana, Betsiboka, Boeny, Bongolava, Haute Matsiatra, Ihorombe, Itasy, Melaky, Menabe, Sofia Vakinankaratra, Vatovavy Fitovinany.

[4] A locust plague is characterized by severe and widely distributed infestations, most of which being in the form of hopper bands and adult swarms. The entire invasion area, well beyond the outbreak area, is then infested over a period of one year or more.

[5] GIEWS Website, "GIEWS Country Brief: Madagascar:, 12 June 2014, available at: http://www.fao.org/giews/countrybrief/country.jsp?code=MDG

1.2. Locust and anti-locust contexts

The 2013/14 locust Campaign was officially launched on 20 September 2013 after a year during which the locust plague spread both geographically and demographically (during the 2012/13 rainy season) due to quasi absence of large-scale survey and control operations. Large-scale aerial surveys began on 27 September in order to 1) identify and localize the hotspots of the locust populations having survived the winter period to become the parental generation of the first breeding of the rainy season and 2) determine where to deploy the two aerial bases, each equipped with one helicopter for survey and control. Large and dense swarms of an average size of 10 000 ha were observed on a daily basis during these first large-scale surveys carried out in late September/early October 2013 in the Middle-West. The two aerial bases were deployed: one in the Middle-West (central compartment of the central invasion area, AIC), first in Tsiroanomandidy then in Miandrivazo, and one in the outbreak area, in Ihosy, thereby taking into account the intense locust activity in the Bongolava Region and in the north of the outbreak area. Locust control operations against hopper bands of the first generation of the rainy season started in early November. As of 20 December, more than 68 000 hectares (ha) had been treated and protected against hopper populations and young adults from these two bases.

From early December 2013 onward, when the eastern part of the invasion area became too wet for the Migratory Locust, the winged locust populations that had escaped control operations formed light or dense flights. These moved towards the coastal plains or the outbreak area where hopper and adult locust populations, less homogeneous and dense than those in the invasion area, were present over huge areas. The second generation of breeding started by the 10th of January 2014, mainly in the coastal plains of the invasion area and in the northern and central lowlands of the outbreak area. The most infested areas were located within a stretch of approximately 900 km length and 80-100 km width, from Maintirano up to the south of Toliara. First hatching was observed between Morondava and Toliara during the second ten-day period of January.

Given the extent of this second breeding, a third helicopter and a fixed-wing aircraft were deployed in early February and early March, respectively, as it had been initially anticipated, in order to strengthen locust survey and control capacities. By mid-January 2014 the two aerial bases were deployed in the western coastal plains of Madagascar, one in Morondava and one in Toliara. The third aerial base, equipped with one helicopter, was established north of Toliara on 11 February 2014. With the arrival of a fixed-wing aircraft to carry out control operations in areas too remote to be accessible by the helicopters, and in view of the changing locust situation, the aerial base previously located in Morondava moved to Tsiroanomandidy (in the Middle-West) where the helicopter and the fixed-wing aircraft worked in full complementarity, the latter spraying the infested areas identified by the helicopter.

At the end of March, just as the second generation of breeding of the rainy season was coming to an end, more than 480 000 ha had been treated or protected. However, more and more winged populations were appearing, much more visible than hopper bands, and resulted in numerous reports. The infested areas stretched from Soalala area (at approximately 100 km south-west of Mahajanga) to the southern part of the Mahafaly

Plateau (south of Toliara). In the invasion area, young hopper bands were present in the Soalala area and hopper bands as well as swarms were reported from the Middle-West. In the outbreak area, late instar hopper bands as well as young adults and swarms were present along a coastal area of less than 100 km width.

In early April, numerous and dense medium-size to large swarms of young winged locusts were present in the western part of the invasion area. Later in the month, several of them reached the *Hautes Terres*, and even the suburbs of Antananarivo, where they were probably carried up by the strong winds generated by the tropical cyclone Hellen, which hit north-western Madagascar (Mahajanga area) in early April. In the outbreak area, huge early instar hopper bands of the third generation were developing in the Mahafaly region, southeast Toliara; they were controlled by aerial barrier treatments. With the formation of new swarms, the start of the third breeding, the impact of Hellen and the results of control operations, the shape of the infested areas changed significantly in April, with a greater extension towards the East, in the central part of the Island, but a lesser North extension. During this month, the three mobile aerial bases (equipped with three helicopters and one fixed-wing aircraft) were redeployed several times in the outbreak and invasion areas according to this evolving locust situation and security constraints. A total of 551 000 ha were treated, bringing the total area treated/protected since the start of the campaign to nearly 996 000 ha.

In May, the rainy season was coming to an end and weather and ecological conditions were becoming unsuitable for the breeding of gregarious locusts. In the outbreak area, the development of the third generation was hampered by the large-scale control operations carried out by the fixed-wing aircraft from Toliara first and Betioky later. In the invasion area, numerous highly mobile, small to medium in size swarms continued to fly mainly in the *Hautes Terres*. They were the main target of the helicopters, while the fixed-wing aircraft continued anti-hopper barrier treatments. During this month, more than 170 000 ha were treated and protected.

In June, with the third generation of breeding of the rainy season halted by barrier treatments, the fixed-wing aircraft was demobilized. On the other hand the swarms, still highly mobile and small to medium in size (200 ha on average), continued to move in the invasion area (in the *Hautes Terres* and in the Middle-West) as well as, to a lesser extent, to the borders of the outbreak and invasion areas. However, there was a significant decrease in the number of swarms as a result of the effectiveness of surveys followed by control operations carried out on an area of 39 000 ha during this month. Consequently, the total area treated/protected since the start of the campaign reached more than 1.2 million ha.

The deployment of a fixed-wing spraying aircraft for a three-month period, in addition to the three helicopters, was critical in boosting aerial control operations, thanks to its longer range of action and its larger charge capacity: from 03 March to 03 June 2014, this aircraft alone treated more than 754 000 ha, i.e. about 63 percent of the total area treated and protected.

During the 2013/14 locust Campaign, weather and ecological conditions were generally suitable to the Malagasy Migratory Locust, due also to the extension of the rains beyond the rainy season. Significant control efforts enabled to control locust populations on a total area of 1 204 660 ha as of 30 June, (See Annex 2, Table 1 updated), which corresponds to

74 percent of the total infested areas as per the information regularly provided by the Locust Watch Unit in its ten-day and monthly bulletins. According to the assumptions made for Campaign 1, a total surface of 1.5 million ha was expected to be treated, of which 37 percent with conventional pesticides (full cover treatments against swarms or late-instar hopper bands) and 60 percent with insect growth regulators (barrier treatments against hopper bands up to 3rd instar). As of 30 June, the treated areas accounted for 80 percent of the estimated total area: the difference of 300 000 ha between the target (1.5 million ha to be treated) and actual treatments (1.2 million ha) is due to the lack of information prevailing in some areas throughout the whole Campaign (in particular in the outbreak area that should have been covered by the National Anti-Locust Center (CNA – *Centre national antiacridien*) and to the inaccessibility of some areas for insecurity reasons. In total, 38 percent of the spraying operations were done using the full-cover technique and 62 percent the barrier one; therefore, the treatments have been carried out in accordance with the strategy of the Three-year Programme which privileges, whenever possible, treatment operations against hoppers bands.

These results have been obtained thanks to the deployment of a maximum of four aircraft, three of which dedicated both to survey and control operations. It should be noted that no treatment can be carried out without being preceded by aerial surveys, be it extensive (locating the locust hotspots in order to understand the dynamics of the locust populations, establishing forecasts and optimizing the deployment of the aircraft) or intensive (identifying the blocks to be treated). These aerial surveys allow access to all areas where the Malagasy Migratory Locust can breed and develop, areas that, given the topography of the land, are often inaccessible by road, especially during the rainy season, to identify the targets for treatment (sometimes hidden in growing vegetation, or highly mobile). The aerial bases were redeployed as many times as necessary in order to be as close as possible to the locust hotspots whose successive locations evolve throughout the rainy season according to its characteristics and to the way in which the locust reacts to the environmental changes of its habitat.

In total, as of 30 June 2014, 95 percent of the flying hours originally planned (just over 2 222 hours) were actually used by the four aircraft: 44.4 percent of which (almost 987 hours) were used for survey operations; 38.7 percent (860 hours) for treatments and 16.9 percent (375 hours) for the deployment (to and from the entry point to the aerial bases, and between airbases). Thus, most of the flying hours have been devoted to treatments despite several constraints (See Annex 2, Table 2). In total, more than 470 000 liters of conventional pesticides (Chlorpyrifos), 142 000 liters of insect-growth regulators and 83 kg of biopesticides were used (See Annex 2, Table 3)

In conclusion, the objectives of the first Campaign were reached: the plague of the Malagasy Migratory Locust was halted and its dynamics stemmed without any incident on human health and the environment. In other words, on the one hand the demographic expansion of the plague was stopped given that the exponential increase of the locust numbers associated with every plague was stemmed and the global level of locust infestations was reduced as the number and size of the swarms had strongly declined compared to the beginning of the campaign; on the other hand, the geographical extension of the plague was strongly reduced as neither the North nor the East of the invasion area were colonized by

the locust populations, the ascent of the swarms toward North was blocked and the infestations of the eastern area halted.

Preliminary findings of the evaluation mission of the 2013/14 Campaign, presented at the debriefing held in Antananarivo on 27 June 2014, indicated that the strategy of the Three-year Programme was well-conceived and, based on the results of the campaign, confirmed the positive feedback of the people met and the observations made in the field, that the objectives of the first Campaign were reached. These findings indicated also that, although the 2013/14 locust control Campaign has been a success, all efforts made so far need to be continued during the 2014/15 Campaign in order reach the overall objective and return to a locust recession[6] situation.

As recognized by the Crop and Food Security Assessment mission conducted from the end of June up to mid-July 2014 by FAO and the World Food Programme (WFP), in collaboration with the Ministry of Agriculture and Rural development, the 2013/14 Campaign prevented larger damage to crops, mainly in the major producing areas, and pastures: the major rice producing areas in the northern part of the island were protected and there have been very little damages due to the locusts (see section 1.3 below) across the country.

It has to be noted that during the winter period, i.e. until the end of the 2013/14 Campaign, the aerial operations will identify and treat the swarms still moving in the invasion area and monitor the evolution of the residual gregarious locust populations, as well as of the scattered ones.

1.3. Impact of the locust plague on food security and justification for the response

The locust plague occurs in a context of high food insecurity and malnutrition levels. Agriculture employs 80 percent of families on nearly 2.5 million farms, and accounts for 27 percent of gross domestic product (GDP) and 47 percent of the primary GDP (1984-2005). Rural farmers are especially vulnerable owing to the subsistence nature of their livelihoods. Moreover, the resilience of farming households is very low as a result of insufficient reserves; a lack of collective storage structures; and widespread poverty, which in recent years has undermined the villages' solidarity networks. Even a small amount of damage to crops will inevitably have a deeply destabilizing effect on rural farmers and the greater population.

According to the findings of the assessment of the locust plague's impact on crops and pastures carried out by FAO in April-May 2013 there had been a progressive deterioration in food security resulting from the absence of large-scale locust control operations during the 2012/13 season. The study indicated also that rice crop losses due to locusts in 2012/13 varied from 10 to as much as 40 percent in 17 of Madagascar's 22 regions. Crop losses were mainly concentrated in the South, which includes four regions, Androy, Anosy, Atsimo Andrefana and Menabe, where as much as 40 percent of the crops could have been lost due to locusts, in combination with other factors such as recurrent droughts and cyclones. These findings were confirmed by the joint Crop and Food Security Assessment mission conducted

[6] Notes on the preliminary findings of the evaluation mission of the 2013/14 Campaign, Said Ghaout, 27 June 2014.

by FAO, the World Food Programme and the Ministry of Agriculture and Rural development in July 2013. The report, published in October 2013, warned of the potentially serious impact the locust plague could have on next season's rice crops, if uncontrolled.

Before the start of the first locust campaign, in September 2013, the most recent field observations and historical data indicated that at least 1.5 million ha were likely to be infested. Given the magnitude of the plague, it was estimated that the food security of 60 percent of the population could be affected by the locust crisis which threatened the livelihoods, nutrition and food security of 13 million people, nine million of whom depending on agriculture for their livelihoods. Areas already infested or at risk of being affected by the locust plague included, from south to north: Androy, Anosy, Atsimo Andrefana, Ihorombe, Matsiatra Ambony, Menabe, Amoron'i Mania, Vakinankaratra, Itasy, Bongolava, Analamanga, Melaky Betsiboka, Alaotra Mangoro, Boeny and Sofia (see Annex 5: Administrative map of Madagascar).

The first locust Campaign (2013/14) of the Three-year Programme in response to the locust plague allowed to significantly reduce the numbers and gregariousness of the locust populations as well as the geographical extent of locust infestations, thus limiting damage to crops and pastures. On 17 July 2014 in Antananarivo the Government was debriefed on the main findings of the FAO/WFP Crop and Food Security Assessment Mission (CFSAM), which was conducted from the end of June up to mid-July 2014. Although the data processing and analysis has not yet been completed, preliminary results indicate that rice production at the national level has increased this year. However, in some southern regions, crop production, particularly maize, is expected to register a year-on-year decline compared to 2013, primarily as a result of below average rains. As mentioned above, the assessment also shows that despite some losses, the anti-locust campaign prevented larger damage to crops, mainly in the major producing areas, and pastures.[7]

In order not to endanger the achievements reached during the first Campaign, it is essential to support the decline of the locust plague during the 2014/15 Campaign and return, in 2016, to a recession situation[8] (overall objective of the Three-year Programme), stop the cycle of locust crises and avoid further deterioration of food security.

The indirect impact of the plague in the medium and long terms must also be taken into consideration by the national authorities and humanitarian actors. These include impacts linked to the impoverishment of farming households (such as insufficient grazing or the sale of zebus to cope with food shortages); the abandonment of agricultural land or a reduction in cultivated area; taking children out of school; and deterioration of the health of affected populations (e.g. an increase in disease, malnutrition and stunting among children). Thanks to the contribution of the Central Emergency Response Fund of the United Nations in October 2013, the humanitarian needs of the affected population were addressed through an emergency aid for agricultural recovery and a food aid (FAO, WFP, WHO, UNFPA and ONG).

[7] More details will be available in the CFSAM final report.

[8] Period without widespread and heavy locust infestations in the outbreak area of the Malagasy Migratory Locust and, a fortiori, on the whole territory.

2. THE THREE-YEAR PROGRAMME IN RESPONSE TO THE LOCUST PLAGUE (2013-2016)

2.1. Objectives, beneficiaries, components and indicative budget

The **main objective** of the Three-year Programme is to contribute to safeguarding food security for the most vulnerable rural populations in Madagascar.

The direct **beneficiaries** of the Programme will be the rural populations living in the areas infested by locusts, whose harvests will be preserved.

Considering the magnitude and geographical scope of the infested and contaminated surface areas, it is estimated that at least three successive locust control campaigns are necessary to return to a locust recession period, as follows:

- **Locust Campaign 1**: fight against the plague, from September 2013 to September 2014 (more than 1.2 million hectares treated);
- **Locust Campaign 2**: measures to support the anticipated decline, from October 2014 to September 2015 (from 500 000 to 800 000 hectares to be treated);
- **Locust Campaign 3**: towards recession and capacity building of the National Anti-Locust Centre, from October 2015 to June 2016 (about 150 000 hectares to be treated).

The Three-year Programme developed in response to the locust plague has five components:

1. Capacity for monitoring and analysis of the locust situation strengthened;
2. Locust control capacity strengthened;
3. Human health preserved and environment protected;
4. Implementation and coordination of the Programme;
5. Assessment of the effectiveness of the locust campaigns and the impact of the locust crisis on crops and pastures.

In December 2012 the **budget** for the implementation of the Three-year Programme had been estimated at USD 41.5 million. This estimated budget was to be revised on an annual basis to reflect the evolution of the locust situation, the needs of each locust campaign and the actual costs of the various items. Already adjusted at the beginning of the first campaign, in September 2013, and then in June 2014, the below table (Table 1) was updated again in December 2014, taking into account the actual cost of the first Campaign and the estimated cost ofthe second campaign. It provides an indicative break-down by component and by locust campaign.

SUMMARY	CAMPAIGN 1 (2013/14) USD million	CAMPAIGN 2 (2014/15) USD million	CAMPAIGN 3 (2015/16) USD million	TOTAL USD million
Component 1: Capacity for monitoring and analysis of the locust situation strengthened	5.07	2.60	1.10	**8.77**
Component 2: Locust control capacity strengthened	12.13	7.42	1.80	**21.35**
Component 3: Human health preserved and environment protected	0.18	0.95	0.16	**1.29**
Component 4: Implementation and coordination of the Programme	2.78	4.20	0.80	**7.78**
Component 5: Assessment of the effectiveness of locust campaigns and the impact of the locust crisis on crops and pastures	0.05	0.10	0.05	**0.2**
TOTAL (USD)	**20.21**	**15.27**	**3.91**	**39.39**

It is essential that all required funds for the Three-year Programme are available in order to return to a locust recession situation.

2.2. FAO's comparative advantage

As part of its mandate to fight against hunger, to provide technical assistance to governments in the development and implementation of effective agricultural policies, and to strengthen production capacities, FAO has been active in Madagascar for many years.

Working in collaboration with other United Nations agencies and various technical and financial partners, FAO has developed a unique expertise regarding both the development and implementation of preventive control strategies and the management of locust crises.

FAO played a key role in controlling the 1997-2000 locust plague in Madagascar. Recently, FAO conducted two large-scale campaigns against a locust upsurge (in 2010/11 and 2011/12); however, these campaigns lacked sufficient resources. As a result, a new locust plague began in April 2012, which FAO reported to its technical and financial partners. In order to mobilize the Government and donors, in June 2012, FAO helped to define the prerequisites for external assistance. Beginning in December 2012 (following the official request for assistance from the Government of Madagascar), FAO worked with the Government to develop a Three-year Programme in response to the locust plague. In this context, FAO has successfully conducted the first locust campaign of the Three-year Programme, which must be completed by the second and third campaigns, a condition *sine qua non* for achieving the objectives of the Programme, i.e. a return to a locust recession situation.

Based on its experience in the development and implementation of the previous preventive control strategy, FAO also conducted an institutional and technical study on locust management in Madagascar (2011) aimed at providing an updated overview; identifying the strengths and weaknesses of the National Anti-Locust Centre, as well as the constraints for the sustainability of the preventive strategy; and making relevant recommendations by capitalizing on the work carried out to date. Upon return to a locust recession situation, the

main challenge for Madagascar will be the effective implementation of an efficient and sustainable preventive control strategy.

FAO's added value is based on:

- unrivalled technical expertise in the locust field, including deep knowledge of locust management in Madagascar;
- a longstanding tradition of collaboration with the technical services of the Ministry of Agriculture of Madagascar;
- an efficient organizational and logistical infrastructure for crisis management;
- consolidated relations with many donors, which facilitates the rapid mobilization of financial resources for the implementation of large-scale actions.

2.3. Factors assuring sustainability

Strengthening of institutional and technical capacities

The Three-year Programme in response to the locust plague was prepared in close collaboration with the Ministry of Agriculture and Rural Development (from which the official request for assistance originated). Interventions are therefore consistent with current policies and strategies of the Government, for which the locust crisis remains a major challenge. The Government must be integrated into ongoing development actions to ensure the sustainability of the process after the Programme's completion. Thus, while the 2013/14 Campaign's objective is to halt the plague, the 2014/15 and 2015/16 Campaigns are needed to support the decline of the locust populations and to ensure a return to locust recession. Only the long-term commitment of the Government and of technical and financial partners can help counter the recurrence of locust crises, which are neither seasonal nor inevitable events.

It is only on these conditions that a preventive control strategy can be implemented effectively. Discussions along these lines have already been initiated by the technical services of the Ministry of Agriculture and Rural Development and FAO, based on achievements and lessons learned from past experiences. The National Anti-Locust Centre must be reformed in order to be able to implement an effective and sustainable preventive control strategy as soon as the plague ends. This includes the annual funding for its operations and human and material resource management, including the maintenance and replacement of the equipment required for monitoring and controlling locusts.

By then, over the course of the Three-year Programme, the activities implemented will contribute to the development of national capacities in data monitoring and analysis, management and implementation of locust survey and control operations, and monitoring of the treatments' impact on human health and the environment. The Programme will also provide an opportunity to test the National Locust Emergency Plan and improve it through lessons learned.

Environmental aspects

Within the framework of the Three-year Programme, FAO has developed in September 2013 a Human Health and Environment Management Plan for locust campaigns in Madagascar (PGSE –*Plan de gestion sanitaire et environnemental*). This plan includes the assessment of

risks and mitigation measures, procedures for health and environmental impact monitoring, pesticides management and provision of information on locust control operations. It is a dynamic document that will not only be used as a reference in the fight against the plague (Three-year Programme) but will also be useful in future years for the implementation of the preventive control strategy.

Concerning the use and management of pesticides, which is a major concern of all stakeholders, it is clear that during a locust plague, the use of large quantities of pesticides is essential. In particular, the use of conventional pesticides with a wide spectrum[9] but a quick action is necessary against mobile locust populations (swarms) or directly threatening crops. However, in order to limit the environmental impact of locust control operations, and especially to restrict the quantities of pesticides that are either in circulation or stored (and at risk of expiring), FAO will encourage the 'triangulation' of pesticides, whereby a country with a stock of pesticides donates part of it to a beneficiary country with FAO providing the transportation. It should be noted, however, that locust control operations target hopper populations that occupy smaller areas, move slower and are more vulnerable to pesticides compared with adult (winged locusts) populations. Thus, Insect Growth Regulators (IGR), which are slower-acting and have a narrower spectrum, can be used against the hoppers because IGRs only act on moulting insects. Moreover, since IGRs have long-lasting effects, they can be applied in barriers (a swath treated every 500 to 1 000 metres) allowing rapid protection of large areas infested by hopper bands. Finally, non-chemical pesticides formulated with *Metarhizium acridum,* an entomopathogenic fungus specific to locusts, are used in environmentally sensitive areas. Every effort will be made to prevent pesticide stocks from becoming obsolete in Madagascar.

[9] They are insecticides acting on all insect species.

3. DETAILED PRESENTATION OF THE 2014/15 LOCUST CONTROL CAMPAIGN

3.1. Objectives

Within the overall objective of helping to safeguard the food security of the most vulnerable rural populations in Madagascar, the specific objective of the 2014/15 Campaign is to support the anticipated decline of the Malagasy Migratory Locust plague and thereby limit the damages caused by locusts on crops and pastures.

In practice, the achievement of this objective will result in a new and significant decline of the geographical extension of the area settled by the Malagasy Migratory Locust populations, that should no longer be observed beyond the edge of the outbreak area and, at the same time, in a reduction of the infested areas, a decrease in the number and size of the swarms and in the gregariousness of the locust populations.

3.2. Adopted strategy

The strategy that will be implemented to respond to the plague includes identifying the hotspots of locust populations; regularly monitoring the dynamics of these populations in order to establish the most accurate diagnosis and forecast; and deploying and using control measures according to the best agricultural practices and with respect to human health and the environment.

In the plague context prevailing in Madagascar, this strategy implies control operations with different types of pesticides, taking into account the list of pesticides registered in the country; the latest report of the Pesticide Referee Group (composed of independent experts); and the locust targets and various habitats. Three types of pesticides will be used: conventional fast-acting pesticides for full cover treatments (used mainly against adults locusts when rapid mortality is necessary, particularly if they are located near crops, or to prevent them from moving to other areas); IGRs for barrier treatments (to rapidly protect large areas contaminated by hopper bands at stages 1 to 4, thus preventing the formation of new swarms); and biopesticides formulated from the spores of the entomopathogenic fungus *Metarhizium acridum* and used for full cover or barrier treatments (especially in environmentally sensitive areas). The treatments primarily target hopper infestations.

The total amount of pesticide to be purchased for the second campaign shall allow treating 800 000 hectares. The basic assumption made for this 2014/15 Campaign is in fact cautious (based on the precautionary principle) considering the treatment of 800 000 ha instead of the 500 000 as envisaged in December 2012 during the preparation of the Three-year Programme. Thus the gap between planned areas to be treated (1.5 million ha) and areas actually treated (1.2 million ha) during the 2013/14 Campaign, i.e. 300 000 ha, was taken into account when preparing the 2014/15 Campaign document. As mentioned above, this difference is due to the following factors: 1) a lack of information prevailing throughout the first Campaign and that still persists for some areas (mainly in the outbreak area, the traditional habitat of the Malagasy Migratory Locust, which should be covered by the National Anti-Locust Center); it is assumed that some of the locust populations that have

developed in these areas could have been undetected; 2) the inaccessibility to some areas due to insecurity and logistical constraints (ground support, which is essential for the implementation of aerial operations, may not always be able to follow closely the operations, *de facto* limiting them); and 3) the characteristics of the locust: the more gregarious it is, the more opportunistic and mobile it becomes.

Owing to the extent of the potentially infested areas, their location and the spatial-temporal evolution of the dynamics of locust populations, large-scale aerial operations are required. It is absolutely necessary to stick to this strategic approach, namely the realization of large-scale aerial operations, to successfully complete the fight against the locust plague during the 2014/15 Campaign. Indeed, such operations will allow: 1) the collection of data on the status and dynamics of the locust populations throughout the whole infested areas and the identification of the most infested areas through extensive surveys; 2) the prioritization of areas to be treated during intense surveys; and 3) the implementation of control operations. The areas to be treated are so important (estimated at 800 000 ha for this second campaign) that only aerial treatments are able to carry out timely and appropriate sprayings. They also allow reaching the most remote areas, which are not accessible by ground during the rainy season. The total estimated number of flying hours for the second campaign is of 1 200 hours. Approximately 300 flying hours will be required for survey operations that play a crucial role in implementing the locust control strategy and doing tactic adjustments; the remaining 900 hours are for locust control operations.

As part of this strategy, as was the case during the implementation of Campaign 1, necessary tactical adjustments will be adopted to respond to the evolving nature of the locust plague. These adjustments could have an impact on the number of flying hours and perhaps on their distribution (in particular, the ratio of survey and control flying hours could change depending on the types of aircraft that will be required during the locust campaign), on the quantities of pesticides used and on the number of hectares treated. During the 2014/15 Campaign, which supports the anticipated decline of the plague, the targets of the treatment will be fewer, smaller and thus, more difficult to find, especially hopper bands that are already less visible than adult populations (since they move through the vegetation) and are subject to far fewer reports by rural populations compared to swarms; treatments are likely to focus more on the fight against the most visible and most frequently reported adult populations (swarms and groups), and therefore to full-cover treatments which will require to spend more flying hours.

In addition to aerial pesticide spraying, ground control operations will be carried out as follows:

- On the one hand, ground control is limited in the framework of the Three-year Programme from the aerial bases deployed under FAO's aegis, to complete the aerial treatments as close as possible to the buffer zones (so-called "cleaning-up" treatments) and to treat sensitive areas using biopesticides (by the biopesticide team) and using mounted-vehicle sprayers (by the mobile ground control team);
- On the other hand, under the Government's responsibility, ground control will be carried out by the Support Unit for Anti-Locust Ground Control (CALAT – *Cellule d'appui à la lutte antiacridienne terrestre*) in the invasion area and by the National Anti-Locust Center in the outbreak area, to protect the crops under direct locust threat.

This close crop protection carried out by the national authorities under the Ministry's aegis is expected to have a positive social impact on the rural populations by rebuilding their confidence in the actions undertaken by the Government to end the plague, thus ensuring cultivation of the abandoned fields after hopper bands or swarms went through. An immediate impact is also expected on the livelihoods of the households whose crops will be protected. Nevertheless, such ground operations are much localized by their nature (as the staff walks) and, thus, can only have a minimal impact on the dynamics of the locust populations. Officers of the Regional Rural Development Directorates (DRDR) participating in the ground operations of the Support Unit for Anti-Locust Ground Control (CALAT) and who have not yet received training or a refresher course on ground control techniques and on all precautions to be taken to protect human health and preserve the environment, will receive such training from an FAO expert.

Before, during and after control operations, special attention will be given to the preservation of human health and the protection of the environment, in accordance with the Human Health and Environment Management Plan and using the didactic documents widely distributed to the rural populations.

Thanks to the mobilization of locust management expertise and to the delivery of training sessions and refresher courses, including in the field (see Annexes 6 and 7), human capacities will be strengthened throughout the Campaign 2, as it was already done during the previous one. This will contribute to the strengthening of national capacities, which is essential in view of the Government taking over locust control after 2016.

Finally, FAO will supervise all project activities, and provide technical and operational coordination in order to ensure the success of the campaign.

3.3. Description of expected outcomes, indicators and activities by component

Following the first 2013/14 Campaign, which has been decisive in halting the plague, the 2014/15 Campaign of the Three-year Programme in response to the locust plague, will be intended to support the decline of the plague. The following paragraphs describe in detail the expected outcomes for each component, the activities to be carried out during the campaign and the indicators. The logical framework, including the provisional workplan of the second campaign of the Programme, is provided in Annex 3.

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

Expected outcome:

The capacities for monitoring and analysing the locust situation are strengthened, thus making it possible to understand the dynamics of the locust populations; implement the locust control strategy; make necessary tactical adjustments during the campaign; and identify the targets for large-scale control operations.

Indicators:

- 300 flying hours for aerial surveys are undertaken from September/October 2014 to August 2015, surveying around 22 million hectares in the areas infested (or likely to be infested).
- Spatial-temporal dynamics of the locust populations are known and documented (both in quantitative and qualitative terms); the number, size, density, developmental stage and phase status of hopper and adult populations (swarms) are identified in the infested areas; movements of the swarms are described and mapped.
- Ten-day and monthly bulletins on the locust and anti-locust situation are published by the Locust Watch Unit no later than 15 and 30 days respectively, after the reported period.
- Number of technicians (surveyors and members of the Locust Watch Unit) trained in data collection, analysis and information management.

Activities:

Activity 1.1. Strengthening of human capacities in data collection and analysis, and information management

The Locust Watch Unit, established in February 2013 within the Plant Protection Directorate of the Ministry of Agriculture and Rural Development for the entire duration of the Three-year Program, will continue to gather all locust, ecological and weather data, as well as information on damage to crops and pastures. This data will be entered into a database for analysis and reference. The Unit will be strengthened through: (a) technical support on locust matters for data management and analysis; (b) continued support provided by a junior international consultant for the whole duration of the campaign in order to make the preparation and issuance of the ten-day and monthly bulletins and updates more efficient; (c) support in Geographical Information System (GIS) provided by an international expert, including for on-the-spot training, to the benefice of the national GIS expert at the beginning of the 2014/15 Campaign.

Technical assistance will also be provided by a national locust expert throughout the whole duration of the Campaign, and by both the locust expert, Coordinator of the FAO response to the locust plague in Madagascar, and an international locust expert through a dedicated mission in March 2015 and at distance. This technical assistance will include the assessment of the locust situation, the development of accurate appraisals regarding the dynamics of locust populations and their likely future development, and recommendations relevant for making necessary tactical adjustments to the anti-locust strategy.

Activity 1.2. Support to survey operations

Aerial survey operations must be carried out continuously during the locust campaign, from September/October 2014 to August 2015. In September/October 2014 survey operations will allow to assess the importance of the adult populations from the last locust breeding of the 2013/14 rainy season having survived to the winter period, and to identify their geographical distribution (extensive surveys). These operations will continue in order to locate targets for control operations (intensive surveys). The analysis of the survey results and other information collected (weather and locust records) will provide for: ten-day and monthly overviews of the locust situation; determining hotspots of locust populations;

developing locust diagnoses and forecasts (and the preparation of related ten-day and monthly bulletins on the locust and anti-locust situation); and implementing the locust control strategy and regularly adjusting locust control tactics, particularly by establishing priority areas for treatment.

During the 2014/15 Campaign , it is expected that a total of about 300 flying hours for survey operations will be undertaken (by helicopter). In addition to survey flying hours, this component will cover the acquisition of additional survey and camping equipment, tires and other spare parts for vehicles and motorbikes, as well as the operating costs of the aerial bases and of the survey teams.

Component 2: Strengthening of national locust control capacities

Expected outcome:

National locust control capacities are improved and the number of Migratory Locust populations is reduced during the 2014/15 Campaign in the infested areas, thereby limiting damages to crops and pastures due to the locust plague.

Indicators:

- Approximately 800 000 hectares are treated between October/November 2014 and August 2015.
- Locust mortality rate in the treated areas is over 85 percent.
- Number of locust-regions[10] infested is reduced (reference is the locust infestation map dated 30 June 2014)
- Number of staff trained in campaign management and spraying techniques (both aerial and ground).
- Relative importance of damage to crops and pastures.

Activities:

Activity 2.1. Human capacity building for locust control

Technical assistance will be provided in locust control throughout the whole duration of the campaign. Trainings in aerial and ground spraying techniques will be delivered by international experts at the aerial bases to the benefice of locust control staff assigned to the aerial bases, seconded from the National Anti-Locust Centre, the Plant Protection Directorate and the Regional Rural Development Directorates, as well as of staff from the Support Unit for Anti-Locust Ground Control (CALAT) established in April 2014 within the Ministry of Agriculture and Rural Development.

[10] In Madagascar, the so-called "locust-regions" are the areas of significant importance for the development of the Malagasy Migratory Locust, the dynamics of its populations and the movements of its swarms throughout the year [i.e. during the rainy (period of breeding) and winter (unsuitable for locusts) seasons] according to its status [i.e. outbreak area during recessions when the locusts are solitary and invasion area during plagues when they are gregarious].

Activity 2.2. Support to locust control operations

Under this component, the quantities of pesticides needed to treat approximately 800 000 ha will be acquired (through the triangulation process and through purchase). Given the number of hectares to be treated or protected and the extent of the territory concerned, two aerial bases, each equipped with at least one aircraft, will be set up from October/November 2014 to June 2015; one base will be maintained from July to the end of August 2015. The Programme includes approximately 900 flying hours for control operations in 2014/15, as well as the operating costs of the aerial bases. The control operations will also be supported through the acquisition of additional equipment, personal protective equipment, camping, communication and computer equipment as well as the tires and other spare parts for vehicles.

The quantities of pesticides needed (in liters or kilograms) and the areas to be treated or protected (in hectares) are outlined in Table 2. The control operations will be carried out with three types of pesticides: conventional pesticides, IGRs and biopesticides.

Table 2 - Pesticides required for the 2014/15 Campaign and hectares to be treated or protected

PESTICIDE	Quantities	Hectares treated/protected
Conventional pesticides: full cover (litres)	230 000	230 000
Insect growth regulators: barriers (litres)	110 000	550 000
Biopesticides (kg)[11]	1 000	20 000
TOTAL		**800 000**

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

Expected outcome:

No incident affecting human health during the aerial control operations or the handling of pesticides is reported; the impact on the environment of the control operations is limited.

Indicators :

- Number of incidents reported affecting human health during the aerial control operations or the handling of pesticides.
- Number and severity of any potential incident caused by control operations on the environment.
- Number of staff trained in monitoring of the impact of treatments on human health and the environment, in the use of a drum-crusher, and in the use of the pesticide stockpile management system (PSMS).

[11] Biopesticides: 20 000 liters produced through mixing 1 000 kg of spores with diesel in order to be sprayed on 20 000 ha at a volume of 1 l/ha.

Activities:

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

Technical assistance will be provided in the following way: two missions of an international environmental expert will be fielded in October/November 2014 and in March 2015, about the monitoring of the impact of treatments on human health and the environment; a (refresher) training will be delivered on the use of the pesticide stockpile management system in October 2014; and a training on the use of a drum-crusher will take place in May 2015 (15 days). Brainstorming discussions will also be held during the second locust campaign on the revision of environmental specifications (by three national experts from the National Anti-Locust Centre, the Plant Protection Directorate of the Ministry of Agriculture and Rural Development, and the National Environment Agency).

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

The Human Health and Environment Management Plan (PGSE) that has been developed at the beginning of the Three-year Programme by two international environmental experts, will continue to be carefully implemented during the second campaign, as it was the case during the implementation of the first campaign. Furthermore, the Programme will continue to cover the operating costs of the teams that were set up to monitor the impact of treatments on human health and the environment and the management of empty pesticide drums. Finally, in close collaboration with the Campaign Coordinator and the logistics experts, the designated national focal point will continue to ensure the management of pesticides throughout the 2014/15 Campaign. Particular attention will be given to communication aspects and to the awareness campaign to be implemented by the Ministry of Agriculture and Rural Development.

Activity 3.3. Construction of a pesticide storage facility

A pesticide storage facility will be built in Toliara during the 2014/15 Campaign, as the land has already been identified, the plans finalized and the tender for selecting the construction company launched during the 2013/14 Campaign. The related cost of human resources will also be covered by the Programme.

Component 4: Implementation and coordination of the Programme

Expected outcome:

The supervision and technical and operational coordination of the overall Programme, as well as those of the specific field operations, are performed and adjusted if needed, enabling the achievement of the expected outcomes of the campaign and of the Program in the best possible way.

Indicators :

- The supervision and coordination mechanism is set up, effective and efficient.
- The locust control campaign is implemented as planned.
- The operation shows overall positive outcomes.

Activities

Activity 4.1. Implementation of the National Locust Emergency Plan

According to the official request for assistance dated 5 December 2012, implementation of the Programme activities will continue to be supervised and coordinated by FAO. Within this framework, the National Locust Emergency Plan, which is based on an innovative approach in locust control, was developed in October 2012 and cleared by the Council of the Government in September 2013. This Plan will continue to be implemented by the National Coordination Unit, which was established in September 2013 within the Ministry of Agriculture and Rural Development in Antananarivo. This Unit is a coordination tool to facilitate the locust campaign management and contributes to the transfer of skills to coordinate the response of large-scale locust crises in the country. The Programme will provide support for the Unit's organization, if needed. At the end of the campaign and the Programme, lessons will be drawn to improve the National Locust Emergency Plan.

Activity 4.2 Coordination of the Programme

Effective coordination of the Programme will be critical to its success. The following is envisaged: (a) Daily supervision and coordination of field operations through international technical expertise (Campaign Coordinator and logisticians); (b) monitoring of Programme implementation at national level by the FAO Representation in Madagascar, including operational, administrative and financial support, resource mobilization at the national level, smooth information flow and liaison with all stakeholders, including the authorities as well as technical and financial partners in Madagascar; and (c) supervision and coordination of the Programme at FAO headquarters, including definition of the locust control strategy and clearance of related tactical adjustments, programming and planning, resource mobilization, procurement of inputs and contracts, pesticide triangulation, technical, operational and financial management of the Programme, staff management, monitoring of activities and expenditures, and reporting at the Programme level.

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 assessment results regarding both the 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

- Results of the assessment of the locust campaign's effectiveness are available and disseminated in a timely manner for the preparation of the next campaign.
- Results 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.

Activities

Activity 5.1 Assessment of the effectiveness of the locust control campaign

At the end of each locust control campaign, an assessment will be performed on the efficiency of its implementation as well as its effectiveness, and lessons learned will be

incorporated into the subsequent campaign. Therefore, the outcomes of the assessment of the 2013/14 locust control Campaign and recommendations made throughout the campaign were fully taken into account for the preparation of the 2014/15 Campaign to improve its efficiency and efficacy.

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

An impact assessment of the locust crisis on crops and pastures as well as on the food and nutrition security of affected populations, will be conducted and a summary will be made available at the end of the campaign. The figures obtained will serve as a basis for determining the support to be provided to farming households whose livelihoods have been affected by the locust crisis.

3.4. Assumptions and risks

The success of the implementation of this Programme is based on the following assumptions:

- involvement and support from the Government to the locust control campaign;
- no major deterioration of the socio-political context or of the security situation;
- availability and timely provision of required funds;
- availability of national and international human resources;
- availability of the required equipment;
- no extreme weather events.

4. IMPLEMENTATION ARRANGEMENTS

4.1. Management modalities and partnerships

FAO will ensure the direct responsibility for implementation of the Programme, in close collaboration with the Ministry of Agriculture and Rural Development, particularly the Ministry's Plant Protection Directorate and Regional Rural Development Directorates, as well as the National Anti-Locust Centre.

The effective implementation of Programme activities will be supervised and coordinated by FAO experts at headquarters and at the FAO Representation in Madagascar, and in the field by the international Campaign Coordinator supported by a logistician. The activities will be carried out with the support of National Anti-Locust Centre staff in the Malagasy Migratory Locust outbreak area, and with the support of the Plant Protection Directorate and Regional Rural Development Directorates in the invasion area. The National Coordination Unit set up within the Ministry of Agriculture and Rural Development in Antananarivo under the National Locust Emergency Plan will also contribute to the coordination of the Programme.

The Programme team will work actively with all stakeholders and agencies to avoid duplication of efforts. Local and national administrations and organizations will be involved in the implementation of the Programme, especially regarding the timely flow of information.

Finally, a partnership will be established with other organizations involved in locust control, particularly the National Environment Agency and the National Centre of Applied Research for Rural Development.

4.2. Technical and operational support for the implementation of the Programme

During the 2014/15 Campaign, FAO will continue to mobilize the required human resources to ensure the success of the campaign. In addition to field experts, the technical and operational support of the Programme will be provided through the professional expertise outlined below:

At the FAO Representation in Madagascar, the Deputy Representative and the Operations Coordinator will ensure a close liaison with all stakeholders involved in the management of the locust plague (e.g. Ministries, technical and financial partners operating in Madagascar, and experts in the field) supported by the Programme Officer. The international Operations Officer will monitor operations in close collaboration with FAO headquarters and field-based consultants, including the pre-positioning of all inputs, and support the international technical experts; a National Operations Officer will be recruited to provide support for these activities. Finally, the national experts will provide support for the operational, administrative, logistics and financial management aspects of field operations.

At FAO headquarters, in Rome:

- The Locusts and Transboundary Plant Pests and Diseases team (Coordinator of the FAO emergency response to the locust plague in Madagascar, Senior Locust Expert and Locust Programme Officers) will ensure oversight and technical coordination of the Programme and its technical monitoring, both remotely and through field missions. This will include: the definition of the locust strategy and any necessary adjustments; the coordination and consistent implementation of all projects contributing to the Programme; the definition of the required technical profiles, the preparation of the relevant terms of reference and identification of the technical staff; the technical supervision of consultants; the preparation of technical specifications of the equipment; the approval and monitoring of technical and operational execution of the Letters of Agreement; technical analysis and clearance of calls for tender; the monitoring of the pesticide triangulation process, with transportation provided by FAO and funding from the campaign's budget; daily supervision of the technical choices made throughout the implementation, in close collaboration with the Campaign Coordinator and other technical experts; monitoring and approval of technical documents (including ten-day and monthly bulletins); clearance of both mission reports and activity reports; and liaison with technical and financial partners on all technical aspects.
- The Emergency and Rehabilitation Division will be responsible for the management of operations (Liaison and Operations Officer, and Operations Officers). This will include: operational and financial management of the Programme; follow-up of the entire procurement process of inputs (from the launch of tenders through the delivery of equipment to the final destination in Madagascar); pesticide triangulation; follow-up of the contract awarding process; staff recruitment and administrative management; monitoring of activities and expenditures, etc.
- The Procurement Service will launch international tenders for the procurement of equipment and services in accordance with FAO rules and regulations, based on detailed technical specifications prepared by the technical team.

The above-mentioned staff, in Madagascar and at FAO headquarters, will continue to play an active role in identifying the additional financial resources required for the 2014/15 Campaign and the subsequent one.

4.3. Donors' inputs

The human and material resources needs required for the 2014/15 Campaign are summarized below:

Field experts: This category includes human resources for the implementation of the 2014/15 Campaign, as described in paragraph 4.2 (national and international technical and operational support staff working in the field): Campaign Coordinator; logisticians; locust experts; experts in Geographical Information Systems (GIS); information management experts regarding data on locusts, weather and damage to crops and pastures (Locust Watch Unit); environmentalists; drum-crusher expert; pesticide management experts; experts for the revision of the environmental specifications; architects and engineers for the

construction of the pesticides storage facility; and evaluation experts to assess the campaign and the impact of the locust crisis on crops and pastures.

Training: Training sessions/refresher courses or on-the-spot training will be organized in the following technical areas: data collection and management regarding locusts, weather and other subjects; GIS; ; campaign and aerial base management; aerial and ground control operations; monitoring of the impact of treatments on human health and the environment; using of the drum-crusher and of the pesticide stockpile management system; including all issues related to pesticide management, as well as monitoring and mitigation measures of the impact of treatments on human health and the environment (including the storage, transportation and handling of pesticides).

Contracts: Contracts will be signed between FAO and specialized companies for the provision of two to three aircraft (helicopters and fixed-wing aircraft) for an estimated 1 200 flying hours during the 2014/15 Campaign: 300 hours for survey operations and 900 hours for locust control operations. These contracts also cover the cost of logistics and aircraft mobilization/demobilization. In addition, a contract will be signed for the construction of a pesticide warehouse in Toliara.

Equipment: The following expendable and non-expendable equipment will be purchased:

- *Pesticides*: 200 000 litres of conventional pesticide (active ingredient: Chlorpyrifos) through triangulation and procurement (in addition to about 30 000 litres remaining from the 2013/14 Campaign); 100 000 litres of IGR (active ingredient: Teflubenzuron) in addition to about 10 000 litres remaining from the 2013/14 Campaign; and 100 kg of biopesticide (spores of *Metarhizium acridum*). These pesticides will be stored in the central and secondary pesticides storage facilities of the National Anti-Locust Centre and the Regional Rural Development Directorates (then moved to the central pesticide warehouse in Toliara as soon as the construction works will be completed), and brought to the aerial bases over land by 4x4 trucks[12]. Safe storage of pesticide drums will be guaranteed at each base, as well as the collection and gathering of empty drums, in accordance with best practices.
- *Vehicles*: The vehicles required have already been purchased during the 2013/14 Campaign. 28 4x4 vehicles are available for the missions of staff assigned to the aerial bases (e.g. locust scouts, control agents, teams for treatment monitoring, pesticide management) as well as 28 motorcycles at the locust posts. Four trucks transport the pesticides from the storage facilities to the aerial bases or treatment areas and return the empty drums to the storage areas. According to their needs, vehicles will be made available to the different teams involved in the campaign implementation (coordination, preservation of human health and protection of the environment, pesticide management and assessment of the campaign). All vehicles will be monitored (e.g. provided with a travel logbook indicating every trip, its

[12] The Programme has no other option except to make use of the existing main and secondary warehouses (the first located in Toliara) even though they are not compliant with international standards. In fact, due to the prevailing invasion situation, it is necessary not only to carry out operations on the whole territory, but also to pre-position pesticides in areas becoming isolated during the rainy season.

purpose, staff present and related mileage); regularly maintained, including update maintenance logs; and equipped with a radio transmitter-receiver, survival kit and first aid kit. Additional tyres for 4x4 vehicles and trucks will be purchased during the 2014/15 Campaign.

- *Positioning and communication equipment*: 100 GPS, as well as 11 fixed and 35 mobile single-sideband modulation radios (for vehicles) and 7 satellite phones are already available since the 2013/14 Campaign.
- *Personal protective equipment*: This is essential for all staff involved in control operations and pesticide (or empty pesticide drums) handling. This equipment must be available in sufficient quantities (two kits per agent per campaign). Some items (masks, gloves and goggles) will be repurchased during the 2013/14 Campaign to replace normal wear of the equipment procured and used during the previous campaign.
- *Camping equipment*: Good camping equipment is essential for the aerial bases because the staff will have to live there for several months. Some camping equipment items will be repurchased due to wear of the equipment procured and used during the 2013/14 Campaign.
- *Sprayers*: Some sprayers for ground treatment (cleaning-up) carried out from the aerial bases are already available since the 2013/14 Campaign as follows: two AU815 vehicle-mounted sprayers, 90 AU8000 backpack sprayers, and 150 ULVA+ hand-held sprayers.
- *Health and environmental monitoring equipment*: This material, already available since the 2013/14 Campaign, includes cholinesterase kits to measure the rate of exposure to conventional pesticides (Chlorpyrifos) in the blood of the operators as well as antidotes and equipment for environmental monitoring.
- *Equipment for Information Technologies:* Human and material resources management software as well as IT equipment, particularly for the aerial bases are already available since the 2013/14 Campaign.
- *Survey equipment:* The equipment procured during the 2013/14 Campaign will be completed or renewed according to the needs. This includes: sweep nets to capture locusts; callipers, scissors, tweezers and magnifiers to observe them; tachometers and hydro-thermometers, etc.
- *Other equipment*: Pumps, hoses and mixers for pesticides and biopesticides will be procured according to the needs.

General operating expenses: The expenses related to the implementation of various activities of the campaign and the operation of the aerial bases include: purchase of fuel and lubricants, vehicle maintenance, and eventual repair (or if necessary, car rental); operational costs of various teams ; purchase of first aid and survival kits; purchase of small office supplies; communication costs, including printing or copying material for communications/visibility; awareness and training activities; and insurance costs. This budget line also includes the rental of a cold room for biopesticides and the security costs for the aerial bases.

4.4. Government's inputs

The Government will take all necessary arrangements to facilitate the implementation of the Programme and assist its personnel and those of FAO to obtain the necessary clearances. It will ensure exemption from all taxes on imports of supplies and equipment needed for the regular execution of the Programme, obtain overflight permits for aircraft contracted by FAO, and facilitate the administrative procedures for Programme implementation.

In addition, the Government will designate and ensure the full-time commitment of national managerial and technical staff needed for the smooth implementation of the Programme throughout its duration. The designated staff will cooperate with FAO in survey, control, pesticide management, environmental monitoring operations and with the National Coordination Unit within the Ministry of Agriculture.

The Government will also make available to the Programme its premises to serve as offices for the Programme team in Antananarivo, Toliara and Betioky and in any other location on the Malagasy territory.

In line with the activities of the Programme (prevalence of aerial treatments with ground control operations 1) at the level of aerial bases i.e. the so-called "cleaning-up" treatments; 2) using the vehicle-mounted sprayers; and 3) spraying the biopesticide), the Government is responsible for organizing ground control operations carried out by the National Anti-Locust Centre and the Support Unit for Ground Anti-Locust Control (CALAT) in the outbreak and invasion area, respectively. FAO contributed to these operations at the end of the 2013/14 Campaign through the provision of sprayers and pesticides and will provide ground control training at the beginning of the 2014/15 Campaign. A continuous exchange of information will make it possible to best coordinate these different activities and to ensure the best possible synergy between the impact on the locust plague and the protection of small farmers.

5. MONITORING, EVALUATION AND INFORMATION

5.1. Monitoring

FAO will be responsible for the continuous monitoring of Programme activities, with support provided by Government's staff. A simple internal monitoring system, based on performance indicators, will be used for this purpose. Based on this system, FAO staff will regularly review the progress of the Programme implementation, highlight potential problems and recommend appropriate solutions.

In addition to the indicators relating to various activities of the five components (see Section 3), the monitoring indicators of the Programme are defined as follows:

- number of reports on damage to crops or pastures, and related numbers of hectares affected (i.e. the negative impact of the plague on food security);
- quantitative and qualitative development of the locust populations during the campaign as well as their size and phase status at the end of the campaign (decline of the plague);
- number of swarms escaping from the outbreak area in the southwest of Madagascar and reaching the invasion area;
- number and nature of human health incidents reported concerning the control staff, the personnel involved in the management of pesticides, and the rural population;
- number and nature of incidents reported concerning adverse impacts of control operations on non-target wildlife and the environment;
- reports on impact monitoring of control operations on human health and the environment carried out under the Programme;
- mapping of all empty pesticide drum locations at the end of the campaign (collected and grouped together, underway or completed);
- number of national technical staff trained on the different themes identified.

5.2. Assessment

Under Component 5 of the Programme, two assessments will be conducted at the end of the 2014/15 Campaign. The first will cover the impact of the locust crisis on crops and pastures and, consequently, on food security and the living conditions of affected populations. The assessment will make it possible to provide support for affected populations, in collaboration with humanitarian partners. The second assessment will focus on the locust campaign, including the quality, effectiveness and impact on human health and the environment of the control operations. This assessment will be useful for all partners, particularly for the national actors, and for documenting lessons learned to improve the management of the subsequent campaign. In addition, lessons learned will be recorded regarding the implementation of the National Locust Emergency Plan.

5.3. Reports

The Programme will produce the following reports:

- Ten-day and monthly bulletins on the locust situation and locust control efforts, which will be widely distributed throughout the campaign.
- Consultants' mission reports will be available upon request.
- A final programme report will be prepared by FAO in accordance with its procedures. This report will include an in-depth review of activities undertaken, major achievements, problems, progress towards achieving the objectives of the Programme and the impact on beneficiaries. A chapter on recommendations and lessons learned will be included, presenting the guiding principles for future interventions.

In addition to these reports, financial and narrative reports will be provided to every donor on their specific contributions in accordance with the terms of the Agreements signed with them.

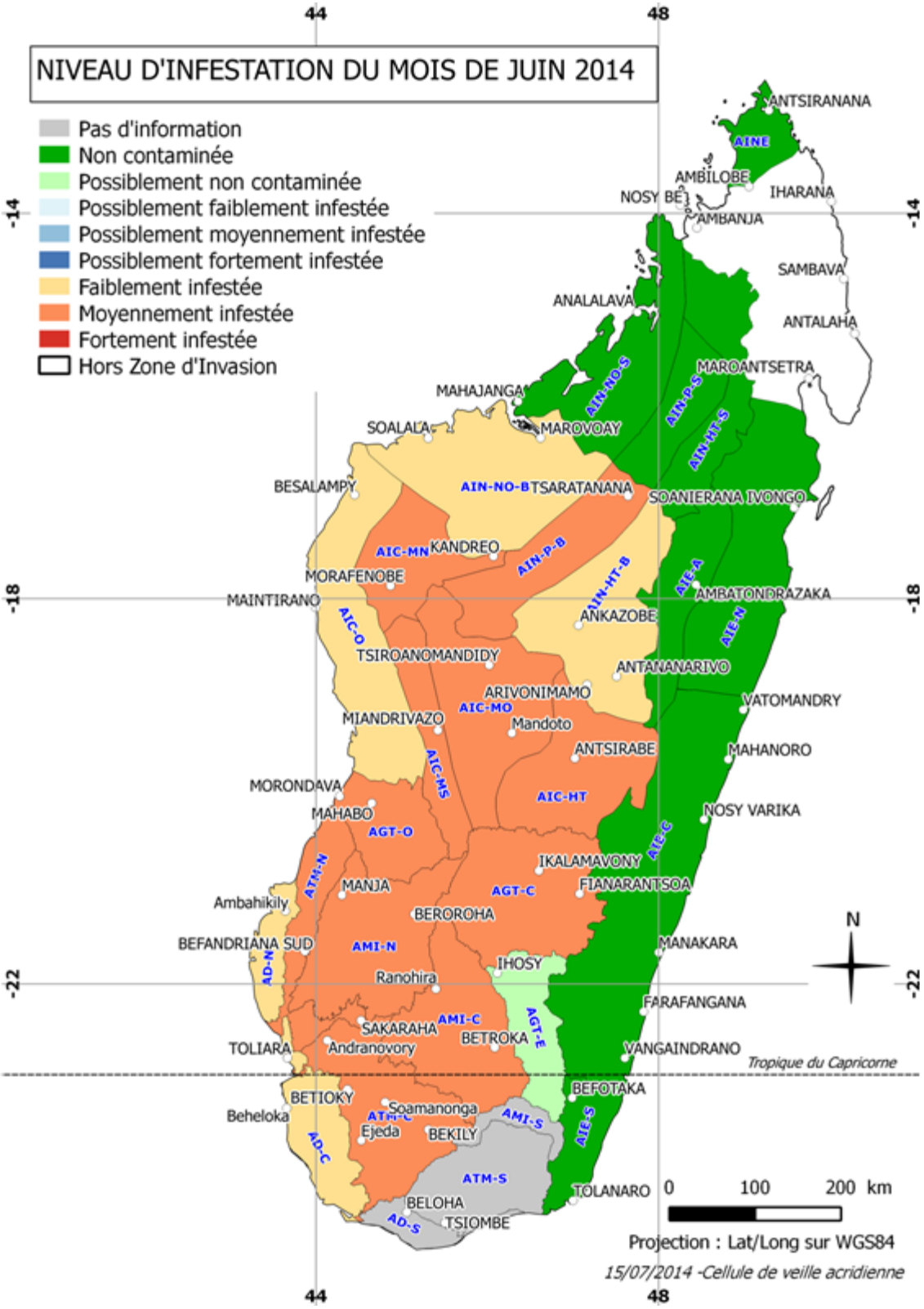
5.4. Communication and visibility

FAO will ensure that all technical and financial partners are regularly informed on the progress of implementation activities. Updates will be communicated through regularly disseminated bulletins and briefings provided by partners on key periods of the campaign, particularly by the Locust Control Committee.

More broadly, FAO will provide maximum visibility of the Programme activities through national and international media, its own Web site and internal publications. Particular attention will be paid to communications and visibility, including press releases at key periods of the Programme implementation; the dissemination of bulletins on the locust situation and control operations; and the production of videos. FAO will also ensure visibility to all donors who support the Programme.

ANNEXES

Annex 1. Map of locust infestations in June 2014



Annex 2. Area treated, flying hours and pesticides used during Campaign 1 (2013/14) as of 31 August 2014 (updated table)

Table 1. Total area treated and protected by aerial and ground control operations as of 31/08/2014

Area (ha)	Aerial treatments	Ground treatments	Total
Treated	**460 791**	**12 602**	**473 393**
Protected	**742 930**	**0**	**742 930**
Total	**1 203 721**	**12 602**	**1 216 323**

Table 2. Total flying hours used as of 31/08/2014

Aircraft	Flying hours	Allocation (%)
F-GEDF (helicopter)	845:07:00	35,1
F-GHPH (helicopter)	663:17:00	27,5
F-GMTH (helicopter)	532:18:00	22,1
Total helicopters	**2040:42:00**	**84,7**
F-GOKZ (fixed-wing)	368:50:00	15,3
Total	**2409:32:00**	**100,0**

Table 3. Total quantities of pesticides used as of 31/08/2014

Pesticides and biopesticide	Total
Conventional Pesticide Chlorpyrifos 240 ULV (l)	**471 931**
Insect-growth regulator Nomolt 50 UL (l)	**20 950**
Insect-growth regulator Teflubenzuron 50 UL (l)	**121 500**
Biopesticide Green Muscle® (kg)	**83**

Annex 3. Trainings delivered during Campaign 1 (2013/14)

Training planned in the Programme document for Campaign 1	Status	Trainer	Date	Duration	Beneficiaries
Data collection and information management on locusts, weather and other	Completed	International Locust expert	February 2013	5 days	Locust Watch Unit (3 persons)
Geographical Information Systems	Completed	International GIS Expert	October 2013	1 month	Locust Watch Unit (4 persons)
Geographical Information Systems	Completed	International GIS Expert	February 2014	1 month	Locust Watch Unit (4 persons)
Pesticide Stock Management System (PSMS)	Completed	International Expert in pesticide management (PSMS)	November 2013	10 days	CNA and DPV Staff (4 in total)
Management of radio data	Completed	Radio technician			CNA staff
Campaign and aerial base management	Completed	Logistic and security special advisor	October/November 2013	8 days	CNA staff (aerial bases' personnel, surveyors, ground control teams) and helicopters crews (26 persons in total)
Training in calibration of aircraft spraying systems	Completed	Campaign coordinator, Madagascar	October/November 2013	8 days	CNA staff (aerial bases' personnel, surveyors, ground control teams) and helicopters crews (26 persons in total)
Use of biopesticides	Completed	International expert Biopesticides	March 2014	1 month	5 CNA's senior staff
Monitoring of the impact of treatments on human health and the environment	Completed	Environmentalist international expert	February 2014	1 month	CNA personnel (3 staff) and PCN (2 staff)
Use of drum-crusher	Post-poned		2015		
Introduction to and training in the use of radios BLU	Completed		2013/2014	12 days over a one-year period	CNA Personnel (14 drivers et 3 radio operators) et 5 FAO drivers

Annex 4. Planned and mobilised expertise during Campaign 1 (2013/14)

Type of expertise planned in the Programme document of Campaign 1	Status of the related mission	Job title and field of expertise	Mission dates		Duration (month)
			Start	End	
Environment (development of the Human Health and Management Plan)	Completed	International experts, Environmentalists	26/08/2013	30/09/2013	1 x 2
Locust studies	Completed	International locust expert	28/08/2013	31/10/2013	2
		International junior locust expert	18/01/2014	30/04/2014	3
		International junior locust expert	18/01/2014	30/06/2014	5.5
		International locust expert	05/08/2014	28/08/2014	1
Logistics and security	Completed	Logistic and security special advisor	02/09/2013	01/11/2013	2
			27/01/2014	10/03/2014	2
Logistics and security	Completed	Logistician aircraft	10/09/2013	20/12/2013	3
			10/02/2014	31/08/2014	2
			15/03/2014	16/04/2014	1
Logistics	Completed	International consultant Logistician	25/05/2014	31/07/2014	2
Coordination of the Campaign	Completed	Campaign coordinator	09/09/2013	08/11/2013	2
			17/01/2014	10/03/2014	2
			13/05/2014	30/06/2014	1.5
			01/11/2013	06/12/2013	1
			01/03/2014	15/05/2014	2.5
Geographical Information System (GIS)	Completed	International GIS Expert	06/09/2013	14/11/2013	1
			09/01/2014	09/02/2014	1

Type of expertise planned in the Programme document of Campaign 1	Status of the related mission	Job title and field of expertise	Start	End	Duration (month
Information management on locusts, weather situation and damage to crops and pastures (CDV)	Completed	Junior consultant in support of the Locust Watch Unit	14/06/2014	13/05/2015	3
		Locust Watch Unit /locust data			12
		Locust Watch Unit /meteorological data			12
		Locust Watch Unit /damage to crops and pastures			12
		National GIS Expert	From oct. 2013		
Pesticide management	Completed	International Expert in pesticide management (PSMS)	05/11/2013	19/11/2013	0.5
Biopesticides	Completed	International expert Biopesticides	10/03/2014	09/04/2014	1
Environment	Completed	International experts Environmentalists	15/02/2014	15/03/2014	0.5
Installation of drum-crusher	Post-poned	Mission postponed: the training will be delivered when the pesticide warehouse will be built.			
Input/supplies management	Completed	Input/supplies management expert	Remote work		
Spraying techniques	Completed	Consultant in spraying techniques	18/01/2014	30/06/2014	3
Risk management in support of the locust emergency national plan (*Plan national d'urgence acridienne* - PNUA)	Completed	International expert, PNUA	06/09/2013	25/09/2013	0.25
Evaluation of the campaign	Completed	International locust consultant	02/06/2014	05/07/2014	1
Assessment on the impact of the locust plague on crops and pastures.	Completed	International consultant – (CFSAM)	01/07/2014	30/07/2014	1
		International consultant – (CFSAM)	01/07/2014	30/07/2014	1

Type of expertise planned in the Programme document of Campaign 1	Status of the related mission	Job title and field of expertise	Start	End	Duration (month)
Architecture (Pesticide warehouse)	Completed	Architect	No mission performed during Campaign 1		
Engineering	Completed	Engineer	20/02/2014	30/05/2014	3

Annex 5. Administrative map of Madagascar

Annex 6. Planned expertise during Campaign 2 (2014/15)

Type of expertise planned in the Programme document of Campaign 2	Job title and field of expertise	Mission dates		Duration (month)
		Start	End	
Environment (monitoring of the implementation of the Human Health and Management Plan)	International expert environmentalist	01/10/2014	15/11/2015	1,5
	International expert environmentalist	1/03/2015	30/03/2015	1
Locust studies	International locust expert	10/01/1015 15/06/2015	28/02/2015 31/08/2015	5
	Junior[13] international locust experts	10/01/2015	30/04/2015	3,5
		10/01/2015	30/04/2015	3,5
		01/10/2014	15/01/2015	3,5
		01/10/2014	15/01/2015	3,5
	International locust expert	1/03/2015	31/03/2015	1
	International locust expert	1/09/2014	31/08/2015	12
General logistics	International expert logistician	1/09/2014	31/08/2015	12

[13] The need for a permanent presence of FAO experts on each aerial base became evident during Campaign 1 in order to ensure that all operations are conducted properly, that all incidents are immediately reported and that all information on locust situation and treatments is transmitted on a daily basis. The number of experts with all the required knowledge, skills and experience is limited and they are often already involved in the campaign, or elsewhere; for other key positions. Moreover, such experts have an important cost, so it is not possible to assign a "senior" expert to each base. As the tasks at each base essentially correspond to daily monitoring and support, the best solution was to assign a "junior" expert. These experts, who master new technologies and dispose of excellent technical knowledge and good writing skills, are ideal to support scouts and aerial base managers who have the required field experience but are not always able to report in an appropriate way (accurate, concise and almost in real time). The functioning of the aerial bases was greatly improved thanks to the presence of these experts, from February 2014 onwards, and it was decided to extend the positive experience of their presence.

Type of expertise planned in the Programme document of Campaign 2	Job title and field of expertise	Mission dates		Duration (month)
		Start	End	
Logistics aircraft	Logistician aircraft	20/10/2014	10/01/2015	5
		25/04/2015	30/06/2015	
	Logistician aircraft	22/09/2014	31/10/2014	1
Expertise in spraying techniques	International consultant in spraying techniques	1/10/2014	30/10/2014	4
		25/01/2015	30/04/2015	
Coordination of the Campaign	Campaign coordinator	08/09/2014	03/10/2014	7
		1/11/2014	31/12/2014	
		1/02/2015	30/03/2015	
		1/05/2015	30/06/2015	
Expertise in Geographical Information Systems (GIS)	International GIS expert	15/09/2014	30/10/2014	2
Data analysis and information management on locusts, weather situation and damage to crops and pastures (CDV)	Junior consultant in support of the Locust Watch Unit	1/09/2014	31/08/2015	12
	Locust Watch Unit /locust data	1/09/2014	31/08/2015	12
	Locust Watch Unit /meteorological data	1/09/2014	31/08/2015	12
	Locust Watch Unit /damage to crops and pastures	1/09/2014	31/08/2015	12
	National GIS Expert	1/09/2014	31/08/2015	12
Pesticide management	Pesticide management international expert (PSMS)	01/10/2014	30/10/2014	1
Installation of drum-crusher	International Expert – installation/training on the use of drum-crusher	1/05/2015	15/05/2015	0,5
Evaluation of Campaign 2	International consultant evaluation of Campaign 2	1/06/2015	30/06/2015	1

Type of expertise planned in the Programme document of Campaign 2	Job title and field of expertise	Mission dates		Duration (month)
		Start	End	
Assessment on the impact of the locust plague on crops and pastures.	International consultant – (CFSAM)	1/06/2015	30/06/2015	1
	International consultant – (CFSAM)	1/06/2015	30/06/2015	1
Architecture (Pesticide warehouse)	Architect	To be determined	To be determined	1
Engineering (Pesticide warehouse)	Engineer	01/09/2014-	31/08/2015	12

Annex 7. Planned training during Campaign 2 (2014/15)

Component	Nature of training	Beneficiaries	Period	Trainer/ Technical assistance
1	Data collection, analysis and information management	Three members of the Locust Watch Unit	During missions and continuing, including on a distance basis, throughout the duration of the campaign	Locust experts in support of the Locust Watch Unit
1	Mapping	National GIS expert within the Locust Watch Unit	October 2014 (expert's mission) and on a distance basis throughout the duration of the campaign	International GIS expert
1	Surveys and data analyses	Prospectors assigned to the two aerial bases (2 to 6 persons)	Throughout the duration of the campaign	Locust experts assigned to the bases
2	Management of the Campaign	Locust control staff assigned to the aerial bases seconded from the National Anti-Locust Centre and the Directorate of Plant Protection and, in particular the base managers and their assistants (10 persons at least)	Throughout the duration of the campaign	Locust experts assigned to the bases; Campaign coordinators
2	Spraying techniques	Locust control staff assigned to the aerial bases seconded from the National Anti-Locust Centre and the Directorate of Plant Protection (10 persons at least)	Throughout the duration of the campaign	International experts in spraying techniques and logisticians aircraft
		CALAT staff (number of participants to be provided by the MADR)	October 2014	
3	Monitoring of the impact of treatments on human health and the environment	CNA staff responsible of the monitoring of the impact of treatments (2 persons at least)	October/November 2014 and March 2015	Environmentalist
3	Pesticide Stock Management System	CNA staff, including the « Pesticide » focal point and the warehouse keepers (5 persons at least)	October 2014	PSMS expert
3	Use of drum-crusher	CNA staff, including the « Pesticide » focal point and the warehouse keepers (5 persons at least)	May 2015	« Drum-crusher » expert

Annex 8. Logical framework and workplan of the Programme in response to the locust plague in Madagascar - 2014/15 Campaign

Intervention logic	Objectively verifiable indicators	Sources and means of verification	Assumptions
Overall objective Contribute to safeguarding the food security of the most vulnerable rural populations in Madagascar.	- The relative importance of the impact of the locust plague on agricultural production and on the livelihoods of rural people in Madagascar is limited. - Improved availability and access of vulnerable populations in Madagascar to staple food (rice, maize). - Reduced or stabilized Market prices of staple food (rice and maize). - Reduction in malnutrition rates.	• Crop and Food Security Assessment Mission Report (CFSAM) • Section 3 "Agro-socio-economic situation" of the Ten-day and monthly bulletins of the Locust Watch Unit. • Assessment report on the impact of the plague on crops and pastures. • Reports of *the Observatoire du riz* (OdR) of the Action Plan for Rural Development (PADR) • Mid-term and final reports of the Programme. • FAOSTAT • Reports from UNICEF and other agencies	• No major deterioration in the socio-political context. • Involvement and support from the Government to the locust control campaign. • Timely availability of the required funds. • Availability of national and international human resources according to the identified profiles. • Availability of required equipment. • No extreme weather events with direct impact on agricultural production.
Specific objective Support the anticipated decline of the Malagasy Migratory Locust plague and thereby limit the damages caused by locusts on crops and pastures.	- Relative importance of damages to crops and pastures due to the locust plague. - Decreasing of the geographical extension and surface of the infested areas; reduction of the number of swarms; and locust populations in the process of losing -gregarity.	• Ten-day and monthly reports of the Locust Watch Unit. • Consultants' reports. • Assessment report on the 2014/15 Campaign. • Mid-term and final reports of the Programme.	

Component 1. Strengthening of national capacities for the monitoring and analysis of the locust situation																									
Expected outcome: The capacity for monitoring and analysing the locust situation is strengthened, thus making it possible to understand the dynamics of the locust populations; to implement the locust control strategy; to make necessary strategic adjustments during the campaign; and to identify the targets for large-scale control operations.	• 300 flying hours for aerial surveys are undertaken from September/October 2014 to August 2015, surveying around 22 million ha in the areas infested (or likely to be infested). • Spatial-temporal dynamics of the locust populations known and documented (both in quantitative and qualitative terms): number, size, density, developmental stage and phase status of hopper and adult populations (swarms) identified in the infested areas; movements of the swarms described and mapped. • Issuance of the ten-day and monthly (anti) locust situation bulletins by the Locust Watch Unit no later than 15 and 30 days respectively, after the reported period (with FAO support and technical validation). • Number of technicians (surveyors and members of the Locust Watch Unit) trained in data collection, analysis and information management.	Maps of the hotspots of locust populations are regularly available: • Ten-day and monthly bulletins of the Locust Watch Unit. • Daily flight sheets; • Survey flight plans; • Consultants' reports; • Assessment report of the 2013/14 Campaign; • Mid-term and final reports of the Programme.																							
Component 1 activities	**Sub-activities of Component 1**													**Workplan of activities**											
														S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Activity 1.1. Strengthening of human capacity in data collection and analysis and information management	1.1.1. Provide international and national locust expertise and technical assistance in GIS for collecting, analysing and managing information, including tactical adjustments to the locust strategy, throughout the duration of the campaign.													x	x	x	x	x	x	x	x	x	x	x	x	x
	1.1.2. Organize trainings and refresher trainings in data collection and analysis and information management benefitting the three members of the Locust Watch Unit, the national GIS expert and surveyors of the aerial basis.													x	x					x						
Activity 1.2. Support to survey operations	1.2.1. Purchase and pre-position the equipment required for survey operations from September /October 2014 (survey equipment; - camping equipment; - Spare parts (tires) for vehicles and motorcycles)													x	x	x										
	1.2.2. Set up fully operational and secure aerial bases through the issuance of contracts with the airlines and the mobilization of personnel.													x	x	x	x	x	x	x	x	x	x	x	x	x
	1.2.3. Implement the aerial survey plan in the infested areas starting from secured mobile aerial bases: using 300 flying hours from September 2014 to August 2015 in order to survey approximately 22 million ha.													x	x	x	x	x	x	x	x	x	x	x	x	x

Component 2. Locust control capacity strengthened			
Expected outcome: National locust control capacities are improved and the number of Migratory Locust populations is reduced during the 2014/15 Campaign in the infested areas, thereby limiting damages to crops and pastures due to the locust plague.	• Approximately 800 000 ha treated between October/November 2014 and August 2015. • Locust mortality rate in the treated areas exceeding 85 percent. • Reduction of the number of locust-regions infested (compared to the locust infestation map of 30 June 2014) • Number of agents trained in campaign management and in spraying techniques (both aerial and ground). • Relative importance of damages to crops and pastures.	- Consultants' reports. - Daily flight sheets. - Printouts of the treated areas. - Number of flying hours performed / number of flying hours scheduled. - Area treated or protected, or the ratio between treated or protected areas and areas to be treated or protected. - Ten-day and monthly bulletins of the Locust Watch Unit. - Mid-term and final reports of the Programme. - Assessment report of the 2013/14 Campaign.	

Component 2 activities	Sub-activities of Component 2	Workplan of activities												
		S	O	N	D	J	F	M	A	M	J	J	A	S
Activity 2.1. Human capacity building for locust control	2.1.1. Provide technical assistance in campaign management and locust control throughout the campaign:	x	x	x	x	x	x	x	x	x	x	x	x	x
	2.1.2. Organize trainings in (a) campaign management benefitting about ten locust control staff; (b) aerial and ground spraying techniques benefitting about 20 locust control staff assigned to the aerial bases seconded from the National Anti-Locust Centre, the Directorate of Plant Protection, the Regional Rural Development Directorates and the Support Unit for Anti-Locust Ground Control (CALAT):	x	x			x	x	x	x					
Activity 2.2. Support to locust control operations	2.2.1. Purchase or triangulate and pre-position the pesticides needed for the campaign at the storage facilities, as well as at the aerial bases throughout the campaign (220 000 litres of conventional pesticides, 110 000 litres of insect growth regulator and 1 000 kg of biopesticide).	x	x	x	x	x	x	x	x	x	x	x	x	
	2.2.2. Purchase and distribute the equipment needed for the control operations from October 2014 at the aerial bases (personal protective equipment, camping, IT equipment and tires for vehicles and motorbikes).	x	x	x	x									
	2.2.3. Set up fully operational and secured aerial bases through the issuance of contracts with airlines and mobilisation of personnel).		x	x	x	x	x	x	x	x	x			
	2.2.4. Implement the aerial control plan in infested areas: 700 hours flown for control operations of October 2014 to June 2015 for the treatment of approximately 800 000 hectares.		x	x	x	x	x	x	x	x	x			

Component 3. Preservation of human health and protection of the environment														
Expected outcome: No incident affecting human health during the aerial control operations or the handling of pesticides has been reported; the impact on the environment from the control operations is limited.	• Number of incidents reported affecting human health during the aerial control operations or the handling of pesticides. • Number and severity of any potential incident caused by control operations on the environment. • Number of agents trained in monitoring of the impact of treatments on human health and the environment, in the use of a drum-crusher, and in the use of the pesticide stockpile management system (PSMS).	• Consultants' reports. • Ten-day and monthly reports of the Locust Watch Unit. • Assessment report for the 2013/14 Campaign. • Mid-term and final reports of the Programme.												
Component 3 activities	**Sub-activities of Component 3**	**Workplan of activities**												
		S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Activity 3.1. Strengthening of human capacity for human health preservation and protection of the environment.	3.1.1. Provide technical assistance in monitoring the impact of treatment on human health and the environment throughout the duration of the campaign	x	x	x	x	x	x	x	x	x	x	x	x	x
	3.1.2. Organize training for the agents allocated to the aerial bases, seconded from the National Anti-Locust Centre , the Directorate of Plant Protection and Regional Rural Development Directorates: 25 people in monitoring the impact of the treatments on human health and the environment; five people in the use of drum crushers; three people in expanding the pesticide stock management system; 30 people on all aspects of pesticide management and mitigation measures of the impact of treatments on human health and the environment (including storage, transportation and handling of pesticides).		x	x				x		x				
	3.1.3. Make recommendations on the revision of the environmental specifications by the national experts.		x	x	x	x	x	x						
Activity 3.2. Support impact monitoring (of treatment) on human health and the environment	3.2.1. Implement the Human Health and Environment Management Plan throughout the campaign.		x	x	x	x	x	x	x	x	x	x	x	x
	3.2.2. Support the monitor units of the impact of treatments on human health and the environment at the aerial bases and for the entire duration of the control operations.		x	x	x	x	x	x	x	x	x	x		
	3.2.3. Strengthening the units managing the inventory and empty pesticides drums are operational during the campaign.	x	x	x	x	x	x	x	x	x	x	x		
Activity 3.3. Construction of the pesticide storage facility (Toliara)	3.3.1. Build the pesticide storage facility in Toliara (land and plans already available and tender launched) for appropriate storage during the coming campaigns.	x	x	x	x	x	x	x	x	x	x	x	x	

Component 4. Implementation and coordination of the Programme														
Expected outcome: The supervision and the technical and operational coordination of the overall Programme, as well as those of the specific field operations, are performed and adjusted if needed, enabling the achievement of the expected outcomes of the campaign and of the Program in the best possible way.	- The supervision and coordination mechanism is set up, effective and efficient. - The locust control campaign is implemented as planned. - The operation shows overall positive outcomes.	• Consultants' reports. • Ten-day and monthly bulletins of the Locust Watch Unit. • Assessment report of the 2013/14 Campaign. • Mid-term and final reports of the Programme												
Component 4 activities	**Sub-activities of Component 4**		**Workplan of activities**											
			S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Activity 4.1. Implementation of the National Locust Emergency Plan	4.1.1. Implement the National Locust Emergency Plan and mobilize the National Coordination Unit within the Ministry of Agriculture and Rural Development in Antananarivo.		x	x	x	x	x	x	x	x	x	x	x	x	x
Activity 4.2. Coordination of the Programme	4.2.1. Supervise and coordinate the Programme effectively and efficiently at different levels: - at field level thanks to international technical expertise (Campaign Coordinator and logistician); - at national level by the FAO Representation in Madagascar through operational, administrative and financial support for implementation and resource mobilization at the national level; facilitate the flow of information and liaising with all stakeholders, including local authorities and the technical and financial partners in Madagascar); - at FAO headquarters level through validation of relevant strategic adjustments; programming and planning; resource mobilization; procurement of inputs and contracts; triangulation of pesticides; technical, operational and financial management of the Programme; personnel management; monitoring of activities and expenditures; and reporting at the Programme level.		x	x	x	x	x	x	x	x	x	x	x	x	x

Component 5. Assessment of the effectiveness of the locust control Campaign and the impact of the locust crisis on crops and pastures															
Expected outcomes: The assessment results regarding both the locust campaign's effectiveness and the impact of the locust crisis on crops and pastures and ultimately, on the food and nutrition security of affected populations, are available to all stakeholders. •	- Results of the assessment of the locust campaign's effectiveness available and disseminated in a timely manner for the preparation of the next campaign. - Results of the impact assessment of the locust crisis on crops and pastures as well as of the food and nutrition security of affected populations available and disseminated.	• Assessment report of the 2013/14 Campaign; • Assessment report of the impact of the locust crisis on crops and pastures; • Report of Crop and Food Security Assessment Mission (CFSAM) • Mid-term and final reports of the Programme.													
Component 5 activities	**Sub-activities of Component 5**	**Timetable of activities**													
		S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	
Activity 5.1. Assessment of the effectiveness of the locust campaign.	5.1.1. Document the technical, socio-economic and environmental relevance of the locust campaign and drown lessons for subsequent campaign.										x	x			
Activity 5.2. Assessment of the impact of the locust crisis on crops and pastures.	5.2.1 Quantify and characterize the impact of the locust plague on food security in order to define, if necessary, effective and appropriate emergency countermeasures for households affected by the locust crisis.										x	x			

FOOD CHAIN CRISIS
Management Framework

The Food Chain Crisis Management Framework (FCC) supports FAO member countries in the fight against threats to the human food chain at all stages from production to consumption.

These threats are specifically transboundary animal, fish and aquatic diseases, plant and forest pests and diseases, food safety incidents, or radionuclides dispersed into the environment.

The Programme in response to the locust plague in Madagascar is implemented through the FCC.

www.fao.org/foodchain

LOCUST CRISIS
MADAGASCAR

FIAT PANIS

www.fao.org/emergencies