Response to the locust plague

Programme – Campaign 2013/14

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SUMMARY

Madagascar is prone to natural disasters, including drought, flooding, 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, the food security of 13 million people (60 percent of the population) could be affected. To address this dire situation, the Ministry of Agriculture 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, for which funds have been actively sought since December 2012.

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

- **Locust Campaign 1:** control and eradicate the plague, from September 2013 to September 2014 (1.5 million hectares to be treated).
- **Locust Campaign 2:** measures to support the anticipated decline, from October 2014 to September 2015 (500 000 hectares to be treated).
- **Locust Campaign 3:** towards recession and capacity building of the National Anti-Locust Centre, from October 2015 to June 2016 (150 000 hectares to be treated).

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. improve monitoring capacity and analysis of the locust situation.
2. strengthen locust control capacity.
3. preserve human health and protect the environment.
4. implement and coordinate the Programme.
5. assess the effectiveness of locust campaigns and the impact of the locust crisis on crops and pastures.

The budget for implementing the Programme is estimated at USD 41.5 million, of which over USD 22 million is earmarked for the first campaign (2013/14).

It is essential that all funds required to implement the Programme are available in order to return to a locust recession situation. It is also crucial that all funds for the 2013/14 locust campaign are available in time for the implementation beginning in September 2013. If a large-scale locust control campaign is not set up quickly, the plague could escalate and worsen.

This document describes the first locust control campaign, which will be conducted in 2013/14, and its objective of halting the plague dynamics through large-scale 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; the technical and operational support provided for Programme implementation; project inputs; and the monitoring, evaluation and reporting system.

1 GENERAL INFORMATION

1.1. Sectorial context

Madagascar is prone to natural disasters, including drought, floods, cyclones and locust plagues. The humanitarian consequences of these disasters are particularly important because Madagascar is one of the poorest countries in the world, ranking 151st out of 187 countries in the 2013 Human Development Index. The country's widespread poverty and food insecurity particularly affect rural areas, according to the "Preliminary Conclusions of the Special Rapporteur on the Right to Food" (Olivier De Schutter, mission to Madagascar, July 2011). The poverty rate in rural areas is 82.2 percent, as compared with 54.2 percent in the cities. The situation in the south is the most dramatic: 68 percent of households are food insecure. The Rapporteur suggests the following causes: high population growth; climatic factors such as drought, cyclones and floods (Madagascar is the third most vulnerable country in the world to such natural disasters); the upsurge of the Malagasy Migratory Locust (Locusta migratoria capito) in the south since 2010, which became a locust plague[1] in 2012; and the consequences of the political crisis.

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.

1.2. Locust and anti-locust contexts

From April 2010 onward, an upsurge of the Malagasy Migratory Locust developed in the southwest of Madagascar. In the outbreak area, the southwestern part of Madagascar, hopper bands and a large number of swarms formed, the latter having progressively invaded the midwest. Despite the efforts of the National Anti-Locust Centre (*Centre national antiacridien [CNA]*) to eliminate infestations through ground treatments, the situation deteriorated rapidly. Without large-scale control operations, this situation would have evolved into a major upsurge from the onset of the next rainy season (October 2010). In mid-July 2010, the Malagasy authorities requested FAO's technical support. A locust control programme for the 2010/11 locust campaign was developed and implemented. The 2010/11 locust control campaign contributed to the aerial spraying of nearly 200 000 hectares and achieved the following outcomes: a) the locust upsurge was contained in the outbreak area, as no swarms escaped and invaded the midwest (as was the case in May/June 2010); b) no significant damage to crops or pastures reported; c) no adverse impact of the upsurge on food security; d) no incident on human health or the environment reported; and e) biopesticide used for the first time at an operational scale and by aerial spraying in Madagascar. It was not possible, however, to control

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

all locust infestations that needed treatment, because only 50 percent of the funds required were received (i.e. USD 14.5 million). A second emergency campaign estimated at USD 7 million was therefore needed in 2011/12, which was also partially funded (26 percent).

At the beginning of the 2011/12 locust campaign, early rains and a relatively wet austral spring resulted in the rapid breeding of Migratory Locust populations, producing waves of hatching followed by the formation of hopper groups and bands from mid-September 2011. Despite a rainfall deficit in October, hatching and hopper development continued and the first swarms formed. The situation deteriorated from mid-December due to the early start of the second breeding. At the end of February 2012, following the rains brought by cyclones Giovanna and Irina, the Migratory Locust populations were redistributed and the species was eventually able to trigger two successive breedings in three months, between March and April. The rapid increase in numbers led to a new gregarization[2].

The locust plague began in April 2012 as a result of the geographical expansion of the locust populations as well as the change of their phase status. In early April 2012, at least 300 000 hectares were infested by hopper bands gathered at the limit between the outbreak and invasion areas; simultaneously, swarmlets and light flights formed and spread into the southern part of the invasion area where they laid eggs. Most of the individuals of the third generation of the rainy season were gregarious. In addition, due to the lack of adequate funding mentioned above (only 26 percent of the required funds), the 2011/12 campaign limited the extent of damage but did not halt the dynamics of the locust populations.

In May and June 2012, numerous dense swarms formed. In July, they moved across the western side, from Fort Dauphin to Besalampy; more than 70 swarms were observed at that time. Although this figure is approximate given the lack of reliable information, especially in the invasion area, it was indicative of a dramatic situation, which had not occurred since the start of the last locust plague in 1997/98. For the record, over four million hectares had to be treated due to this plague, which lasted from 1997 to 2000 and cost USD 60 million to the Malagasy Government and the international community.

In order to stop these repeated locust crises, in June 2012 the Donors' Group for Rural Development (*Groupe des Bailleurs de Fonds pour le Développement Rural*) informed the Minister of Agriculture of the prerequisites for any further external support. These conditions have since been met: (i) preparation of a recovery plan for the National Anti-Locust Centre (September 2012); (ii) promulgation of the decree to reform the National Anti-Locust Centre (November 2012); (iii) declaration of Public Calamity on the National Territory (27 November 2012); and (iv) request for financial and technical assistance from FAO (5 December 2012) calling for "technical and financial support from FAO, to mobilize the necessary resources from partners, in close liaison with the Ministry, and to ensure the coordination and implementation of an emergency response to the locust crisis, whose estimated scope exceeds national capabilities".

2 *Gregarization: the ability of locusts to change their behaviour, physiology, colour and shape in response to a change in locust numbers (density). At low numbers, locusts behave as individuals (solitarious phase); at high numbers, they behave as a single mass (gregarious phase). The transformation process from solitarious to gregarious phases is called gregarization.*

In the absence of any funds and since these prerequisites had not yet been met, no major campaign could be conducted during the 2012/13 rainy season. At that point, the only justifiable strategy to safeguard the food security of rural populations in Madagascar was to prepare a comprehensive programme in response to the locust plague, and to mobilize the funding needed to launch large-scale field operations from the beginning of the 2013/14 rainy season. This was achieved through the joint preparation by FAO and the Ministry of Agriculture of a Three-year Programme (2013-2016), for which funds have been actively sought since December 2012.

In order to overcome the lack of regular and reliable information on the locust situation, a Locust Watch Unit was established in February 2013 in the Plant Protection Directorate of the Ministry of Agriculture. The role of this unit was to collect and analyse data on locusts, weather and damage to crops and pastures. This information, combined with data from field missions carried out by the Locust Watch Unit since February 2013, confirmed the severity of the locust crisis. On 22 and 23 February 2013, cyclone Haruna crossed southwestern Madagascar, thoroughly watering most of the outbreak area, providing the locust with suitable conditions for its third generation, and thus the opportunity to increase its numbers and the gregarity of its populations. Ground treatments were carried by the National Anti-Locust Centre (according to the information provided, 85 300 hectares were treated between October 2012 and April 2013) to protect the most threatened crops; efforts were thus very localized and given the extension of the plague had no impact on its dynamics. Indeed, during the 2012/13 rainy season, three successive generations occurred in the outbreak area, which remained the main driver of the plague, and two in the midwest and the west; some swarms even reached the Antsirabe basin. In mid-June, many immature swarms – very dense, very gregarious and ranging in size from 100 to several thousands of hectares, hovered at the edge between the outbreak and the invasion areas. These swarms moved to the north, which resulted in an extension of the contaminated areas during the 2013 austral winter.

In conclusion, in the absence of large-scale control operations during the 2012/13 rainy season, the locust numbers increased and most of the locust populations became gregarious. The plague spread throughout the outbreak area (southwest Madagascar) and over half of the invasion area is now contaminated (See Annex 1).

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

The locust plague occurred in a context of high food insecurity and malnutrition levels. In April-May 2013, FAO assessed the locust plague's impact on crops and pastures. This impact assessment found a progressive deterioration in food security resulting from the absence of large-scale locust control operations during the 2012/13 season. The results of this assessment can be summarized as follows:

- Rice and maize, the two main cereal crops, as well as pastures have suffered serious damage.
- The quantity of the annual rice harvest that will be lost ranges between the low estimate of 11 000 tonnes and the high estimate of around 309 000 tonnes (most likely). The high estimate represents the worst case scenario – almost twice the level of annual rice imports.
- The situation is particularly critical in the south, including the regions of Androy

Anosy, Atsimo Andrefana and Menabe, which could incur losses ranging from 30 (low estimate) to 40 percent (high estimate), with a dramatic impact on the affected farmers.

Historical data, lessons learned over the past decades and recent field observations indicate that at least 1.5 million hectares are likely to be infested in September 2013, affecting two-thirds of the country. Given the magnitude of the plague, the food security of 60 percent of the population could be affected by the locust crisis. Indeed, the crisis threatens the livelihoods, nutrition and food security of 13 million people (more than half the population of Madagascar, including nine million who depend on agriculture for their livelihoods). Areas already infested or that may be affected by the locust plague include, 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 2).

It is therefore essential to halt the plague as early as the onset of the 2013/14 rainy season, in order to limit damage to crops and pastures, and thus the impact on food security of the Malagasy population. It is also essential to eventually return to a recession[3] to stop such cycles of locust crises and avoid the further deterioration of food security.

The indirect impact of the plague in the medium and longterm 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).

2. THE THREE-YEAR PROGRAMME TO RESPOND 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 (1.5 million hectares to be treated).

3 *Recession is a period without widespread and heavy locust infestations in the outbreak area of the Malagasy Migratory Locust and, a fortiori, in the east of the territory.*

- **Locust Campaign 2:** measures to support the anticipated decline, from October 2014 to September 2015 (500 000 hectares to be treated).
- **Locust Campaign 3:** towards recession and capacity building of the National Anti-Locust Centre, from October 2015 to June 2016 (150 000 hectares to be treated).

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

1. improve monitoring capacity and analysis of the locust situation.
2. strengthen locust control capacity.
3. preserve human health and protect the environment.
4. implement and coordinate the Programme.
5. assess the effectiveness of locust campaigns and the impact of the locust crisis on crops and pastures.

The **budget** for the implementation of the Three-year Programme is estimated at USD 41.5 million. Table 1 provides the break-down by component and by locust campaign. It is a provisional budget that can be adjusted as needs arise.

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

Table 1 – Programme budget (in USD million)

COMPONENT	CAMPAIGN 1 (2013/14)	CAMPAIGN 2 (2014/15)	CAMPAIGN 3 (2015/16)	Total
Component 1: Capacity for monitoring and analysis of the locust situation strengthened	3.95	2.10	1.10	**7.15**
Component 2: Locust control capacity strengthened	15.24	10.73	1.80	**27.77**
Component 3: Human health preserved and environment protected	0.70	0.22	0.16	**1.08**
Component 4: Implementation and coordination of the Programme	2.48	2.10	0.80	**5.38**
Component 5: Assessment of the effectiveness of locust campaigns and the impact of the locust crisis on crops and pastures	0.05	0.05	0.05	**0.15**
TOTAL	**22.42**	**15.20**	**3.91**	**41.53**

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 locust upsurges (in 2010/11 and 2011/12); however, these campaigns lacked sufficient resources. 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.

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. 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 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 resource management, and the maintenance and replacement of the equipment required for monitoring and controlling locusts.

In the meantime, over the course of the Three-year Programme, the activities implemented will contribute to the development of national capacities for data monitoring and analysis, the management and the implementation of the locust survey and control operations, and the 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

Given the extent of infested areas during a locust plague, the use of large quantities of pesticides is essential. In particular, the use of conventional pesticides with a wide spectrum[4] but also a quick action is necessary against locust populations directly threatening crops, or against swarms in order to prevent their movement to other areas. 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 molting insects. Moreover, since IGRs have long lasting effects, they can be applied in barriers (a swath treated every 500 to 1000 metres allowing rapid protection of large infested areas). Finally, non-chemical pesticides formulated with *Metarhizium acridum*, an entomopathogenic fungus specific to locusts, will be used in environmentally sensitive areas. Every effort will be made to prevent pesticide stocks from becoming obsolete in Madagascar.

3. DETAILED PRESENTATION OF THE 2013/14 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 2013/14 campaign is to halt the drivers of the Malagasy Migratory Locust plague.

3.2. Adopted strategy

The strategy that will be implemented to respond to the plague includes identifying 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

4 *They are insecticides acting on all insect species.*

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 will primarily target hopper infestations. The total amount of pesticide to be purchased for the first campaign shall allow treating 1.5 million hectares.

Owing to the extent of the infested areas to be surveyed and treated, the location of the infested areas (e.g. some treatments will take place in isolated areas during the rainy season), and the spatial-temporal dynamics of the locust populations, the first locust campaign will require aerial operations for an estimated 2 325 hours. Approximately 500 flying hours will be required for survey operations that play a crucial role in implementing/adjusting the locust control strategy; the remaining 1 825 hours are for locust control operations.

Before, during and after control operations, special attention will be given to the preservation of human health and the protection of the environment, which has a unique biodiversity. Therefore, a health and environmental management plan will be prepared and implemented during the campaign.

Training will be provided throughout the campaign, strengthening the capacities of those involved with the Programme. 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

The first locust campaign (2013/14), which is part of the Three-year Programme in response to the locust plague, will be decisive in halting 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 first 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:

- 500 flying hours for aerial surveys are undertaken from September 2013 to August 2014, surveying around 80 million hectares in the infested areas.
- Spatial-temporal dynamics of the locust populations are documented (both quantitative and qualitative); the number, size and density of hopper and adult populations (swarms) are identified in the infested areas; movements of the swarms are described and mapped.

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, will be maintained 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 benefit from the technical assistance of an international expert, who will guide the establishment and management of a Geographical Information System (GIS). The expert also will provide on-site training in using the GIS database, and in creating thematic maps on the dynamics of the locust, ecological and weather situations, as well as on the locust control operations. This information will become the foundation of locust management strategies and planning, and guide the survey and control operations beginning in September 2013.

Technical assistance from locust experts will be provided in the definition and adjustment of the locust control strategy. Training in data collection, entry, analysis and information management will also be delivered during the 2013/14 campaign, as well as training for a radio technician.

Activity 1.2. Support to survey operations

Aerial survey operations must be carried out continuously during the locust campaign, from September 2013 to August 2014. Surveying must begin in September 2013 to assess the extent and size of the adult populations from the last locust breeding of the 2012/13 rainy season, 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.

Considering the prevailing locust plague situation, it is expected that a total of about 500 flying hours for survey operations will be undertaken (by helicopter) during the 2013/14 campaign. In addition to the flying hours for survey operations, this component will cover the acquisition of survey, camping, communication and global positioning equipment, computers, 4x4 vehicles and motorbikes, as well as the operating costs of the aerial bases and of the ground survey teams. Finally, technical assistance from locust experts and training sessions will be provided in data collection, entry, analysis and information management.

Component 2: Strengthening of national locust control capacities

Expected outcome:

The number of Migratory Locust populations are reduced during the 2013/14 campaign in the infested areas, and damage to crops and pastures due to the locust plague is limited.
Indicators

- 1.5 million hectares are treated or protected.
- Locust mortality rate in the treated areas.
- Number, size and density of swarms leaving the infested areas.

Activities:

Activity 2.1. Human capacity building for locust control

Technical assistance will be provided in locust control over the duration of the campaign. International experts will deliver training (or refresher training, given that training sessions have already been conducted since 2010) to the 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. These training sessions will be delivered on the following topics: campaign and airbase management, input management, aerial control and calibration of sprayers, and the use of biopesticides. Specific technical assistance will also be required for the instalment of input management software and the use of biopesticides.

Activity 2.2. Support to locust control operations

Under this component, the quantities of pesticides needed to treat approximately 1.5 million hectares will be purchased in order to control the plague. Given the number of hectares to be treated or protected and the extent of the territory concerned, three aerial bases, each equipped with an aircraft, will be set up from September 2013 to June 2014 (at least one of these in the outbreak area) and one base will be maintained from uly to September 2014. The Programme will provide approximately 1 825 flying hours for control operations in 2013/14, as well as the operating costs of the aerial bases. The control operations will also be supported through the acquisition of equipment, including sprayers (ground control), personal protective equipment, camping, communication, global positioning and computer equipment (including input management software) as well as the purchase of 4x4 vehicles and trucks for the aerial bases and the transportation of pesticides.

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

Table 2 – Hectares to be treated or protected and quantities of pesticides required for the 2013/14 campaign

PESTICIDE	Quantity	Hectares treated/protected
Conventional pesticides: full cover (litres)	550 000	550 000
Insect growth regulators: barriers (litres)	150 000	900 000
Biopesticides (kg)	1 500	30 000
TOTAL		**1 500 000**

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.
- Severity of the impact of control operations on the environment.

Activities:

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

By taking into account the training already delivered since 2010, technical assistance will be provided, and training or refresher courses will be delivered by international experts on the following topics: monitoring the impact of treatments on human health and the environment; the use of a drum-crusher; pesticide management; and implementation of the pesticide stockpile management system. Discussions will also be held on the revision of environmental specifications with three national experts from the National Anti-Locust Centre, the Plant Protection Directorate of the Ministry of Agriculture, and the National Environment Agency. In addition, an environmental expert will provide support for the preparation of a health and environmental management plan, which will be implemented during the campaign.

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

The Programme will contribute to setting up teams to monitor the impact of treatments on human health and the environment (one team per aerial base) and the management of empty pesticide drums (also one team per base), for which it will cover the operating costs. This support will comprise the acquisition of monitoring equipment, such as cholinesterase kits, antidotes and other small equipment. Finally, in close collaboration with the Campaign Coordinator and the logistics experts, a national expert will be recruited for pesticide management throughout the campaign. Particular attention will be given to communication aspects and to the awareness campaign to be implemented by the Ministry of Agriculture; a lump sum is provided for the preparation of the relevant didactic material.

Activity 3.3. Construction of a pesticide storage facility

A pesticide storage facility will be built in Toliara during the 2013/14 campaign, as the land was already identified and the plans prepared in 2011. 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 Programme, as well as those of the field operations, are performed and the expected outcomes are achieved.

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 be supervised and coordinated by FAO. Within this framework, the recently developed National Locust Emergency Plan, which is based on an innovative approach in locust control, will be implemented from September 2013. A National Coordination Unit will be established within the Ministry of Agriculture in Antananarivo, which will coordinate the locust campaign management. Its establishment will also allow the transfer of skills to coordinate large-scale locust crises in the country. The Programme will provide international expertise and support for the Unit's creation and organization. The Programme will also contribute to the creation of the Regional Coordination Unit, which will be operational at the National Anti-Locust Centre in Toliara. At the end of the campaign, 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:

- daily supervision and coordination of field operations through international technical expertise (Campaign Coordinator and logisticians);
- monitoring of Programme implementation at national level by the FAO Representation in Madagascar, including operational, administrative and financial support for the implementation of the Programme, resource mobilization at the national level, and smooth information flow and liaison with all stakeholders, including the authorities as well as technical and financial partners in Madagascar; and
- 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 are available to all stakeholders.

Indicators:

- Results of the assessment of the locust campaign's effectiveness are disseminated.
- Results of the impact assessment of the locust crisis on crops and pastures are 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 are expected to improve the efficiency and efficacy of the 2014/15 campaign.

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 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 crisis.

3.4. Assumptions and risks

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

- No major deterioration of the socio-political context or of the security situation.
- Involvement and support from the Government to the locust control campaign.
- 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, 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. 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. To facilitate the coordination of the Programme, a National Coordination Unit will also be set up within the Ministry of Agriculture in Antananarivo under the National Locust Emergency Plan.

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

FAO will mobilize considerable 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 (which is either already present or will be recruited in order to implement this Programme):

- At the FAO Representation in Madagascar, the Emergency Coordinator and the Assistant Emergency 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); a Programme Officer will be recruited to provide support for these activities. An Operations Officer will monitor operations in close collaboration with FAO headquarters and field-based consultants, including the pre-positioning of all inputs, and support to international technical experts. The national experts will provide support for the operational, administrative, logistics and financial management aspects of field operations.
- At FAO headquarters, the Locusts and Transboundary Plant Pests team (Team Leader, Locust Expert and Locust Programme Officer) will ensure oversight and technical coordination of the Programme and its technical monitoring, both remotely and through field missions. This will include a definition of the locust strategy and any necessary adjustments; coordination and consistent implementation of all projects contributing to the Programme; definition of the required technical profiles, preparation of the relevant terms of reference and identification of the technical staff; technical supervision of consultants; preparation of technical specifications of the equipment; approval and monitoring of technical and operational execution of the Letters of Agreement; technical analysis and clearance of calls for tender; 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.

- At FAO headquarters, 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); follow-up of the contract awarding process; and recruitment of personnel. 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 will continue to play an active role in identifying the additional financial resources required for the 2013/14 and subsequent campaigns.

4.3. Donor inputs

The expected inputs within the 2013/14 Campaign are summarized below:

Field experts: This category includes human resources for the implementation of the 2013/14 campaign, as described in paragraph 4.2 (national and international technical and operational support staff working in the field): Campaign Coordinator; logisticians, including security and aircraft logistics; 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); inputs/supplies management expert; biopesticides experts; 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; risk management experts to support the National Locust Emergency Plan; and evaluation experts to assess the campaign and the impact of the locust crisis on crops and pastures.

Training: Training sessions will be organized in the following technical areas: data collection and management regarding locusts, weather and other subjects; using GIS; managing radio data; campaign and aerial base management; aerial control operations (calibration of aircraft spraying systems); using biopesticides; monitoring the impact of treatments on human health and the environment; using the drum-crusher; and using the pesticide stockpile management system. On-site training will also be delivered by international experts on various aspects, 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 three aircraft (helicopters and/or airplanes) for an estimated 2 325 flying hours during the 2013/14 campaign: 500 hours for survey operations and 1 825 hours for locust control operations. These contracts also cover the cost of logistics and aircraft mobilization/demobilization. A contract will be signed for the construction of a pesticides storage facility in Toliara.

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

- **Pesticides:** 550 000 litres of conventional pesticide (active ingredient: Chlorpyrifos); 150 000 litres of IGR (active ingredient: Teflubenzuron); and 1 500 kg of biopesticide (Metarhizium acridum). The pesticides purchased as part of emergency operations implemented by FAO will be stored in the central and secondary pesticides storage facilities of the National Anti-Locust Centre and the Regional Rural Development Directorates, and brought to the aerial bases over land by 4x4 trucks. 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:** Each aerial base will be equipped with 4x4 vehicles and motorcycles for the travel of staff assigned to the base (e.g. locust scouts, control agents, teams for treatment monitoring, pesticide management) as well as trucks for the transportation of pesticides from the storage facilities to the aerial bases or treatment areas and the return of empty drums to the storage areas. Vehicles will be made available according to the needs of 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 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.
- **Positioning and communication equipment:** GPS will be provided, as well as fixed and mobile single-sideband modulation radios (for vehicles) and satellite phones.
- **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).
- **Camping equipment:** Good camping equipment is essential for the aerial bases because the staff will have to live there for several months.
- **Sprayers:** Sprayers will be provided in small numbers for additional ground treatment (cleaning up) carried out from the aerial bases, following large-scale aerial operations: AU815 vehicle-mounted sprayers, AU8000 backpack sprayers, and ULVA+ hand-held sprayers.
- **Health and environmental monitoring equipment:** This material 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:** input management software must be provided, as well as IT equipment, particularly for the aerial bases.
- **Other equipment:** During the campaign, other technical equipment will be needed in order to monitor the campaign's progress. This includes survey equipment (tachometers, hydro-thermometers, calipers, insect sweep nets and bags, scissors and tweezers, magnifying glasses and equipment for entomological collection) as well as pumps and mixers for pesticides and biopesticides.

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 (including the collection of empty pesticide drums); 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 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 required for project implementation. 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 in setting up 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.

5. MONITORING, EVALUATION AND INFORMATION

5.1. Monitoring

FAO will be responsible for the continuous monitoring of Programme activities, with support provided by its governmental counterparts and implementation partners. A simple internal monitoring system, based on performance indicators, will be defined 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 (when the plague has halted).
- Number of swarms escaping from the outbreak area in the southwest of Madagascar.
- 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 2013/14 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 subsequent campaigns. 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.

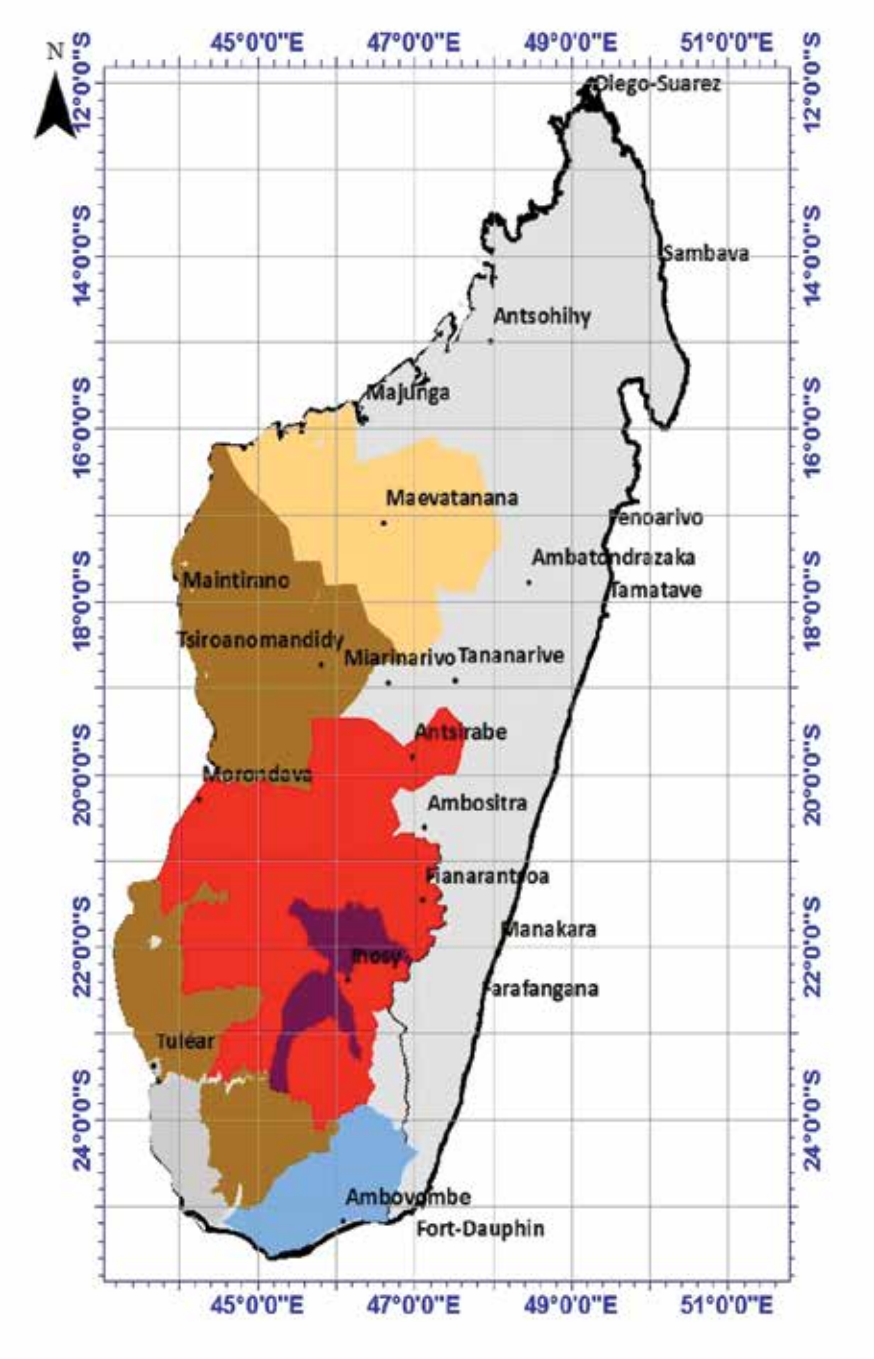
5.4. Communication and visibility

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 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 the launch of the Programme and at key periods of its implementation; the dissemination of bulletins on the locust situation and control operations; the display of information boards; and the production of videos. FAO will also ensure visibility to all donors who support the Programme.

ANNEXES

Annex 1. Map of locust infestation levels as of 31 August 2013



- Presence of swarms and of high-density locust populations (density higher than 2 000 adults/hectare)
- Heavy infestation – current presence of swarms
- Medium to strong infestation
- Likely infestation
- Southern part of the outbreak area, probably with significant infestation
- Area with no infestation

Annex 2. Administrative map of Madagascar

Annex 3. Logical framework and workplan of the Programme in response to the locust plague in Madagascar: Campaign 1 (2013/14)

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.	- Damage to crops and pastures due to the locust plague is limited. - The impact of the locust plague on agricultural production and on the livelihoods of rural people in Madagascar is limited.	- Ten-day and monthly bulletins of the Locust Watch Unit. - Assessment report on the impact of the plague on crops and pastures. - Mid-term and final reports of the Programme.	- 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.
Specific objective Halt the drivers of the Malagasy Migratory Locust plague.	- Significant reduction of any new locust populations across the Malagasy infested territory (number of infested hectares, size and number of swarms at the end of the campaign, and phase status of the locust populations).	- Ten-day and monthly reports of the Locust Watch Unit. - Consultants' reports. - Assessment report on the 2013/14 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.	- 500 flying hours for aerial surveys are undertaken from September 2013 (up to August 2014) and approximately 80 million hectares are surveyed in the infested areas. - Spatial-temporal observations of the locust populations are documented (both quantitative and qualitative evolution); the number, size and density of hopper and adult populations (swarms) are identified in the infested areas; movements of the swarms are described and mapped.	- 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	Objectively verifiable indicators	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.Technical assistance in collecting, analysing and managing information is provided regularly and on a timely basis throughout the duration of the campaign. - The Locust Watch Unit is fully operational. - National and international locust expertise is guaranteed. - National logistics expertise is ensured. - Geographic Information System (GIS) is implemented, operational and is used.	x	x	x	x	x	x	x	x	x	x	x	x	x
	1.1.2. Training in data collection and analysis and information management is delivered. - 10 scouts are trained in information gathering. - The three members of the Locust Watch Unit are trained /re-trained in field data analysis and management. - The National GIS expert has received on-site training. - A radio technician is trained.	x	x	x	x									
Activity 1.2. Support to survey operations	1.2.1. The equipment required for survey operations is purchased and pre-positioned from September 2013 at the aerial bases: - survey equipment; - camping equipment; - positioning equipment, communication and information technology; - 4x4 vehicles and motorcycles.	x	x	x										
	1.2.2. The first aerial base is fully operational and secure in September 2013 for extensive survey operations (contract finalized with previously used airlines; aircraft are in place; and personnel are mobilized).	x	x	x										
	1.2.3. The aerial survey plan is implemented in the infested areas starting from secured mobile aerial bases: - 500 flying hours from September 2013 to August 2014; - approximately 80 million ha surveyed.	x	x	x	x	x	x	x	x	x	x	x	x	x

Component 2. Locust control capacity strengthened			
Expected outcome: The size of the migratory locust populations is reduced during the 2013/14 campaign in the entire infested area, and damage to the crops and pastures due to the locust plague is limited.	- 1.5 million hectares are treated or protected. - Locust mortality rate in the treated areas. - Number, size and density of swarms leaving the infested areas.	- 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	Objectively verifiable indicators	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. Technical assistance in locust control is provided on time and regularly throughout the campaign: - national expertise in logistics is ensured; - an input management system is set up.	x	x	x	x	x	x	x	x	x	x	x	x	x
	2.1.2. Training in locust control is provided for locust control staff assigned to the aerial bases, seconded from the National Anti-Locust Centre, the Directorate of Plant Protection and the Regional Rural Development Directorates: - three people for management of the campaign and an aerial base; - 10 people for the aerial control (calibration of spray booms of the helicopters and ground sprayers); - three people for the management of inputs; - 10 people for the use of biopesticides.		x	x	x	x	x						
Activity 2.2. Support to locust control operations	2.2.1. Pesticides needed for the campaign are acquired and available at the storage facilities, as well as at the aerial bases throughout the campaign: - 550 000 litres of conventional pesticides; - 150 000 litres of insect growth regulator; - 1 500 kg of biopesticide.	x	x	x	x	x	x	x	x	x	x			
	2.2.2. The equipment needed for the control operations is acquired and available from October 2013 at the aerial bases: - 4x4 vehicles and trucks; - camping equipment; - positioning, communication and IT equipment; - locust control equipment, such as sprayers; - personal protective equipment.	x	x	x	x									
	2.2.3. Aerial bases are fully operational and secured from October 2013 (contract with previous airline used, aircraft in place and personnel mobilized).		x	x	x	x	x	x	x	x	x			
	2.2.4. The aerial control plan is implemented in infested areas: - 1 825 hours flown for control operations of October 2013 to June 2014; - approximately 1.5 million hectares treated or protected through the entire Malagasy territory.		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 have been reported; the impact on the environment from the control operations is limited.	- Number of incidents reported affecting human health during aerial control operations or pesticide handling. - Severity of the impact of control operations on the environment.	- 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	**Objectively verifiable indicators**	**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. Technical assistance in monitoring the impact of treatment on human health and the environment is provided in a timely and regular basis throughout the duration of the campaign: - a plan for health and environmental monitoring is developed in September 2013 and implemented throughout the country; - international expertise in monitoring the impact of treatment on human health and the environment is ensured.	x	x	x	x	x	x	x	x	x	x				
	3.1.2. Training is provided 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 are trained in monitoring the impact of the treatments on human health and the environment; - five people trained in the use of drum crushers; - three people trained in expanding the pesticide stock management system; - 30 people trained (on-site) 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	x	x							
	3.1.3. Discussions are held and recommendations formulated 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. Equipment for human health monitoring (e.g. cholinesterase kits and antidotes) and environmental monitoring is acquired and is available from October 2013 at the aerial bases.		x	x	x	x									
	3.2.2. The units monitoring the impact of the treatments on human health and the environment are operational at the aerial bases and for the entire duration of the control operations.		x	x	x	x	x	x	x	x	x				
	3.2.3. Units for managing the inventory and empty pesticides drums are operational during the campaign.	x	x	x	x	x	x	x	x	x	x				
Activité 3.3. Construction du magasin de stockage des pesticides	3.3.1. The pesticide storage facility is built in Toliara (land and plans already available) for storage at the National Anti-Locust Centre in the coming seasons.		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 Programme as well as the field operation units are assured and the expected outcomes are achieved.	- 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	**Objectively verifiable indicators**	**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. The National Locust Emergency Plan is implemented and contributes to the coordination of the campaign: - international expertise is provided for the establishment and operation of the National Coordination Unit; - the National Coordination Unit is operational at the Ministry of Agriculture in Antananarivo in September 2013; - the Regional Coordination Unit is operational at the National Anti-Locust Centre in Toliara from October 2013; - lessons learned are drawn for improving the Plan at the end of the campaign.	x	x	x	x	x	x	x	x	x	x	x	x	x
Activity 4.2. Coordination of the Programme	4.2.1. The Programme is supervised and coordinated effectively and efficiently at different levels: - daily supervision and coordination of field operations through international technical expertise (Campaign Coordinator and logistician); - monitoring of the implementation of the Programme at the national level by the FAO Representation in Madagascar (e.g. provide 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); - Supervision and coordination of the Programme at FAO headquarters: definition of locust strategy and validation of relevant 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 results of the assessment of the locust campaign's effectiveness and of the impact assessment of the locust crisis on crops and pastures are available to all stakeholders.	- Outcomes of the assessment of the effectiveness of the locust campaign are disseminated. - Outcomes of the assessment of the impact of the locust crisis on crops and pastures are disseminated.	- Assessment report of the 2013/14 campaign; - Assessment report of the impact of the locust crisis on crops and pastures; - Mid-term and final reports of the Programme.												
Component 5 activities	**Objectively verifiable indicators**		**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. The technical, socio-economic and environmental relevance of the locust campaign is documented and lessons learned are drawn for subsequent campaigns.										x	x	x	x	x
Activity 5.2. Assessment of the impact of the locust crisis on crops and pastures.	5.2.1 The impact of the locust plague on food security is quantified and qualified; if necessary, effective and appropriate emergency countermeasures are defined for households affected by the locust crisis.										x	x	x	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.

Such threats emerge from transboundary animal, fish and aquatic diseases, plant and forest pests and diseases, food safety hazards, and nuclear and radiological incidents

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

www.fao.org/foodchain

FIAT PANIS

www.fao.org/emergencies