

**REPORT**

**Technical Workshop  
on Locusts in  
Caucasus and Central Asia (CCA)**

Tbilisi, Georgia

24-28 October 2011



Food  
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Participants to the “Technical Workshop on Locusts in Caucasus and Central Asia”  
Tbilisi, Georgia, 24-28 October 2011

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

a.i.	Active ingredient
AGPM	Plant Production and Protection Division (FAO)
CCA	Caucasus and Central Asia
CIT	<i>Calliptamus italicus</i> (Linnaeus 1758), Italian Locust
DMA	<i>Dociostaurus maroccanus</i> (Thunberg 1815), Moroccan Locust
ET	Economic Threshold
FAO	Food and Agriculture Organization of the United Nations
FPPP	FAO-Turkey Partnership Programme
GPS	Global Positioning System
ha	hectare
IGR	Insect Growth Regulator
LMC	<i>Locusta migratoria capito</i> (Saussure 1884), Malagasy Migratory Locust
LMI	<i>Locusta migratoria</i> (Linnaeus 1758), Asian Migratory Locust
LW-CCA	Locust Watch in Caucasus and Central Asia
PPE	Personal Protective Equipment
PRG	Pesticide Referee Group (FAO)
RF	Russian Federation
RP	Regular Programme
TCP	Technical Cooperation Programme (FAO)
ULV	Ultra-Low Volume
USA	United States of America
USAID	United States Agency for International Development

## **INTRODUCTION**

1. The Technical Workshop on Locusts in Caucasus and Central Asia took place in Tbilisi, Georgia, on 24-28 October 2011. It was organized by the Food and Agriculture Organization of the United Nations (FAO) in the framework of the Five-year Programme aiming at improving national and regional locust management in Caucasus and Central Asia (CCA).
2. The following countries participated in the Technical Workshop: Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Uzbekistan. The List of Participants is given in Annex I.
3. The Technical Workshop started with an opening speech of Mr Zurab Lipartia, Head of the Phytosanitary Department of the National Food Agency, Ministry of Agriculture, Georgia. He welcomed the delegates and thanked FAO for organizing the workshop. He also recalled the main features concerning locust management in Georgia. Up to 85 per cent of the territory of Georgia is occupied by agricultural lands and forests, and that is why the problem of locust control is very important for the country. Some croplands became fallows, creating mass breeding areas for locusts. As a result, their outbreaks became more frequent and devastating in the recent years, especially in the eastern part of Georgia. The Department of Phytosanitary of the National Agency of the Ministry of Agriculture conducts annual locust control measures and protects crops. Mr Lipartia said that the current workshop would cover the locust management situation in ten countries of Caucasus and Central Asia and that its results would help the participating countries to strengthen national capacities and decrease economic losses due to locusts.
4. On behalf of FAO, Ms Annie Monard, Senior Officer – Transboundary Plant Pests, welcomed the delegates and expressed her gratitude to Georgia for hosting the meeting. After having recalled the purpose of the two past regional meetings on locusts in Caucasus and Central Asia , which were held in Kazakhstan in 2009 and Tajikistan in 2010, she underlined the importance of the current workshop, during which the Five-year Programme would be officially launched. She said that the workshop would allow discussing and agreeing on Programme implementation. In addition, it would be the occasion, like every year, to exchange on the national locust situations of the last campaign and on forecast for the next year. Last, the meeting would go through the progress made in CCA concerning efficient and environmentally less hazardous strategies, technologies and products for locust control. The Senior Officer also expressed her satisfaction that delegates from Turkmenistan would participate in the meeting, for the first time. Eventually, she wished a fruitful and successful work to all participants.

## **OFFICERS OF THE SESSION**

5. The following officers were elected:

Chairperson	Mr Zurab Lipartia (Georgia)
Vice-Chairperson	Mr Zhanybek Derbishaliev (Kyrgyzstan)
Drafting Committee	Mr Jahed Ahadi (Afghanistan)

Ms Gulnar Yussupova (Kazakhstan)  
 Ms Annie Monard, Senior Officer –  
 Transboundary Plant Pests (FAO)  
 Ms Marion Chiris, Locust Programme Officer (FAO)  
 Mr Alexandre Latchininsky, Consultant, Locust Expert (FAO)

## AGENDA

6. The Agenda, as adopted, is given in Annex II.

## SESSION 1: NATIONAL LOCUST CAMPAIGNS IN 2011 AND FORECASTS IN 2012

### National locust campaigns in 2011 (countries' presentations)

7. The delegates of all present countries made comprehensive presentations on their national 2011 locust campaigns. A summary of each presentation is provided in Annex III.
8. All delegates provided information on surveyed, infested and treated areas concerning all locusts and grasshoppers in 2011, as follows:

Country	Area (ha)		
	Surveyed	Infested	Treated
<b>Afghanistan</b>	295,650	256,790	227,149
<b>Armenia</b>	51,000	3,000	200
<b>Azerbaijan</b>	300,000	140,000	50,000
<b>Georgia</b>	45,000	25,000	2,100
<b>Kazakhstan</b>	10,221,340	2,994,880	1,917,060
<b>Kyrgyzstan</b>	100,784	61,436	58,701
<b>Russian Federation</b>	16,745,860	3,533,300	1,376,550
<b>Tajikistan</b>	245,500	158,516	137,518
<b>Turkmenistan</b>	500,000	258,000	258,000
<b>Uzbekistan</b>	903,600	468,100	439,800
<b>Total</b>	29,408,734	7,899,022	4,467,078

9. On the whole, in-country locust infestations and outbreaks were kept under control by relevant national services; it was also the case in the border areas as fewer problems were faced there as compared to the previous years. Though, the total infested area in the ten CCA countries amounted to 29.4 million ha, which represents an increase of almost 10% as compared to 2010; the total treated area reached 4.4 million ha, increasing by more than 33% as compared to 2010. Significant increase in infested and treated areas occurred in Afghanistan and Tajikistan, due to the drought; however, similar weather situation in the neighbouring Uzbekistan and Turkmenistan did not have the same impact on locust populations. In Kazakhstan, infested and treated areas were quite similar to the previous year (a decrease of 6% and an increase of 2% respectively). In the Russian Federation, which was facing quite a heavy situation for the second consecutive year, the increase of infested area was of 17% as compared to 2010 but the treated areas doubled. The Federal Russian Government had sent warnings to local governments as early as December 2010 to request them allocation of additional funding for locust control, which

they did. Locust infestations in Russia occurred mostly along borders with Kazakhstan, China and Mongolia. Out of the total infested area of 3.5 million ha, about 70% were infested with gregarious species, mainly the Italian Locust.

10. Georgia mentioned fund shortage in 2011 as a major constraint, due to the fact that part of the resources had to be allocated to control operations against the Fall Webworm. Several other countries also reported lack of modern tools and technologies for locust survey and control operations, including Global Positioning System (GPS) devices and spraying equipment. Afghanistan expressed the need for more equipment and training. Kyrgyzstan said that the lack of resources was a major constraint for implementation of a locust preventive strategy because locust monitoring and forecast could not be carried out adequately. Tajikistan faced similar problems. These two last countries reiterated the request for assistance that they had formulated in 2010. The FAO experts explained that the projects they had prepared had not yet been approved (no available funds) but they also informed that there were good possibilities that funding be granted by the end of the current year.
11. The question of pesticides used in the various countries was raised several times. However while similar discussions during the two past regional meetings concerned mainly their efficiency, this time they included equally efficiency and concern for the possible impacts on human health and the environment. At this occasion, the FAO Senior Officer – Transboundary Plant Pests informed the delegates that there would be a new meeting of the Pesticide Referee Group (PRG) within the next two years and that one or two specialists from CCA would be welcomed to participate in such meeting.
12. As compared to the previous years, progress was made concerning collaboration between neighbouring countries for handling locust infestations in border areas. Several examples of good or improved collaboration were mentioned and, overall, contacts between the different countries increased although access to neutral zones along the borders remained difficult in some cases. Every country provided a list of existing or envisaged agreements (see Annex IV). In this context, the delegate of Tajikistan specifically called for enhanced collaboration with Afghanistan.

### **Locust forecast for 2012 and preparation of the next campaign**

13. The delegates of all countries presented the forecast for the coming year. A decrease of the areas infested by the Moroccan Locust is expected in some countries of southern Central Asia (Afghanistan, Tajikistan and Uzbekistan).
14. In Kyrgyzstan, preliminary results of autumn surveys indicated also a reduction of locust spreading. It is expected that 60,000 hectares (ha) will require control operations in 2012, a situation similar to the 2011 one, i.e. 70% in the southern part of the country, mainly in the Fergana valley, at the borders with Tajikistan and Uzbekistan, and 30% in the northern part of the Republic.
15. In Kazakhstan, as per preliminary forecast and without taking into account likely movements of adult populations from the Russian Federation, a further reduction of the Asian Migratory Locust (LMI) infested areas is expected (which would result in 40% less area to be treated against this locust pest), while a significant increase of areas infested by the Italian Locust (CIT) and the Moroccan Locust (DMA) is foreseen. For the

latter, it would result in an increase of more than 60% of the areas to be treated. In total, it is planned to carry out control operations on almost 2.2 million ha in 2012, an increase of almost 14% as compared to 2011. One fifth of this area will be treated using Insect Growth Regulators (IGRs).

16. In the Russian Federation, infestations will remain important although they should decrease. Consequently, it is expected that 800,000 ha will be treated in 2012 (against 1.4 million ha in 2011). The delegate informed that survey results would be available in early November and published on official website.
17. In Georgia, only 10% of infested areas was treated in 2010 and a serious situation is therefore expected in 2012. Infestations will be due not only to DMA but also to CIT. The delegate of Armenia informed Georgia that they could assist them with sprayers for ULV formulations (Micronair Ulva+), which were provided some years ago in the framework of a FAO emergency project. In Armenia, where very few control operations were carried out in 2011, a locust spread out would probably occur throughout the whole territory although no serious situation is expected. However, it was mentioned that DMA populations would probably migrate from the neighbouring countries. In Azerbaijan, autumn surveys will be completed at the end of October. It is anticipated that 300,000 ha will again have to be surveyed in 2012, which should be confirmed in April 2012 based on the spring egg-pod survey. The areas to be treated will be identified after this spring egg-pod survey.
18. A summary of national locust situations in 2011 and forecasts for 2012 is provided in Annex III.

### **Information sharing and cooperation in 2011**

19. The FAO Senior Officer – Transboundary Plant Pests, Ms Annie Monard, reminded that a number of tools had been adopted during the Regional Consultation on Locust Management in 2009 in order to facilitate the regular collection and exchange of standardized data, more specifically the standard survey and spray forms and the template for national and regional monthly bulletins; a bilingual website, Locust Watch in Caucasus and Central Asia” (LW-CCA), had also been created as a platform for exchanges.
20. The discussion started with the in-country use of standard survey and spray monitoring forms. The major part of countries indicated that they used forms at national level, either the FAO ones or forms containing similar information. Some countries had organized training on the use of such forms in 2011; if not, they had dispatched guidelines to technicians. The delegate of Armenia informed that the form had been slightly modified in order to match better with the national situation (no egg-bed survey in this country). The delegates of Afghanistan and Kyrgyzstan regretted the lack of GPS when conducting the survey operations and asked for assistance in this regard. Last, the delegate of the Russian Federation indicated that the whole campaign had also been documented through video. He also invited countries to join and assist in the national training sessions.
21. As far as the national monthly bulletins were concerned, the FAO Senior Officer indicated that they started to be received in early April 2011. As compared to 2010, there were fewer and they arrived less regularly and at a later date. Only two countries,

Armenia and Kazakhstan, sent the bulletins every month throughout the campaign. The others provided data at least twice but generally more than four times. One country never sent any information. Information was provided as monthly bulletins but also as e-mails, spread sheets, filled-in forms and tables. In such cases, the resulting information was less analyzed and less standardized but often more detailed. It was noted that 2011 was a transition year between the end of the two-year regional project TCP/INT/3202 (D) and the start of the Five-year Programme, with no funding available for national focal points preparing the national bulletins. During the discussions, it was agreed that a repository would be made available, either on the website LW-CCA, with a restricted access, or using the Field Transfer Procedure (FTP) to allow the delegates sharing documents, including pictures. It was also said that efforts should be made to provide the information in a regular and timely manner, for the benefit of all countries. Upon suggestion from the Russian Federation, an additional bulletin would be prepared at the end of 2011 or in early 2012 to provide with the updated national forecast for 2012 (based on the analysis of the autumn survey results).

22. The monthly regional bulletins were prepared from April 2011 and posted during five consecutive months on the FAO website. It was indicated that both irregular receipt of national bulletins and staff shortage at FAO-Headquarters had delayed their preparation. In reply to a question from the Senior Officer, the delegates said that even if information was not received from all countries, it was worth preparing the regional bulletin as any piece of information was important for immediate and long-term transboundary pest management.
23. Regarding the website LW-CCA, it was said that its update had been slowed down both by staff shortage and because 2011 was a transition year. However, it is expected that a number of documents and updates will be regularly posted in 2012. Countries were invited to send information and useable pictures for the website.

## **SESSION 2: IMPLEMENTATION OF THE FIVE-YEAR PROGRAMME TO IMPROVE LOCUST MANAGEMENT IN CAUCASUS AND CENTRAL ASIA**

### **Five-year Programme: overview**

24. The FAO Locust Programme Officer, Ms Marion Chiris, provided an overview on the Five-year Programme, recalling the process which had allowed its preparation and led to its endorsement by CCA countries in 2009. She also briefly presented the Programme objective and its six results, as follows:
  - Result 1: Regional cooperation developed for better locust management
  - Result 2: National capacities strengthened
  - Result 3: Locust issues and disasters better anticipated and mitigated
  - Result 4: Improved response mechanisms to locust outbreaks
  - Result 5: Impact on human health and the environment mitigated and monitored
  - Result 6: Effective public information and awareness increased.
25. Afterwards, she explained how fund-raising had been conducted over the past two years. Lobbying donors included preparation of information material (leaflets, concept notes, etc.), bilateral meetings with donors in CCA countries and at the level of their Permanent Representations to FAO in Rome, donor meetings at FAO-HQs, transmission of an

official letter from the Director-General of FAO to donors, and preparation of funding proposals, taking into account the area of interest, strategies and specific requirements of each donor. She also explained that the Five-year Programme was multi-funding, meaning that the Programme was made up by a number of projects funded by different donors.

26. Then the financial situation was presented, as of the end of October 2011. Available funds were of USD 2.4 million, thanks to contributions from the United States Agency for International Development (USAID), the FAO-Turkish Partnership Programme (FTPP) and the FAO Regular Programme (RP). Additional funding was expected by the end of the year, for an amount of about USD 3 million, including USD 2 million from the Russian Federation and other funds from the FAO Technical Cooperation Programme (TCP). This is presented in the below table in which the colored parts indicate which are the results covered by each funding, the darker parts showing where the bulk of each assistance is. Out of the total budget of USD 7.8 million, the funding gap is therefore of USD 2.4. million. Missing funding concerns mostly procurement of equipment for the ten concerned countries. It was agreed that fund-raising efforts would be pursued.

5-Yr PROG. for CCA	USD (mill.)	Countries	R1	R2	R3	R4	R5	R6
<b>Confirmed</b>	2.4							
<b>USAID</b>	1.6	All						
<b>FTPP/Turkey</b>	0.6	AZE-KAZ-KYR-TAJ-TUK-UZB						
<b>FAO Reg. Prog.</b>	0.2	All						
<b>Expected</b>	3							
<b>Russian Fed.</b>	2	All						
<b>FAO TCP TAJ</b>	0.5	TAJ						
<b>FAO TCP KYR</b>	0.5	KYR						
<b>Funding Gap</b>	2.4	All						

27. Thanks to the above assistance, the Five-year Programme for improving national and regional locust management in Caucasus and Central Asia was officially launched at the occasion of the current workshop. The participants took this occasion to express their gratitude to all contributors to the Five-year Programme as well as to FAO which had made it possible.

### How to implement the Five-year Programme?

28. A roadmap for the programme implementation over the five-year period was presented to countries by the Locust Programme Officer. For each Programme Result and Activity, the roadmap indicated the funding situation (confirmed/expected source or gap), the envisaged timeframe, the issues to be addressed, as well as countries' specific engagements. Each single activity was reviewed by the attendees. The main points discussed are presented hereafter.

29. The discussions allowed explaining the difference between the monographs concerning the three locust pests present in CCA (activity 2.2-b) and the practical guidelines for locust management (activity 2.2-c). The three monographs aim at providing insights on the bio-ecology as well as population management strategies of each of the three locust species (Italian, Asian Migratory and Moroccan Locusts); they will be targeting primarily researchers and students but, more generally, will serve as a reference book for all staff involved in locust management. The practical guidelines, which will include information on locust survey methods, forecast and control, impact monitoring of control operations on human health and the environment, and campaign management, are meant to be an operational tool for workers. They will provide transversal information useful for each locust species but which will have to be adjusted to their respective characteristics. The delegates were informed that the preparation of the monographs would be led by Mr Latchninsky, FAO Consultant, Locust Expert. Besides the overall coordination, he will also update the existing monograph of Moroccan Locust (issued in French only, in 1992). Co-authors of the two other monographs would be Mr Childebaev and Mr Sergeev for the Italian Locust; and Mr Gapparov and Mr Kambulin for the Asian Migratory Locust. It was explained that these co-authors were encouraged to work with other specialists if possible (without additional financial cost for the Five-year Programme). All colleagues were invited to provide reference material, such as high quality pictures. While this work should start as early as November/December 2011, it was expected that the co-authors would prepare a detailed outline, for each monograph, within three months from the start of the work. The monographs would be prepared in Russian and translated into English at a later stage. In reply to a question of Mr Kambulin, it was said that FAO guidelines/requirements would be provided concerning the format of the monographs. Mr Childebaev stressed that too many details would not be provided on pesticides as this information would be provided in the practical guidelines. Last, it was said that the monographs would be available in an electronic version on the FAO website LW-CCA and that the initial number of printed copies would depend on fund availability.
30. The composition of the e-committees for selecting (a) national institutes/research centers for two grants on applied research and (b) national laboratories for grants aiming at strengthening their capacities (activity 2.4) was discussed at length. On the one hand, it was said that the committee members should know the existing institutes as well as the needs for applied research related to locusts in CCA. On the other hand, it was mentioned that there should be no conflict of interest and that the members of the committee should be independent experts from countries outside CCA. It was also underlined that the selected topics should be of interest for all CCA countries. Finally, it was agreed that this e-committees would be made of five members, four FAO experts and one country representative, from Afghanistan. A call for interest would be issued (in accordance with FAO rules), with clear and transparent selection criteria. It was also clarified that the maximum duration for applied research topic was of five years.
31. It was decided that the technical assistance (visits from international experts) provided to a single country on locust monitoring (activity 3.1.1.), locust control (activity 4.1.1) or impact monitoring of control operations on human health and the environment (activity 5.1) could benefit two countries rather than one if such visits would be done at the time of cross-border surveys (activity 3.2). This will concern three cross-border surveys, out of the four which will be organized during Year 1 (2012), as follows: joint survey between (a) Azerbaijan and Georgia, (b) Afghanistan and Tajikistan, (c)

Turkmenistan and Uzbekistan. Concerning the cross-border survey between Azerbaijan and Georgia, it was decided that Georgia would invite Armenian technicians to participate in such activity and that FAO would financially contribute to their participation if funds were available (to be confirmed at a later stage). The fourth joint surveys benefiting from a financial assistance in 2012 (with no participation from an international expert) concerns Kyrgyzstan and Uzbekistan and will take place in the Fergana Valley. During discussions, a cross-border survey between Turkmenistan and Afghanistan was also planned for Year 2.

32. As far as equipment for locust monitoring and control is concerned (activities 3.1.2 and 4.1.2), the list of items to be delivered to all countries before the beginning of the next campaign (February/March 2012) was provided to the delegates (see Annex V). It was explained that such equipment would be procured thanks to USAID and the FAO Regular Programme. However, this was only a small part of the equipment that it is envisaged to procure within the Five-year Programme (as there is no funding yet for more equipment).
33. Concerning activity 3.4., countries provided an overview on the development of annual workplans. More specifically, the delegate of Tajikistan explained that the need for a contingency plan related to locust management had been recognized at the national level and the delegate of Kazakhstan informed that a plan of action had been prepared for emergencies (including locusts), thus enforcing the national law on emergencies.
34. Discussion also concerned the partnership with private companies in countries which delegate partially or fully control operations to these companies. Such countries are Armenia, Georgia, Kazakhstan, Kyrgyzstan and Uzbekistan. The Five-year Programme indeed plan that such countries will organize round tables and provide guidelines to private operators in order to promote respect of good agricultural practices before, during and after control operations (activity 4.2.3).
35. Last, the envisaged video-tutorials on ULV spraying (to be shot during spring 2012 in Morocco) and on biopesticides (planned for 2014 in a CCA country) were particularly welcomed by the delegates.
36. The roadmap, which includes the result of the discussions and the decisions taken by all the delegates, is provided hereafter. It will serve as the basis for the Programme implementation over the five-year period. Adjustments will be made on a yearly basis (annual workplan) during the future technical workshops.

Results & Activities	Actions to be taken Responsibility/operators	Funding 5-yr Prog. (confirmed/ <i>envisaged</i> )	Time frame					<i>Funding gap</i> Comments *Issues discussed and decisions taken	Specific countries' engagement (Except when specified otherwise hereafter, envisaged expenses are covered by the Programme)
			Y1	Y2	Y3	Y4	Y5		
			2012	2013	2014	2015	2016		
<b>R1</b>	<b>Regional cooperation developed for better locust management</b>								
1.1.	Facilitate regional exchanges to manage locust situations								
	<u>1.1.1. Create and maintain regular regional information sharing of standardized data:</u> (a) Use regularly standardized survey and control forms ( <b>Responsibility Countries</b> ); (b) Issue standard monthly national bulletins, from March to October [ten national consultants] ( <b>Resp. Countries</b> ) and monthly regional bulletins ( <b>Resp. FAO</b> )	(a) Countries (b) USAID						Already discussed under Item 6 of the Agenda * Recruitment of national consultants will take place before the next locust campaign	(a) Ensure regular use of standard forms at national level (b) Assist in identifying national consultants and provide them with relevant information for monthly bulletins
	<u>1.1.2. Allow direct experience exchange:</u> organize five Regional technical workshops gathering all countries ( <b>Resp. FAO</b> )	FAO Regular Programme (RP) for Y1 & USAID	Oct.	Oct.	Oct.	Oct.	•	Five annual workshops from October 2011 to October 2015 End-of-programme workshop to be organized in October 2016	Participate every year in workshop
1.2.	Develop coordination including through transboundary policy								
	<u>1.2.1 Promote coordination for implementation of national survey and control plans:</u> as a prerequisite to the implementation of national plan, exchange with neighbouring countries on appropriate timing and location for survey and control operations ( <b>Resp. Countries</b> )	Countries						*Countries will post their annual survey and control plans on a FAO Repository or webpage with restricted access (on website LW-CCA) * FAO will ensure translation of survey and control plans from Russian into English and vice-versa	Prepare annual survey and control plans in Russian or English; Upload/Dispatch the workplans before the beginning of the campaign (repository/website) and inform FAO

	1.2.2. Facilitate cross-border activities and intra-regional assistance: conclude bilateral or multilateral specific agreements for simplifying joint activities; Organize bilateral or multilateral working groups for coordinating joint activities; If possible, transfer teams and equipment from one country to another when needed <b>(Resp. Countries, with FAO assistance if needed)</b>	Countries						* An official letter will be sent by FAO to all countries, technically supporting the conclusion of bilateral agreements, including for joint activities in border areas *At the national level, the delegates will technically advocate for the preparation of such agreements *In case of emergency, the website LW-CCA will be used to issue alerts and to call countries to work jointly on the basis of the existing agreements	Prepare, sign and implement bilateral or multilateral agreements with neighbouring countries; Organize working groups' meetings ( <u>at countries own expenses</u> )  Report during annual workshops on progress made
1.3.	Identify the best long-term solution for sustainable regional cooperation								
	Carry out a comprehensive study on various possible options, including the creation of a FAO Locust Commission <b>(Resp. FAO)</b>	USAID						FAO study - results to be discussed during the annual workshop of Year 3	Participate in the meeting (decision-makers)
<b>R2</b>	<b>National capacities strengthened</b>								
2.1.	Build up capacities through a vast Training-of-Trainers (ToT) programme on locust management								
	(a) Organize ToT <b>(Resp. FAO &amp; Countries)</b> : - two regional sessions for up to 40 Master-Trainers - two national sessions/country for up to 600 locust experts/scouts - five briefing sessions/country for 750 persons (local manpower) prior to control operations	<i>Rus. Fed.</i>	•	•				Two topics: Bio-ecology of the three locust pests, survey operations and information management; Spraying techniques and pesticides management	Nominate appropriate staff to participate in the regional sessions  Organize two national sessions  Organize five national briefing sessions
	(b) Organize refreshing sessions for locust experts and local manpower <b>(Resp. Countries)</b>	Countries				•	•		(b) Organize refreshing national and briefing sessions, <u>at countries' own expenses</u>
2.2.	Make available and accessible background documentation and literature on the three locust pests								
	(a) Bibliography of available documentation on locusts in CCA; Make recommendations on material to be made available to countries; if possible post them on website LW-CCA, with bilingual abstracts <b>(Resp. FAO)</b>	FAO-RP						Bibliography: done (available on LW-CCA) *Members of e-committee to identify material to be made available on website and	Ensure internal despatch of produced material ( <u>at countries' own expenses</u> )

								prepare abstracts of selected material: Ms Abashidze, Mr Gapparov, Mr Kambulin, Mr. Latchininsky, Mr Sergeev	
	(b) Update the existing monograph on the Moroccan Locust (DMA) and prepare two monographs on the Italian Locust (CIT) and the Asian Migratory Locust (LMI) ( <b>Resp. FAO</b> )	FAO RP <i>and Rus. Fed.</i>						To be led by Mr Latchninsky. DMA: Mr Latchninsky CIT: Mr Childebaev & Mr Sergeev LMI: Mr Gapparov & Mr Kambulin	Ensure internal despatch of produced material ( <u>at countries' own expenses</u> )
	(c) Produce practical guidelines for the management of the three locust pests in CCA ( <b>Resp. FAO</b> )	USAID						E-committee made of FAO experts for selection of institute/research center	
2.3.	Allow internships and post-graduate education								
	(a) Allow ten locust/plant protection officers from different countries to make one-month internships abroad ( <b>Resp. FAO</b> )	USAID (x 7 persons)						*Envisaged one-month internship for Year 1: Kazakhstan and Tajikistan, in Morocco, on ULV technology (February 2012); and Uzbekistan, in Australia, on biopesticides (autumn 2012).	Assist in identifying appropriate candidates, both locust/plant protection officers and students
	(b) Allow eight/ten students from CCA to follow a two/three-year post-graduate formation. ( <b>Resp. FAO</b> )	FPPP (x5/6 persons) <i>Rus. Fed.</i> (2 persons)						* Members of e-committee to review, prioritize and select proposed subjects and curriculum vitae, taking into account interest of all countries: Ms Abadshidze, Mr Gapparov, Mr Govorov, Mr Kambulin, Mr. Latchininsky and Mr Sergeev (early 2012)	Provide with related CV  Submit proposals for internships and two/three post-graduate formation
2.4.	Promote and support applied research								
	(a) Allocate two grants to selected institutes for applied research on identified topics ( <b>Resp. FAO</b> )	<i>Rus. Fed.</i>						* Members (5) of e-committee for selection of topics for applied research and laboratories, taking into account interest of all countries: Mr Latchininsky (Chair), 3 other independent	Submit applied research proposals
	(b) Procure entomological and chemical equipment for about six national laboratories ( <b>Resp. FAO</b> )	<i>Rus. Fed.</i>							Assist in identifying laboratories

								experts from FAO or nominated by FAO, one country representative from Afghanistan	
<b>R3</b>	<b>Locust issues and disasters better anticipated and mitigated</b>								
3.1.	Improve survey operations for better locust monitoring								
	3.1.1. <b>Strengthen human capacities:</b> provide regular assistance and organize technical visits, including training, in at least six countries on locust monitoring, incl. survey techniques, data collection, reporting and analysis ( <b>Resp. FAO</b> )	USAID (x3) FTPP (x2)						• <i>Missing funding: at least 1 country</i> *Countries selected for 2012: Afghanistan, Kyrgyzstan	Perform timely survey operations in accordance with annual workplan. Document accurately national surveys. Facilitate technical visits of FAO international consultants (visa, agenda, etc.)
	3.1.2. <b>Strengthen operational capacities:</b> deliver positioning, communication, survey and office equipment to countries ( <b>Resp. FAO</b> )	FAO RP (x3) USAID (x 7)		•	•			<i>Equipment had to be limited to minimum, to be completed with other funding</i>	Use delivered equipment for locust management only. Ensure maintenance of delivered equipment.
3.2.	Organize regular cross-border surveys								
	Carry out 20 cross-border surveys ( <b>Resp. Countries with FAO assistance</b> )	USAID (x10)					•	• <i>Missing funding: 10 cross-border survey</i> (lump sum for general operating expenses/daily subsistence) *Assistance will be provided for the following cross-border surveys during Year 1: - Azerbaijan & Georgia - Afghanistan & Tajikistan - Turkmenistan & Uzbekistan - Kyrgyzstan & Uzbekistan *In the three first cases, international technical assistance provided under 3.1.1, 4.1.1. & 5.1 will contribute to support such cross-border surveys.	Facilitate and participate in cross-border surveys

3.3.	Develop monitoring and analyzing systems								
	3.3.1. <u>Extend use of Geographical Information System and remote sensing</u> (a) Carry out a study on existing national Geographical Information System (GIS) in CCA [regional GIS consultant] and collect information on nature and availability of remote sensing and weather data which are available at national level [ten national consultants] <b>(Resp. FAO)</b>	USAID							Assist in identifying regional GIS and national specialists?  Provide requested information on existing GIS and remote sensing data at national level
	(b) Organize regional workshop to identify main features of regionally compatible GIS <b>(Resp. FAO)</b>	USAID						Release national specialists for participating in regional workshop	
	(c) Design/adapt GIS system [regional GIS consultant] <b>(Resp. FAO)</b>	USAID						Cooperate with regional specialist if needed	
	(d) Install in at least two pilot countries [regional GIS consultant] <b>(Resp. FAO)</b>	USAID						Pilot countries: following installation of regional compatible GIS system, test it and share results	
	3.3.2. <u>Improve forecasting</u> : organize regional workshop for better forecasting <b>(Resp. FAO)</b>	USAID						3.3.2. Participate in regional workshop on forecasting	
3.4.	Enhance preparedness for risk reduction through harmonized national contingency plans								
	(a) Formulate a common strategy/canvass for designing national contingency plans [international consultant] <b>(Resp. FAO)</b>	USAID							
	(b) Discuss with countries, refine and adopt a common canvass, during specific regional workshop <b>(Resp. Countries &amp; FAO)</b>	USAID						Participate in regional workshop on contingency plans	
	(c) Prepare national plans on the basis of the canvass <b>(Resp. four pilot countries, with FAO assistance)</b>	Countries						Pilot countries: prepare national contingency plan with FAO assistance	
	(d) Share lessons drawn with all CCA countries <b>(Resp. four pilot countries)</b>	Countries						Pilot countries: prepare national contingency plan with FAO assistance and share lessons drawn with other CCA countries	

R4									
Improved response mechanisms to locust outbreaks									
4.1. Allow early reaction and appropriate control operations									
4.1.1. Strengthen human capacities: provide regular assistance and organize technical visits, including training, in at least six countries (Resp. FAO)		USAID (x4) FTPP (x2)						*Countries selected for 2012: Azerbaijan, Turkmenistan	Perform timely control operations in accordance with annual workplan; Promote pesticide spraying in the respect of human health and environment and good agricultural practices; Monitor and document control operations; Facilitate technical visits of FAO international consultants (visa, agenda, etc.)
4.1.2. Strengthen operational capacities: procure relevant control equipment to countries, in particular Ultra-Low Volume (ULV) spraying material and protective clothing (Resp. FAO)		FAO RP (x3) USAID (x 7)			•	•		<i>Equipment had to be limited to minimum, to be completed with other funding</i>	Use delivered equipment for locust control only. Ensure maintenance of equipment
4.1.3. Enhance public-private partnership: organize technical round tables with private partners (at least three countries) and provide guidelines and incentives for respect of good practices (Resp. Countries, with FAO assistance)		Countries						To be implemented by countries which fully or partially delegate locust control to private companies	Organize round tables and provide guidelines and incentives to private sector - <u>at countries' own expenses</u>  Report on the actions taken during annual workshops
4.2. Promote less harmful pesticides and alternatives to conventional pesticides									
4.2.1. Develop ULV formulations and related techniques: inform and train countries on ULV technology; provide them with a video tutorial on ULV spraying (Resp. FAO & Countries)		USAID (video)	video					*Video on ULV spraying against Moroccan Locust in Morocco (spring 2012)	Despatch video widely among locust specialists ( <u>at countries own expenses</u> )
4.2.2. Propose alternatives to conventional pesticides: inform on alternatives; organize demonstration in CCA and duly document it with video (Resp. FAO)		USAID				demo & video			Host country: facilitate organization of demonstration Despatch video widely among locust specialists ( <u>at countries own expenses</u> )

	4.2.3. Encourage registration of more pesticides: (a) Define the minimum list of pesticides to be registered in CCA for harmonization ( <b>Resp. FAO &amp; Countries</b> ); (b) Register more pesticides for locust control, incl. less environmentally harmful compounds and formulations or -at least- process for registration launched ( <b>Resp. Countries, with FAO assistance</b> )	Countries						*E-working group to review material received from countries, discuss and define the minimum list of pesticides for registration in CCA, and report to all colleagues includes: Mr Gapparov, Mr Latchninsky, Ms Yussupova	(a) Provide updated list of national registered and/or most used pesticides; Discuss and agree on minimum list of pesticides for locust control (during technical workshop of Year 2); (b) Launch process for national registration ( <u>at countries own expenses</u> )		
<b>R5</b>	<b>Impact on human health and the environment mitigated and monitored</b>										
5.1.	Mitigate impact of locust control operations on human health and the environment										
	(a) Organize technical visits, including training, in at least six countries ( <b>Resp. FAO</b> )	USAID (x4) FTPP (x2)						*No countries selected for 2012	Adopt best agricultural practices and mitigation measures, including use of protective clothing		
	(b) Produce extension material (posters, leaflets, booklets, etc.) and ensure translation into national languages ( <b>Resp. FAO</b> )	<i>Rus. Fed.</i>						To be done using guidelines and training material from ToT	Ensure internal despatch of extension material - <u>at countries' own expenses</u>		
5.2.	Monitor impact of locust control operations on human health and the environment										
	(a) Conduct impact assessments in six countries [national consultants] ( <b>Resp. Countries and FAO</b> )	USAID (x4)					•	•	For the six concerned countries: assist in identifying national consultants  For the six concerned countries: facilitate impact assessment during and after control operations, and analysis of collected material		
	(b) Ensure analysis of collected material and insect identification in relevant laboratories and research centres of the six concerned countries ( <b>Resp. Countries and FAO</b> )	USAID (x4)					•	•			
<b>R6</b>	<b>Public information and awareness increased</b>										
6.1.	6.1. Develop awareness and education among local populations										
	(a) Produce, translate (English/Russian/national languages) and despatch extension documentation to local populations and schools ( <b>Resp. FAO and Countries</b> )	Countries					•	•	•	<i>No funding</i>	Ensure despatch of extension documentation to local populations and schools - <u>at countries' own expenses</u>

	(b) Organize mass-media campaigns ( <b>Resp. Countries</b> )	Countries							Organized mass-media campaigns - <u>at countries' own expenses</u>  Report on actions taken during annual workshops
6.2.	6.2. Enhance visibility of locust issues and management, and of related donor support								
	6.2.1. Prepare and implement a regional communication plan ( <b>Resp. Countries &amp; FAO</b> )			•	•			<i>No funding</i>	Contribute to implement agreed communication plan
	6.2.2. Increment & update the website "Locust-Watch in CCA" ( <b>Resp. FAO</b> )	FAO-RP							Provide documentation, photos, etc. for updating the website
<b>All</b>	<b>Technical supervision, coordination, operational and financial management of the Five-year Programme</b>								
	Technical supervision, coordination, operational and financial management of the Five-year Programme at FAO-level ( <b>Resp. FAO</b> )	FAO RP FTPP <i>and Rus. Fed.</i>				•	•	Annual reports on activities and expenditures; annual workplans to be discussed during workshops (including planned expenses and funding gaps)	
	Liaison with FAO for implementation of the Five-year Programme at the national level ( <b>Resp. Countries</b> )	Countries				•	•	*E-mail will be sent to countries asking them to identify a national focal point, who should be part of the national service in charge of locust management (public official) and will facilitate programme implementation	Designate a national focal point for project implementation
	Evaluation of the Five-year Programme ( <b>Resp. FAO</b> )	USAID <i>and Rus. Fed.</i>							

### **SESSION 3: EFFICIENT AND ENVIRONMENTALLY LESS HAZARDOUS STRATEGIES, TECHNOLOGIES AND PRODUCTS FOR LOCUST CONTROL: PROGRESS MADE IN CCA**

#### **Progress made concerning spraying technologies and products**

37. Countries shared updates on progress made on spraying technologies and products as follows:

- Afghanistan said it used mostly pyrethroids.
- Armenia informed that Ultra-Low-Volume spraying equipment was used in 2004-2005 during the FAO project but since then, these sprayers had not been used. Currently anti-locust treatments are done with tractor-driven and hand-held sprayers. Only blanket treatments are done. Pesticides used include 70 formulations based on 17 active ingredients (a.i.). Most of them belong to pyrethroid group.
- Azerbaijan said it used 40 tractor-driven sprayers, one Antonov-2 aircraft and numerous hand-held sprayers to treat 50,000 ha in 2011.
- Georgia informed that it used mostly ULV (85-90%), particularly the two vehicle-mounted AU 8115 sprayers procured through FAO assistance in 2010. About 10 to 15% of areas were treated with full-volume spraying. Mostly they tried to use long-acting pesticides. There were some aerial treatments, using ultra-light aircraft.
- Kazakhstan said that it had several types of air and ground spraying platforms. Areas treated from fixed-wing aircraft (370,000 ha) decreased as compared to 2010 while areas treated by Ultra-Light Aircraft (738,000 ha) and Aerosol generators (580,000 ha) increased as compared to 2010. Fixed-wing and Ultra-Light Aircraft were equipped with ULV sprayers. Ground ULV sprayers and Tractor sprayers treated 190,000 ha and 48,000 ha respectively (both similar to last year). Almost 70% of the treated area was sprayed using the ULV technology. In 2011, Kazakhstan used only three pesticides: diflubenzuron on 320,000 ha (16% of total area), imidacloprid on 1,020,000 ha (51%) and fipronil on 660,000 ha (33%). No pyrethroids were used. Organophosphates have not been used for the past 11 years. Twelve new pesticides were registered in 2011, including one biological product. In total, there are currently 85 insecticides registered for locust control in Kazakhstan. The only ULV pesticide manufactured locally is Dimilin OF6, but it was not used in 2011.
- Kyrgyzstan said it used aircraft Antonov-2 in the mountains while hand-held sprayers in areas with difficult access. The use of ULV is growing. Although there are nine ultra-light aircraft, they are not used anymore since 2009 when a lethal accident took place.
- Tajikistan informed that it used 66 tractors, including 19 ones belonging to the locust control organization and 47 mobilized from agricultural cooperatives. More than 1,822 hand-held sprayers were used, including 300 airblast aerosol sprayers manufactured in China. The country did not use airplanes because of complicated relief and expensive fuel. Tractor-driven OVH sprayers worked fine, they produced 30-m treated swath.

Deltamethrin (Decis) and lambda-cyhalothrin (Karate) were used early in the season and and chlorpyrifos+cypermethrin (Nurell D) later on.

- Turkmenistan said that in 2011, anti-locust treatments were done by air (five AN-2 aircraft) and by ground (190 tractors OVH-28 and 525 knapsack sprayers). In total, 258,515 ha were treated which is less than in 2010 (300,865 ha). Pesticide Fascord (a.i. alfa-cypermethrin, 10%) was applied at a dose rate of 150-250 g of formulation/ha.
- Uzbekistan said it used 227 tractors (30% of treated area) and 32 vehicle-mounted ULV sprayers (46%); other treatments were done by hand-held sprayers (11%), Ultra-Light Aircraft (13%) and fixed-wing aircraft (0.3%). Most pesticides were produced locally. Treatments were done mostly with imidacloprid (42% of treated area), pyrethroids (23%) and fipronil (28%); smaller areas were treated with Insect Growth Regulators.
- Kazakhstan and Uzbekistan said that they were interested to receive information on effects of fipronil on non-target organisms.

### **Progress made concerning safety and environmental precautions**

38. The purpose of the item was to review progress made on safety and environmental precautions during the past year. Prior to the workshop, the delegates had been requested to prepare an overview on actions taken or in progress concerning information and training, monitoring of control operations and of their impact, and on pesticide handling.
39. It appeared from the speech given by each delegation that it was a real concern. It was said that taking care of the human health and the environment has to be put in place together with the fight against locusts. Overall, efforts have been made to largely disseminate appropriate information on locust control operations and on precautions to be observed by populations living in the infested areas, in particular concerning the withholding periods and the prohibited re-use of empty barrels. Staff directly involved in control operations (who in some countries had to provide a medical certificate prior to recruitment) was trained, instructed and provided with documentation, including on the permanent use of personal protective equipment (PPE); related seminars were open to media.
40. In many countries pesticide handling and application are covered by legal documents. In countries lacking such legal basis, special guidelines were prepared or updated concerning pesticide handling, from storage and transportation up to final use and disposal of empty drums. Several countries indicated that special areas were allocated for obsolete pesticide and drum disposal. The registration procedures, which can last up to three years, pay also attention to human health and environmental aspects. In practice, all stages of pesticide handling were regularly monitored. Although lacking in some countries, personal protective equipment was used and later stored in specific places. The delegates from most countries indicated that pesticides and sprayers were always used under the supervision of a specialist to calibrate the sprayer and demonstrate its use. Despite obvious progress, no reference was made to the impact monitoring of locust control operations on human health and the environment and it was recognized by the delegates that more has to be done at that level.

## Results of recent trials carried out in Uzbekistan with biopesticides

41. Mr Gapparov, Researcher (Uzbekistan), presented the results of the field trials held in 2011 in Uzbekistan with the mycopesticide Green Guard SC Premium produced by the Becker Underwood company (a.i.: *Metarhizium acridum*). The trials took place in two regions, the Jizzak oblast on DMA and the Karakalpakstan republic on CIT. In Jizzak oblast, the acridid population during the trials in April 2011 was dominated by DMA (85%). There were three two-hectare replicates. In Karakalpakstan, the acridid population during the trials in May 2011 was dominated by CIT (77%). The maximum biological efficacy against DMA was observed 21 days after treatment, with 84.6% locust mortality at applied dose rate of 0.5 l/ha and 68.1% mortality at applied dose rate of 0.25 l/ha. Maximal biological efficacy against CIT, observed 16 days after treatment, was of 89.7% at dose rate of 0.5 l/ha and 70.4% at dose rate of 0.25 l/ha and. These results allowed recommending the inclusion of Green Guard SC Premium to the Addition to the List of pesticides authorized for use in Uzbekistan, against pest acridids at dose rates of 0.25-0.5 l/ha, and against later instar nymphs of DMA at dose rate of 0.5 l/ha, in blanket treatment, upon agreements with ministries of Health and Ecology. It was necessary to continue trials in 2012 in order to test lower dose rates against DMA nymphs.
42. In the following discussion, the delegate from the Russian Federation informed that he had attested to the high efficacy of Green Guard in the field trials in Jizzak. He said that the biopesticide was ecologically safe and selective against acridids, and that his country would like to test it also. The delegate from Kazakhstan inquired about the per-hectare price of Green Guard. Mr David Hunter, expert in biopesticides (Australia) answered that the current price was of USD 20/ha but it could be decreased if local production was launched. Methodological difficulties in evaluating the field efficacy of the slow acting biopesticide were discussed by several of the delegates. Existing recommendations were not satisfactory and, in the field, efficacy was assessed using methods developed by Becker Underwood, with estimates of hopper band sizes (areas). The delegate from Kazakhstan also inquired about the possibility of using Green Guard in barrier treatments; the delegate from Uzbekistan responded that it was not possible in 2011 because of very dry conditions and minimal vegetation cover. Several of the delegates questioned the long period (nine days) before mortality start; it was explained that the infected locusts become sluggish and reduce feeding, hence their damage after infection was low. Several of the delegates pointed out that the trials were executed under typical operational field conditions, with regular tractor sprayers. But even in these conditions, Green Guard showed acceptable efficacy.

## Results of recent trials carried out in Georgia with biopesticides

43. Ms Abashidze, Researcher (Georgia), presented the results of field trials with the mycopesticide Green Guard SC Premium of Becker Underwood (BU) company (a.i.: *Metarhizium acridum*), which were held against CIT in Georgia in 2010 and 2011. There are 103 acridid species in Georgia including three locusts. In the recent years, CIT became a more economically important locust species than the Moroccan Locust *Dociopterus maroccanus* (DMA) while in the past, the situation was the opposite. The reason is that CIT is a very ecologically plastic species, which occupies numerous fallows, roadsides and other similar habitats. Another grasshopper species of growing importance is the Egyptian Grasshopper *Anacridium aegyptium* which became more

abundant due to climate change. In the past (1935), this pest totally destroyed citrus plantations in the Kolkhida region. Issues concerning DMA have increased in the three past years, but CIT is the most economically important locust pest.

44. The trials were carried out in 2010/2011 in two regions, in Marneuli on rangeland and in Sagaredjo (Bogdanovka) on sunflower field. The mycopesticide was applied by ground, using a tractor-driven sprayer. The tested dose rate was of 0.5 l/ha and the treated area of 30 ha. Efficacy counts were done before and one, three, five, seven, nine, 11, 14 days after treatment. To monitor the infection, locusts were placed in field cages. After treatments a certain number of locusts were brought into the laboratory for fungus incubation. The results showed that the mycopesticide Green Guard revealed its high efficacy (75-84% corrected mortality) against CIT nymphs and adults 14 days after treatment in both rangeland and cropland conditions. It is selective and specific against locusts, so it can be recommended for the use in Georgia as ecologically safe and effective biological pesticide, particularly in the framework of preventive control.
45. The discussion started with questions from the delegates from Kazakhstan about the treated locust densities. In Georgia, they were relatively low even before the trials but if they exceed 1,000 nymphs per square m, as it often happens in Kazakhstan, the 80% level of efficacy may not be sufficient. Mr Hunter, explained that under very high densities the increased contact between the nymphs and between nymphs and vegetation actually contributed to augment the infection rate.
46. As part of the discussion, Mr Hunter presented the topic on maximizing the effectiveness of *Metarhizium* for locust control. He explained that Australia had more than 12 years experience in using *Metarhizium* operationally for controlling locusts. During this period, more than 100,000 ha have been treated with this fungus. It was found that when applying *Metarhizium*, some locusts were sprayed directly but some were protected by the grass so that a very important source of infection came from locusts picking up *Metarhizium* from the vegetation. Pick up of spores from the vegetation means locusts do not have to be sprayed directly: unsprayed bands marching into the sprayed area during the first four-five days after spraying die from infection. Such results have led to *Metarhizium* being applied by aircraft in strips where 50m barriers are sprayed every 150-200m: the locusts pick up spores as they march through the sprayed barriers leading to high mortality, similar to that obtained when the whole area is treated. In addition, *Metarhizium* does not affect natural enemies: after application of *Metarhizium* in vineyards, grasshopper numbers declined by 89%, but the number of parasites was not affected and the percent parasitism by dipteran parasitoids increased from 1.9% to 15%. It is recognized that *Metarhizium* is more expensive than chemical products but the ability to apply in barriers can reduce costs substantially. Barrier spraying with *Metarhizium* needs to be tested under the various habitats and locust behaviors that occur with each locust species. Important uses of *Metarhizium* are not only in environmentally sensitive areas such as near waterways and in National Parks and Reserves but also, thanks to barrier treatments, in many other circumstances as cost per hectare can be significantly reduced. It should also be noted that some current formulations of *Metarhizium* can be mixed with water or can be applied as an oil mix spray, giving it the flexibility to be applied using a wide variety of pesticide application equipment.
47. Following this presentation, the delegate from Kazakhstan asked about the spore viability under very low winter temperatures; the response was that the relevant data were lacking.

The delegate from Georgia inquired about the duration of toxic action of *Metarhizium*; the answer was that on treated vegetation, the product could keep its potential to infect locusts for about one week. A question regarding the action of this fungus on locust eggs was answered negatively. The next portion of the discussion was devoted to optimal volume per hectare when applying *Metarhizium*. Mr Hunter explained that if the sprayer produces small droplets whose diameter ranges from 50 to 150 microns (typical for ULV, e.g. Micron 8115), then one liter per hectare would provide adequate coverage. If the droplets are bigger, the volume of formulation should be increased accordingly, with the target being 50,000 lethal doses per square meter. The delegates also asked about the optimal temperature for *Metarhizium* fungal growth, with the answer being between 20 and 35°C. Last, the delegate from Turkmenistan requested to test *Metarhizium* under their conditions, and Mr Hunter responded that the company was planning to conduct tests in several Central Asian countries in 2012, but which exactly it would be decided later

### **Implementation of efficient and environmentally less hazardous strategies, technologies and products during a locust emergency campaign: example of Madagascar, 2010/2011**

48. Examples of locust management elsewhere in the world were presented to the delegates. The FAO Senior Officer – Transboundary Plant Pests summarized the emergency aerial campaign against the Malagasy Migratory Locust [*Locusta migratoria capito* (Saussure 1884), LMC] carried out in Madagascar during the 2010/2011 rainy season. A brief background was given on the bio-ecology of this geographical sub-species of *Locusta migratoria*, whose traditional habitat and outbreak area are located in the south-western part of the Island, in relation with the climate features: a hot and rainy season (summer), theoretically lasting six to seven months, from October to April of the successive year and during which up to four generations of breeding can occur; a dry and cool season (winter), during which very mobile immature adult populations are looking for the less suitable habitats for survival.
49. In response to the request made by the Malagasy Government in mid-July 2010, FAO proposed a strategy based on three components: 1) strengthening national survey and control capacities; 2) minimizing human health and environmental risks; and 3) assessing and evaluating locust impacts and control campaign. The initial estimated budget was of USD 14.5 million.
50. Due to rough field conditions, difficult access to remote areas and lack of air strips, aerial survey and control operations were undertaken by helicopters. A total of 184,180 ha of LMC infestations were controlled by air during the campaign, of which 42% using barrier technique. Because of the particularities of LMC phenology and behaviour, pesticides from three groups were used: organophosphates (chlorpyrifos) for full cover treatments against mixed populations of hoppers and imagos and against settled swarms; benzoylurea, i.e. an Insect Growth Regulator (teflubenzuron) against hopper bands; and a biopesticide, the fungus *Metarhizium* (Green Muscle, GM). It was the first operational and aerial use of GM in Madagascar, where it had been registered in October 2009.
51. The main features of the 2010/2011 campaign were a late beginning of the rainy season (delayed by two months as compared to normal), resulting in a very scattered first generation, followed by a longer than usual rainy season allowing three successive generations under highly suitable conditions.

52. The campaign was efficient and successful: no major damage to crops and pastures, no swarms leaving the outbreak area as it was the case in May/June 2010, no incident on human health and the environment. It was also well-documented with regular 10-day bulletins and a number of stakeholder meetings. However, the socio-economical assessment confirmed the vulnerability of the rural populations living in the outbreak area and highlighted the impact of locusts at the level of households. In addition, because of fund shortage, it was not possible to control all the threatening LMC populations and another large-scale campaign should be implemented during the 2011-12 rainy season. The situation was worsened by the winter (June-September 2011), which was relatively wet and less cool than usual; therefore numerous survival and breeding habitats were available, limiting natural mortality and allowing additional increase in numbers.

### **Implementation of efficient and environmentally less hazardous strategies, technologies and products against an acridid outbreak: example of the United States, 2010/2011**

53. Current situation of acridid pest control in the United States of America (USA) was presented by Mr Latchininsky, FAO International Consultant, Locust Expert. Rangeland grasshoppers are important economic pests in 17 Western United states. Each year, they destroy over 20% of the rangeland forage with an estimated cost of about USD one billion. During outbreaks, they require extensive chemical control treatments covering millions of hectares of native rangeland. There are over 600 species of grasshoppers in North America but only about 20 of them are capable to produce recurrent economic outbreaks. All of them are non-swarming grasshoppers; the only North American locust, the Rocky Mountain locust *Melanoplus spretus*, became extinct in the early 20<sup>th</sup> century under the anthropogenic pressure.
54. Grasshopper control treatments can be done by a federal agency (Plant Protection and Quarantine) as well as by pest managers from state departments of agriculture. During an important outbreak in 2010, a total of approximately 2.3 million ha were protected from grasshoppers in nine states. Treatments were done by Reduced Agent and Area Treatment (RAAT) strategy which consists in applying lower than maximum allowed rates of insecticide (quantity of active ingredient per hectare) to alternate swaths (typically 50% treated and 50% untreated swaths). Ultra-Low Volume (ULV) spraying was the predominant application technique. Grasshopper densities were reduced from 23 to three per square m, resulting in 87% efficacy. Costs of treatments were around USD 3.00 per protected ha.
55. Following the presentation, the delegates discussed the reasons for low availability of pesticides for grasshopper control in the US. It was explained that the federal regulations allow using only three pesticides, carbaryl, malathion and diflubenzuron. Control programs conducted by state or private pest managers can also include several pyrethroids registered for grasshopper control. Discussion also touched upon the environmental follow-up of grasshopper control programmes. Evaluation of non-target impact on arthropods was done using a variety of collection techniques (Malaise and pitfall traps, sweep-net samples) one, two, four and six weeks after treatments. A simplified assessment routine was proposed using sweep-net sampling conducted at one and four weeks after treatments.

## **ANY OTHER BUSINESS**

56. The publication “Save and growth - A policymaker’s guide to the sustainable intensification of smallholder crop production” (2011) of the FAO Plant Production and Protection (AGP) was distributed to each of the delegates.

## **ADOPTION OF THE REPORT**

57. The Report is adopted unanimously with amendments made.

## **CLOSING REMARKS**

58. Mr Lipartia, the Chairperson, thanked all the delegates for the fruitful meeting. He noted that a lot of information and material had been received and shared by participants.. He also expressed his gratitude to FAO for the efforts made for the launching of the Five-year programme to improve national and regional locust management in the whole area and for the organization of the third consecutive meeting to the benefit of all CCA countries.

## ANNEXES

## Annex I - List of participants

NAME	TITLE & MINISTRY	TEL (UFF. & MOB.) FAX	E-MAIL ADDRESS	FULL ADDRESS
<b>COUNTRIES</b>				
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**Annex II - Approved agenda**

<b>Technical Workshop on Locusts in Caucasus and Central Asia (CCA)</b>
Tbilisi, Georgia, 24- 28 October 2011
<b>Provisional agenda</b>

**Opening**

1. Opening address
2. Election of Chairman, Vice-Chairman & Drafting Committee
3. Adoption of the agenda

**Session 1: National locust campaigns in 2011 and forecasts for 2012**

4. National locust campaigns in 2011 (countries' presentations)
5. Locust forecast for 2012 and preparation of the next campaign (countries' presentations)
6. Information sharing and cooperation in 2011

**Session 2: Implementation of the Five-year Programme to improve locust management in Caucasus and Central Asia**

7. Five-year Programme: overview
8. How to start implementing the Five-year Programme?
  - a. Further developing regional cooperation (Result 1)
  - b. Strengthening national capacities (Result 2)
  - c. Better anticipating and mitigating locust issues and disasters (Result 3)
  - d. Improving response mechanisms to locust outbreaks (Result 4)
  - e. Mitigating and better monitoring impact on human health and the environment (Result 5)

**Session 3: Efficient and environmentally less hazardous strategies, technologies and products for locust control: progress made in CCA**

9. Progress made concerning spraying technologies and products (countries' feedback)
10. Progress made concerning safety and environmental precautions (countries' feedback)
11. Results of recent trials carried out in Uzbekistan with biopesticides
12. Results of recent trials carried out in Georgia with biopesticides
13. Implementation of efficient and environmentally less hazardous strategies, technologies and products during a locust emergency campaign: example of Madagascar, 2010/2011
14. Implementation of efficient and environmentally less hazardous strategies, technologies and products against an acridid outbreak: example of the United States, 2010/2011

**Closing**

15. Any other business
16. Adoption and signature of the report
17. Closure address

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**Annex III - National locust situations in 2011 and forecast for 2012****National locust situations in 2011****Afghanistan**

The main locust pest in Afghanistan is the Moroccan Locust *Dociostaurus maroccanus* (DMA). The area surveyed in 2011 was 295,650 ha, area infested was 256,790 ha, out of which 227,149 ha were treated between April 2 and June 6 in 11 provinces. Pesticides used were Deltamethrin, Cypermethrin and Diflubenzuron, in total 47,864 l.

**Armenia**

In 2011, the general locust situation was calm. There are 40 Acridid species inhabiting Armenia; the economically important locust species is the Italian Locust *Calliptamus italicus* (CIT). In 2011, the area surveyed was 51,000 ha out of which 3,000 ha in six provinces were found infested by CIT with densities exceeding the Economic Threshold (ET). Control operations funded through state budget were carried out on 200 ha in the Ararat province.

**Azerbaijan**

The most economically important locust species in Azerbaijan is DMA. In 2011 mass breeding areas were found in Eldar, Djeiranchel, Garasu, Padar and Kharamin steppes. Hatching started in the beginning of May which is later than usual (2009: March 25; 2010: April 5). The infested area was 140,000 ha out of which 43,000 ha were treated by ground sprayers with pesticides from pyrethroid group. All anti-locust treatments are funded through central budget.

**Georgia**

In 2011, the phytosanitary situation in Georgia was very complicated. Grasshoppers and katydids produced a serious outbreak resulting in 30 to 40% losses in sunflower crops. Furthermore, several quarantine pests required attention, and funding available for locust control was limited. As a result, chemical treatments were conducted only against CIT hopper bands while DMA infestations were not treated. According to 2011 survey, area infested by locusts and grasshoppers with densities exceeding ET was 25,000 ha. The total area of locust and grasshopper control was 2,100 ha, i.e. less than 10% of the infested area.

**Kazakhstan**

In 2011, the total surveyed area was of 10,221,340 hectares including 6,960,500 ha on CIT, 2,531,840 ha on Asian Migratory Locust *Locusta migratoria migratoria* (LMI) and 729,000 ha on DMA. The total infested area was of 2,994,270 ha as follows: area infested by CIT - 2,298,280 ha, including 1,453,390 ha with densities exceeding ET; area infested by LMI - 528,140 ha, including 379,920 ha with densities exceeding ET; and area infested by DMA - 167,850 ha, including 83,830 ha with densities exceeding ET. The total area treated against locusts was 1,917,060 ha, including 1,453,310 ha against CIT, 379,920 ha against LMI and 83,830 ha against DMA. The area treated against grasshoppers was 344,170 ha. Anti-locust campaign is financed from the state budget. The total volume of insecticides purchased was 133,600 l, which included a.i. diflubenzuron, imidacloprid and fipronil, for treatments on 2,000,000 ha. The insecticide stock from last year was 13,437l, which was enough to treat 442,444 ha. Out of 1,917,060 ha treated, 16% were treated with benzoyl-ureas, 51% with neo-

nicotinoids, and 33% with phenyl-pyrazoles. Pyrethroids were not applied in 2011. The following spraying platforms were used: fixed-wing aircraft (on 370,680 ha), Ultra-Light aircraft (738,230 ha), aerosol generators (580,580 ha), ground (tractor and handheld) sprayers (48,160 ha) and Ultra-low volume (ULV) sprayers (189,760 ha), in total 101 units of sprayers.

### **Kyrgyzstan**

First hatching of DMA was observed on April 7, 2011 in Osh province (Fergana valley), i.e. almost two weeks earlier as compared to 2010; CIT hatching started on May 18, 2011 in Chui province along the Kazakh border. In 2011, 100,784 ha were surveyed and 58,701 ha treated, including 44,453 ha in Fergana valley (mostly along borders), 14,048 ha in Naryn province (Central Tjan-Shan mountains) and 200 ha in Chui province. Three types of spraying platforms were used: AN-2 aircraft, tractor OPV-1200 sprayers and Micron vehicle-mounted ULV sprayers. Three pesticides were used: a.i. esfenvalerate, imidacloprid and fipronil (information was sent to FAO via monthly bulletins). The state allocated USD 278,000 for locust control.

### **Russia**

There are about 60 acridid pest species in Russia out of which 10 to 12 are especially dangerous. In 2011, the area surveyed against locust pests was 16,745,000 ha. Main infested areas were in Southern Russia, Volga Region and Northern Caucasus. Area treated was 1,376,500 ha. Treatments were done with 1,667 sprayer units including 1,551 ground and 106 aerial sprayers. In addition to federal funding, locust control in 2011 was funded through regional budgets in affected provinces.

### **Tajikistan**

In 2011, because of drought the area infested by locusts reached almost 159,000 ha, which is 54,000 ha more than in 2010. The area surveyed was 245,500 ha, out of which 158,516 ha were infested and 137,518 ha were treated, including 120,015 ha against DMA and 17,503 ha against CIT. At the end of the campaign the State Republican Unitary Enterprise (SUE) "Locust Control" conducted summer survey on 62,183 ha. In October, autumn egg-pod survey was on progress on 180,000 ha. During the campaign, 66 tractor sprayers and 1,822 handheld sprayers, including 300 motorized aerosol sprayers were used. Over 4,000 people were working daily. The most important locust problems were concentrated along borders with Afghanistan, Uzbekistan and Kyrgyzstan. Because of restricted access to neutral zones along borders, thousands of locust-infested hectares remained untreated. Tajikistan thanked FAO for technical assistance and monitoring support in areas bordering neighboring countries.

### **Turkmenistan**

In 2011, anti-locust treatments were conducted in Lebap province on 155,941 ha, Akhal province on 47,269 ha, Balkan province on 45,835 ha, and Dashoguz province on 9,470 ha. In total, 258,515 ha were treated which is less than in 2010 (300,865 ha). Treatments were done aerially (five AN-2 aircraft) as well as by ground using tractors OVH-28 (190 units) and knapsack sprayers (525 units). Pesticide Fascord (a.i. alfa-cypermethrin, 10%) was applied at a dose rate of 150-250 g of formulation/ha.

## **Uzbekistan**

The locust situation in 2011 was complicated by drought, especially in Surkhandarya, Kashkadarya, Samarkand and Jizzak oblasts as well as in regions bordering Tajikistan. In total, 904,000 ha were surveyed out of which 468,000 ha were infested. Chemical treatments were conducted on about 440,000 ha. The treatments were done with ULV sprayers on 204,000 ha (46.6%), tractor sprayers on 130,600 ha (29.7%), Ultra-Light Aircraft on 56,900 ha (12.9%), knapsack and hand-held sprayers on 46,900 ha (10.7%) and AN-2 aircraft on 1,200 ha (0.3%). The following pesticides were used: a.i. imidacloprid – 187,000 ha (42.5%), fipronil – 125,700 ha (28.6%), lambda-cyhalothrin – 102,600 ha (23.3%), teflubenzuron – 6,500 ha (1.5%), diflubenzuron – 8,900 ha (2%), and esfenvalerate – 9,000 ha (2%). There were no cases of serious crop or rangeland damage from locusts.

## **Forecasts for 2012**

### **Afghanistan**

It is expected that the area of locust infestations in 2012 will decrease as compared to 2011.

### **Armenia**

It is expected that CIT will infest between 4,000 and 5,000 ha in 2012. Immigration flights of DMA are not excluded. Preliminary area planned for 2012 anti-locust treatments: 3,000 ha.

### **Azerbaijan**

It is expected that high densities of DMA will be found in its historic breeding areas in Eldar, Djeiranchel, Garasu, Padar and Kharamin steppes. In the end of October, when the egg-pod survey will be completed, it will be possible to forecast the extent of the potentially infested area in 2012 and plan the anti-locust treatments accordingly.

### **Georgia**

Because of under-treated locust-infested areas in 2011, it is expected that locust situation in 2012 will be extremely complicated.

### **Kazakhstan**

Based on locust surveys and projected pesticide procurements, it is expected that the total area of anti-locust treatments in 2012 will be 2,182,270 ha, including 1,820,100 ha against CIT, 224,300 ha against LMI and 137,960 ha against DMA. It is planned to procure pesticides from neonicotinoid group (for controlling 75% of the area), Insect Growth Regulators (IGRs, 15% of the area) and phenyl-pyrazoles (10% of the area). The available pesticide stock from the previous year with pesticides from same three chemical groups is sufficient to cover additional 525,382 ha. Hence in total, Kazakhstan will have enough pesticides to treat 2,707,600 ha against locusts in 2012.

### **Kyrgyzstan**

Anti-locust treatments in 2012 are planned on 60,000 ha, including 40,000 ha in Fergana valley and 20,000 ha in the northern provinces. It is planned to use AN-2 aircraft (65%), tractors with OPV-1200 sprayers (10%) and vehicle-mounted ULV sprayers (25%). Pesticides from three chemical groups – benzoyl-ureas, neonicotinoids and pyrethroids will be used.

## **Russia**

Under favorable winter conditions, the overwintering eggs will produce substantial locust populations in 2012 although a general decrease in infested areas is expected. The treatments are anticipated on 800,000 ha (against 1,4 million ha in 2011).

## **Tajikistan**

It is expected that the area of locust infestations in 2012 will decrease as compared to 2011.

## **Turkmenistan**

In 2012 the locust control operations will be conducted on area similar to 2011, i.e. about 250,000 ha. The treatments will be done with pyrethroid pesticide alfa-cypermethrin, 10% emulsifiable concentrate. It is planned to use five AN-2 airplanes, 220 tractors OVH-28 and 500 knapsack sprayers.

## **Uzbekistan**

It is expected that the area of locust infestations in 2012 will decrease compared to 2011.

## Annex IV - Bilateral agreements & transborder locust issues in CCA

As of October 2011:

### 1- Central Asia and adjacent areas (Afghanistan, Russian Federation and China)

	<b>KAZ</b>	<b>KYR</b>	<b>TAJ</b>	<b>TUK</b>	<b>UZB</b>	<b>RUS</b>	<b>China</b>
<b>AFG</b>	<i>No common border</i>	<i>No common border</i>	<b>Envisaged (DMA)</b>	<b>NO (DMA)</b>	<b>NO (DMA)</b>	<i>No common border</i>	Physical barrier
<b>CENTRAL ASIA &amp; ADJACENT COUNTRIES</b>	<b>KAZ</b>	<b>YES (CIT &amp; DMA)</b>	<i>No common border</i>	<b>NO (LMI)</b>	<b>YES (DMA)</b>	<b>YES (CIT &amp; LMI)</b>	<b>YES (CIT &amp; LMI)</b>
		<b>KYR</b>	<b>Envisaged (CIT &amp; DMA)</b>	<i>No common border</i>	<b>Envisaged (DMA)</b>	<i>No common border</i>	Physical barrier
			<b>TAJ</b>	<i>No common border</i>	<b>Envisaged/ (DMA)</b>	<i>No common border</i>	Physical barrier
				<b>TUK</b>	<b>YES (DMA)</b>	<i>No common border</i>	<i>No common border</i>
					<b>UZB</b>	<i>No common border</i>	<i>No common border</i>
						<b>RUS</b>	<b>None</b>

2- **Caucasus:** there is no bilateral agreements between the three concerned countries

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**Annex V - Equipment to be delivered in 2012 (Five-year Programme)****A- On FAO Regular Programme → for Afghanistan, Kyrgyzstan and Tajikistan:**

- Survey/entomological kits: 3 per country
- GPS: 5 per country
- Satellite phone: 1 per country
- Hand-held sprayer (MicroUlva+) for ULV formulation: 20 per country
- Knapsack sprayer (Micron AU 8000) for ULV formulation: 5 per country
- Vehicle-mounted sprayer (Micronair AU 8115) for ULV formulation: 2 per country
- Personal Protective Equipment (PPE) : 30 kits per country

**B- On USAID funding → for all ten countries (mainly for demonstration purpose):**

- Survey/entomological kits: 3 per country
- GPS: 5 per country
- Satellite phone: 1 per country
- Hand-held sprayer (MicroUlva+) for ULV formulation: 3 per country
- Knapsack sprayer (Micron AU 8000) for ULV formulation: 2 per country
- Vehicle-mounted sprayer (Micronair AU 8115) for ULV formulation: 1 per country
- Personal Protective Equipment (PPE) : 10 kits per country