Technical Workshop on Locusts in Caucasus and Central Asia (CCA)
Bishkek, Kyrgyzstan, 12-16 November 2012
Background documentation: E-Committee on pesticides

- Item 10 of the Provisional Agenda -

According to the Roadmap of the "Five-year Programme to improve national and regional locust management in Caucasus and Central Asia (CCA)" and as part of Result 4 - *Improved response mechanisms to locust outbreaks* and Activity 4.2- *Promote less harmful pesticides and alternatives to conventional pesticides*, and more specifically Activity 4.2.3- *Encourage registration of more pesticides*, a E-Committee on Pesticides (ECP) was created with the mandate to define the minimum list of pesticides to be registered in CCA for harmonization. The E-Committee's membership was agreed upon during the Regional Technical Workshop on Locusts in CCA, held in October 2011, in Tbilisi, Georgia, and consisted of: A. Latchininsky (Chair, FAO), G. Yussupova (Kazakhstan) and F. Gapparov (Uzbekistan) as well as A.. Monard and M. Ammati (FAO). All ECP work was executed via e-mail exchanges and Skype discussions.

Information on pesticides currently registered and frequently used against locusts in CCA

The first step was to collect and review the information on pesticides currently registered and frequently used against locusts in CCA. This information was received from nine CCA countries, i.e. all but Afghanistan. In this latter case, the relevant information was taken from the country's annual reports at regional FAO seminars. Analysis of this comprehensive information showed that, as of October 2012, there were 351 formulations of insecticides belonging to seven chemical classes registered for locust control in CCA countries. The number of actually used pesticides - 57 - was significantly lower (see Annexes 1 to 5).

Criteria for defining the minimum list of pesticides proposed for registration for locust control in CCA

The next step was to develop the criteria for defining the minimum list of pesticides for locust control proposed for registration in CCA. These criteria were identified as follows:

1. Efficacy, chemical classes and risks to human health and environment:

- Proposed pesticides should be highly effective against target organisms – locusts – applied at lowest possible dose rates, to minimize risks to human health and pesticide load to the environment;
- Proposed pesticides should belong to a variety of chemical classes in order to respond to a wide range of locust control field situations and to avoid possible resistance;
- Proposed pesticides should belong to the class II (medium risk) or lower according to the World Health Organization (WHO) classification (risk to human health);
- Pesticides less harmful for the environment (water, soil, pollinators, etc.) must be preferred. Also refer to below Point 5.

Organophosphate (OP) pesticides show high efficacy against locusts under normal use and belong to WHO class II or III; however, they are applied at much higher does rates (hundreds of grams of active ingredient per hectare, compared to just grams per hectare for most other insecticides). Furthermore, they may reduce drastically the acetylcholinesterase level– important neurotransmitter in the synapses of the human nervous system – which represents a serious health risk. Therefore and also based on FAO field experience with limited shelf life of certain OP formulations, we have not included any OP pesticide into the proposed minimum list.

2. Mode of action, speed of action and duration of toxic effect (persistence):

- Proposed pesticides preferably should have both contact and ingestion (stomach) action;
- It is desirable that pesticides with both, short and long toxic effect (persistence of ten days or longer) should be included in the list, to address different field situations and provide possibility for blanket and barrier treatments;
- It is desirable that the pesticides should be effective against all developmental stages of locusts, both hoppers and adults;
- Pesticides preferably should have high (one to two hours) or moderate (three to 48 hours) speed of action in the applied dose.

We proceeded from the assumption that the minimal list should include efficient pesticides which are suitable for different locust control situations: treatments of hoppers at hatching sites, agricultural crop protection, treatments of settled swarms of adults, etc. The pesticide requirements vary with the situations. Contact action pesticides are used to directly control dense locust aggregations, hopper bands or adult swarms. Contact pesticides with high speed of action and short persistence are most suitable for agricultural crop protection. Ingestion (stomach) action together with a relatively long persistence, allow treating natural forage vegetation. Ingestion pesticides have lower speed of action; they are effective for controlling locust species with prolonged hatching and for treating moving hopper bands. Because of their long persistence, such pesticides are most appropriate for use in barrier treatments – the methodology which has obvious economic and environmental advantages as compared to conventional blanket treatments. The pesticide speed of action was estimated on the basis of the 9th meeting of the Pesticide Referee Group (PRG, 2004) and scientific publications.

3. Formulations and compatibility with spraying equipment:

- Proposed formulations should be compatible with spraying equipment available in CCA countries; however, further promotion of Ultra-Low Volume (ULV) spraying technology and of appropriate formulations should continue;
- Since ULV is the most efficient and cost-effective spraying technology against locusts, a number of pesticides are proposed specifically in ULV formulations (oil suspensions, etc.);
- Some pesticides are proposed in new, innovative formulations, which are less corrosive for spraying equipment (oil water suspension concentrate, etc.).

Since most existing sprayers in CCA apply pesticides in traditional, full volume spraying, a number of pesticides were proposed in aqueous formulations (emulsifiable concentrate EC, etc.). At the same time, taking into consideration the growing role of ULV spraying and increasing availability of ULV atomizers in CCA, several oil-based formulations for ULV were also included in the list.

4. Dose rate, target organisms, frequency of application:

- Proposed list includes mostly the pesticide dose rates, which are currently registered in CCA;
- Only the locusts are considered targets, irrespective of species and developmental stage. We are aware of the fact that depending on the species and developmental stage (e.g. early instar nymphs compared to late instars or adults) locusts may exhibit differing sensitivity to pesticides. Therefore, we hope that in the future it will be possible to further detail the list and offer a variety of pesticides with differentiated dose rates for different locusts and developmental stages;
- Single application per season is recommended for all listed pesticides except for biological ones.

5. Impact on non-target organisms:

- Proposed pesticides should be highly specific against locusts and have minimal negative impact on non-target fauna and flora.

Evaluation of pesticides according to this criterion was done on the basis of the Report of the 9th meeting of the Pesticide Referee Group (PRG) and relevant scientific publications. Since the biological pesticides (biopesticides) are less harmful for non-target organisms, they are included into the proposed list despite of their currently limited use in CCA countries.

6. Experience in pesticide use:

- Pesticides proposed for the minimal list for the entire CCA region should preferably be already registered and used in locust control in at least several CCA countries.

To date, there are no pesticides registered in all ten CCA countries. Choosing the pesticides for the proposed minimal list, we took into account the practical experience in their use, which already exists in some countries. If the pesticide has already been registered and is available in several countries, its

subsequent registration in all CCA countries could allow delivering the pesticide from the country where it is in excess to a country where there is an urgent need for such a pesticide. This practice is especially effective and economical during outbreaks and emergencies (usually referred as “triangulation process”).

Proposed minimal list of pesticides against locusts for registration in all CCA countries

Based on the above criteria, the ECP proposed a minimal list of pesticides against locusts for registration in all CCA countries (table below). The proposed minimal list is the first step towards the process of harmonizing all pesticide registrations in CCA countries led by FAO.

Recommendations

- It is recommended that each country reviews the proposed minimal list of pesticides and takes the necessary actions to promote their inclusion in the national list of registered pesticides for locust control, in accordance with their national registration procedures;
- It is recommended that each country takes the necessary actions to promote the use of below-listed pesticides when already registered at national level.
- It is recommended to review the list not less frequently than once in three years.

Minimal list of pesticides proposed for registration against locusts for the countries of Caucasus and Central Asia, as of 11 October 2012

Pesticides			a.i. concentration	Recommended dose rate, l/ha	WHO Class (1)	Mode of action		Speed of action (2)	Persistence (3)	Impact on non-target organisms (4)	Barriers	Registered in CCA countries	Used in CCA countries (5)
Active ingredient (a.i.)	Trade name	Formu-lation				Con-tact	Inges tion						
PYRETHROIDS ***Recommended to register at least one emulsifiable concentrate (EC) and one formulation for ULV from below pyrethroid pesticides***													
Alpha-cypermethrin	Fastac 10% /or analog/	OWSC	100 g/l	0,07-0,1	(II)	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	9	3
Deltametrin	Decis 2,5% /or analog/	EC	25 g/l	0,3-0,4	U	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	9	4
Deltametrin	Decis 12,5	OS (ULV)	12,5 g/l	1,0	U	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	2	1
Zeta-cypermethrin	F'juri 10% /or analog/	WE	100 g/l	0,1	(II)	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	8	2
Lambda-cyhalothrin	Karate /or analog/	EC	50 g/l	0,1-0,15	II	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	9	4
Esfenvalerate	Sumi-alpha 5% /or analog/	EC	200 g/l	0,2-0,3	(II)	Yes	No	H	Short	Hazardous for pollinators and aquatic arthropods	No	8	2
NEONICOTINOIDS													
Imidacloprid	Confidor 20% /or analog/	WSC	200 g/l	0,05-0,07	(II)	Yes	Yes	M?	Medium	Hazardous for pollinators	?	6	3
INSECT GROWTH REGULATORS – BENZOYL UREAS ***Recommended to use only against 1-3 instar nymphs, in blanket coverage or barrier treatments***													
Diflubenzuron	Dimilin 48% /or analog/	SC	480 g/l	0.02 blanket 0.03-0.06 in barrier 1:1	U	No	Yes	L	Long	Hazardous for aquatic arthropods	Yes	7	4
Diflubenzuron	Dimilin OF6	OS (ULV)	60 g/l	0.15 blanket 0.3 in barrier 1:1	U	No	Yes	L	Long	Hazardous for aquatic arthropods	Yes	4	3
Teflubenzuron	Nomolt 5% (ULV)	OS (ULV)	50 g/l	0.175 blanket 0.3 in barrier 1:1	U	No	Yes	L	Long	Hazardous for aquatic arthropods	Yes	3	1
PHENYL-PYRAZOLES ***Recommended to use only in barrier (swath) treatment***													
Fipronil	Adonis 4% /or analog/	EC	40 g/l	0,1 in barrier 1:2	U	Yes	Yes	M	Long	Hazardous for pollinators	Yes	6	4
Fipronil	Adonis 7,5	OE (ULV)	75 g/l	0,53 in barrier 1:2	U	Yes	Yes	M	Long	Hazardous for pollinators	Yes	1	1
BIOPESTICIDES ***Recommended to register at least one of the two listed biopesticides***													
Azadirachtin	Green Gold 0,3%	OE	3 g/l	0,15-0,25	(U)	Yes?	Yes?	L	?	?	?	1	0
Fungus *Metarhizium acridum*	Green Guard *Metarhizium*	WS	?	0,5	(III)	Yes	No	L	Medium	?	?	1	0

(1) Class of risk to human health of the World Health Organization (WHO) is indicated for the formulated pesticides on the basis of on the Report of the 9th meeting of the Pesticide Referee Group (PRG), 2004

II – moderately hazardous;
III – slightly hazardous;
U –non-hazardous under normal use
For pesticides not covered by FAO PRG, 2004, the WHO class is indicated in parentheses, analogous to similar pesticides

(2) Speed of action is indicated on the basis of on the Report of the 9th meeting of the Pesticide Referee Group (PRG), 2004

H – high (1-2 hours)
M – medium (3-48 hours)
L – low (>48 hours)
For pesticides not covered by FAO PRG, 2004, the speed of action is indicated in parentheses, analogous to similar pesticides

(3) Duration of the toxic effect is indicated on the basis of various scientific publications:

S – short (1-3 days)
M – medium (3-10 days)
L – long (>10 days)

(4) Impact on non-target organisms is indicated on the basis of the Report of the 9th meeting of the Pesticide Referee Group (PRG), 2004 and scientific publications

(5) Used during last five years (2008-2012)

In cases the relevant information on certain criteria was insufficient, the question mark ("?") is used

Abbreviations:

WSC	water soluble concentrate
WHO	World Health Organization
WS	water solution
WE	water emulsion
g/l	gram per liter
A.I.	active ingredient
CS	concentrate of suspension
EC	emulsion concentrate
l/ha	liter per hectare
OWSC	oil water suspension concentrate
OS	oil suspension
OE	oil emulsion
SC	suspension concentrates
ULV	ultra low volume

ANNEXES

ANNEXE 1. SUMMARY LIST OF PESTICIDES REGISTERED IN THE CAUCASUS AND CENTRAL ASIA COUNTRIES AGAINST HARMFUL LOCUSTS, AS OF SEPTEMBER 2012

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
ORGANOPHOSPHOSPHATES (6 A.I.; 28 pesticides)											
DIAZINON (2)											
Diazinon						X					1
Diazol						X					1
DIMETHOATE (10)											
Bella						X					1
Bi-58 New				X		X					2
Bimet						X					1
Di 40						X					1
Dimethoate						X					1
Dimigor						X					1
Kingbi						X					1
Tagor						X					1
Tajfun						X					1
TERRAdim						X					1
MALATHION (7)											
Barrier						X					1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Iskra-M							X				1
Karbofos		X				X	X			X	4
Karbofot					X		X				2
Kemifos							X				1
Fyfanon					X		X			X	3
Fyfanon ULV					X	X					2
PARATHION-METHYL (1)											
Parachute							X				1
FENITROTHION (2)											
Sumithion		X		X	X	X	X				5
Sumithion ULV					X						1
CHLORPYRIPHOS (6)											
Agrofos		X									1
Dursban EC		X		X	X	X					4
Dursban ULV				X	X	X					3
Napoleon		X									1
Pirineks						X	X				2
Sarban		X									1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
PYRETHROIDS (12 A.I.; 132 pesticides)											
ALPHA-CYPERMETHRIN (30)											
Agrocip					X						1
Ajvengo Ivenhoe							X				1
Akkord Accord							X				1
Alpak		X			X						2
AltAlf							X				1
Alterr						X	X				2
Alpha 100						X					1
Alpha gard					X						1
Alphas							X				1
Alpha cin							X				1
Alpha –Cip					X						1
Alpha –Cipi					X		X				2
Alphashans							X				1
Besta Alpha									X	X	1
Bestseller					X	X				X	3
Kasper					X						1
KingAlpha						X					1
Piket					X	X					2

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Rotalaz					X						1
Tramp					X	X				X	3
Fagot					X		X				2
FAS						X					1
Faskord						X	X		X	X	3
Fastac 10% EC		X		X	X	X	X	X	X	X	7
Fastac 10% OWSC					X	X					2
Fastox	X										1
Fatrin							X				1
Fobos					X						1
Ci-alpha							X				1
Tsunami					X	X	X				3
BETA-CYPERMETHRIN (8)											
Akito										X	1
Kinmix 5% WS		X			X					X	3
Kinmix 5% EC					X	X					2
Kinmix 10% WS					X						1
Kinmix10% EC					X						1
Kinmix Turbo					X						1
Onyx					X						1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Remix						X					1
BETA-CYFLUTHRIN (1)											
Buldoc		X			X	X					3
BIPHENTHRIN (5)											
Agdzhet					X						1
Pilarstar						X					1
Talstar					X						1
TERRAtal						X					1
Tristar						X					1
GAMMA- CYHALOTHRIN (2)											
Vanteks					X		X				2
Fenix					X						1
DELTAMETRIN (16)											
Atom							X				1
Dalmetrin										X	1
Delros						X					1
Delcis 2,5%										X	1
Decis									X		
Deltastar					X						1
Decibel		X									1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Decis 10%										X	1
Decis 12,5 ULV				X							1
Decis 2,5%		X		X	X			X	X	X	5
Decis-Profi 25 WG				X			X				2
Decis-Extra					X	X					2
Metrinal						X					1
Pilardelta 2,5%										X	1
Tadzh 10%										X	1
Ekocis 10%										X	1
Ekocis 2,5%										X	1
ZETA- CYPERMETHRIN (3)											
Taran							X				1
Tarzan					X		X				2
Fury 10%		X		X	X	X	X	X	X	X	7
LAMBDA-CYHALOTHRIN (37)											
Altyn					X	X	X				3
Atilla									X	X	1
Ahilles					X	X					2
Brejk							X			X	2
Breter							X				1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Garat						X					1
Gladiator							X				1
Gjuharad					X						1
Dalatje						X				X	2
Doskarat						X					1
Zoro						X					1
Karat						X					1
Karatart						X					1
Karate		X		X	X	X		X	X	X	6
Karatrin						X					1
Karate-Do						X					1
Karate Zeon					X		X			X	3
KaraTR						X					1
Karachar							X				1
Killer										X	1
Kinglambdacig						X					1
Kungfu							X				1
Lambda						X					1
Lamdeks										X	1
Lambda-S							X				1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Latrin					X						1
Petra					X					X	2
Pulsar	X										1
Samum							X				1
Samuraj						X					1
Sarat						X					1
Sensej							X				1
Sokrat						X					1
Sumo						X					1
Toro					X						1
Taekvando		X									1
Jeureka		X									1
TAU- FLUVALINATE (1)											
Mavrik		X					X				2
FENVALERATE (2)											
Sumicidin		X									1
Fenkill										X	1
CYPERMETHRIN (21)											
Akcent					X						1
Arrivo		X				X	X				3

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Bestciper										X	1
Inta-Vir							X				1
Kral		X		X							2
Moermetrin										X	1
Politrin					X						1
Fitozan							X				1
Cetron						X					1
Cyperind						X					1
Cyperon-A						X					1
Cyperkor				X							1
Cyperplan						X					1
Cipi							X				1
Cypermethrin										X	1
Cyrax	X			X	X					X	4
Citkor					X						1
Sharpey					X		X				2
Sherpa		X			X	X				X	4
Jentometrin										X	1
ESFENVALERATE (**5**)											
Sumi-alpha 20%					X	X				X	3

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Sumi- alpha 5%		X		X	X	X	X	X	X	X	7
Super alpha						X					1
Esfen-alpha 20%										X	1
Esfen-alpha 5%										X	1
NEONICOTINOIDS (2 A.I., 33 pesticides)											
ACETAMIPRID (9)											
Viktor						X					1
Mospi 200						X					1
Mospilan 20 g/kg							X				1
Mospilan 200 g/kg					X	X	X			X	4
Pilarmos					X	X				X	3
Skill						X					1
Sprut						X					1
Tagspilan					X	X					2
Jason						X					1
IMIDACLOPRID (24)											
Bagira 20%										X	1
Bagira-N 200 g/l WSC										X	1
Bolid					X						1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Varrant					X						1
Dakloprid					X						1
Dalpirid 20%										X	1
Imidal					X						1
Imidok					X						1
Imidor 200 g/l WSC					X		X			X	3
Imperator						X					1
King-vaka						X					1
Kinoks					X						1
Klorid					X						1
Koginor 20%										X	1
Kondora						X					1
Confidor 20%				X	X	X		X		X	5
Luidor					X						1
Nuprid					X						1
Pilarking 20%					X					X	2
Rezume					X						1
Storm						X					1
Stragl					X						1
Tanrek					X		X				2

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Fiesta					X						1
INSECT GROWTH REGULATORS – BENZOYLUREAS (5 A.I., 13 pesticides)											
DIFLUBENZURON (8)											
Gerkules					X						1
Gerold					X		X				2
Dimilin 48%				X	X		X	X	X	X	5
Dimilin OF6 (ULV)					X	X		X		X	4
Dimiron					X						1
Diuron					X						1
Diflur					X						1
Difuz 48%					X					X	2
LUFENURON (1)											
Match					X		X				2
NOVALURON (1)											
Rimon 10%					X					X	2
TEFLUBENZURON (2)											
Nomolt 15%					X					X	2
Nomolt 50 g/l (ULV)					X	X				X	3

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
TRIFLUMURON (1)											
Alcistin		X									1
PHENYLPYRASOLES (1 A. I., 10 pesticides)											
FIPRONIL (10)											
Adonis 4%		X			X		X			X	4
Adonis 7,5 ULV					X						1
Vigor 4%										X	1
Derbent 20%										X	1
Lokstin 4%										X	1
Maksimus 4%									X	X	1
Mergen						X				X	2
Regent VDG					X	X					2
Regent KS						X					1
Ekonil 4%										X	1
BINARY MIXTURES (9 mixtures; 17 pesticides)											
Alpha-Cypermethrin + Diflubenzuron (2)											
Alfamilin					X					X	2

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Bonus					X						1
Dimethoate + Beta-Cypermethrin (1)											
Kinfos							X				1
Imidacloprid + Lambda-Cyhalothrin (2)											
Borej							X				1
Perfecto										X	1
Novaluron + Biphenthrin (1)											
Rimon Star										X	1
Profenofos + Lambda- Cyhalothrin (1)											
Politrin										X	1
Thiamethoxam + Lambda- Cyhalothrin (1)											
Enzhio					X	X			X		2
Triazophos + Deltametrin (1)											
Delfos						X					1
Fenitrothion + Esfenvalerate (1)											
Alpha-Kombi					X						1
Chlorpyriphos + Cypermethrin (7)											
Dosciperfos						X					1
Kardinal					X	X					2
Kombat					X						1

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
Narval						X					1
Nurell D				X	X	X		X			4
Chlorcirin					X						1
Cipi-Plus							X				
BIOPESTICIDES (2 A. I.; 2 pesticides)											
AZADIRACHTIN (1)											
Green Gold					X						1
Metarhizium acridum (1)											
Green Guard - Metarizium										X	1
TOTAL (28 A.E., 9 mixtures, 231 pesticides)	3	24		17	97	1	56	9	12	64	361

ANNEX 2. SUMMARY LIST OF PESTICIDE CHEMICAL GROUPS REGISTERED IN THE CAUCASUS AND CENTRAL ASIA COUNTRIES AGAINST HARMFUL LOCUSTS, AS OF SEPTEMBER 2012

	OPCs		Pyrethroids		Neonicotinoides		IGR		Phenyl-Pyrazol		Mixtures		Biopesticides		TOTAL	
	6	28	12	130	2	33	5	13	1	10	9	17	2	2	37	233
Countries	a.e.	pest.	a.e.	pest.	a.e.	pest.	a.e.	pest.	a.e.	pest.	a.e.	pest.	a.e.	pest.	a.e.	pest.
Azerbaijan	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
Armenia	3	6	10	16	0	0	1	1	1	1	0	0	0	0	15	24
Afganistan																
Georgia	3	4	6	10	1	1	1	1	0	0	1	1	0	0	12	17
Kazakhstan	3	7	10	47	2	19	4	12	1	3	4	8	1	1	25	97
Kyrgyzstan	5	19	9	48	2	13	2	2	1	3	3	6	0	0	22	91
Russia	4	8	8	37	2	4	2	3	1	1	3	3	0	0	20	56
Tadjikistan	0	0	5	5	1	1	1	2	0	0	1	1	0	0	8	9
Turkmenistan	0	0	5	9	0	0	1	1	1	1	1	1	0	0	8	12
Uzbekistan	1	2	7	35	2	9	3	6	1	7	4	4	1	1	19	64

ANNEX 3. PESTICIDES FOR ULV REGISTERED IN THE CAUCASUS AND CENTRAL ASIA COUNTRIES AGAINST HARMFUL LOCUSTS, AS OF SEPTEMBER 2012

Country/ Pesticides (a.i. and trade name)	AZE 0	ARM 0	AFG	GEO 2	KAZ 6	KYR 4	RUS 0	TAD 1	TUR 0	UZB 2	Total
ORGANOPHOSPHATES (3 A.E.; 3 pesticides)											
MALATHION											
Fyfanon ULV					X	X					2
FENITROTHION											
Sumithion ULV					X						1
CHLORPYRIPHOS											
Dursban ULV				X	X	X					3
PYRETHROIDS (1 A.E.; 1 pesticide)											
DELTAMETRIN											
Decis 12,5 ULV				X							1
INSECT GROWTH REGULATORS – BENZOYLUREAS (2 A.E.; 2 pesticides)											
DIFLUBENZURON											
Dimilin ОФ6 (ULV)					X	X		X		X	4
TEFLUBENZURON											
Nomolt 50 г/л (ULV)					X	X				X	3
PHENYLPYRAZOLES (1 A.E.; 1 pesticide)											
FIPRONIL (10)											

Country/ Pesticides (a.i. and trade name)	AZE 0	ARM 0	AFG	GEO 2	KAZ 6	KYR 4	RUS 0	TAD 1	TUR 0	UZB 2	Total
Adonis 7,5 ULV					X						1

Abbreviations:

A.I., a.i.	active ingredient
EC	emulsifiable concentrate
g/kg	gramme per kilogramme
g/l	gramme per litre
IGR	insect growth regulators
OWSC	oil water suspension concentrate
OPC	organophosphorous compound
SC	suspension concentrate
ULV	ultra low volume
WDG	water dispersible granules
WG	water soluble granules
WS	water suspension
WSC	water soluble concentrate

ANNEX 4. SUMMARY LIST OF PESTICIDES REGISTERED IN 4 AND MORE COUNTRIES OF CAUCASUS AND CENTRAL ASIA AGAINST HARMFUL LOCUSTS, AS OF SEPTEMBER 2012

Country/ Pesticides (a.i. and trade name)	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
ORGANOPHOSPHATES (3 A.I.; 3 pesticides)											
MALATHION (1)											
Karbofos EC		X				X	X			X	4
FENITROTHION (1)											
Sumithion EC		X		X	X	X	X				5
CHLORPYRIPHOS (1)											
Dursban EC		X		X	X	X					4
PYRETHROIDS (6 A.I., 8 pesticides)											
ALPHA-CYPERMETHRIN (1)											
Faskord						X	X		X	X	4
Fastac 10% EC		X		X	X	X	X	X		X	7
DELTAMETRIN											
Decis 2,5%		X		X	X			X	X	X	5
ZETA- CYPERMETHRIN (1)											
Fury 10%		X		X	X	X	X	X	X	X	7
LAMBDA-CYHALOTHRIN (1)											
Karate		X		X	X	X		X	X	X	6

CYPERMETHRIN (2)											
Cyrax	X			X	X					X	4
Sherpa		X			X	X				X	4
ESFENVALERATE (1)											
Sumi- alpha 5%		X		X	X	X	X	X	X	X	7
NEONICOTINOIDS (2 A.I., 2 pesticides)											
ACETAMIPRID (1)											
Mospilan 200 g/kg					X	X	X			X	4
IMIDACLOPRID (1)											
Confidor 20%				X	X	X		X		X	5
INSECT GROWTH REGULATORS – BENZOYLUREAS (1 A.I., 2 pesticides)											
DIFLUBENZURON (2)											
Dimilin 48%				X	X		X	X	X	X	5
Dimilin OF6 (ULV)					X	X		X		X	4
PHENYLPYRASOLES (1 A.I., 1 pesticide)											
FIPRONIL (1)											
Adonis 4%		X			X		X			X	4
BINARY MIXTURES (1 mixture, 1 pesticide)											
Chlorpyriphos + Cypermethrin (1)											
Nurell D				X	X	X		X			4

ANNEX 5. LIST OF PESTICIDES MOST WIDELY USED IN THE CAUCASUS AND CENTRAL ASIA COUNTRIES AGAINST HARMFUL LOCUST 2008 - 2012.

Pesticides (a.i. and trade name)/Countries	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
ORGANOPHOSPHOROUS COMPOUNDS (2 A.I.; 2 pesticides)											
MALATHION (1)											
Fufanon EC						X					1
CHLORPYRIPHOS (1)											
Dursban ULV				X		X					2
PYRETHROIDS (9 A.I.; 31 pesticides)											
ALPHA-CYPERMETHRIN (9)											
AlTERR						X					1
Fastak 10% EC						X			X	X	3
Best Alpha										X	1
Kortak	X										1
Piket						X					1
Tramp						X					1
Fagot							X				1
Faskord									X	X	2
Fastoks	X										1
BETA-CYPERMETHRIN (1)											
Kinmiks						X					1
BETA-CYFLUTHRIN (1)											
Kingdogs	X										1
BIPHENTHRIN (3)											
Kingstar						X					1
Pilarstar						X					1
Talstar						X					1
DELTAMETRIN (2)											
Decis 10%			X			X		X		X	4
Decis ULV			X								1
ZETA- CYPERMETHRIN (3)											
F'juri 10%									X	X	2
Taran							X				1
Tarzan							X				1
LAMBDA-CYHALOTHRIN (5)											
Karate						X		X	X	X	4
Karate Zeon							X				1
Atilla										X	1
Killer										X	1
Pulsar	X										1

Pesticides (a.i. and trade name)/Countries	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
CYPERMETHRIN (4)											
Kral		X									1
Ciraks	X									X	2
Ciperon						X					1
Cypermethrin										X	1
ESFENVALERATE (3)											
Sumi- alpha 5%						X				X	2
Super alpha						X					1
Jesfen-alpha										X	1
NEONICOTINOIDES (2 A.I., 10 pesticides)											
..... ACETAMIPRID (1)											
Mospilan						X					1
IMIDACLOPRID (9)											
Bagira										X	1
Imidor 20% WSC					X		X			X	3
Koginor										X	1
Konfidor						X					1
Dakloprid, 20% WSC					X						1
Pilarking						X					1
Storm						X					1
Tanrek							X				1
Fiesta, 20% WSC					X						1
INSECT GROWTH REGULATORS – BENZOYL UREAS (2 A.I., 7 pesticides)											
DIFLUBENZURON (6)											
Dimilin 48%			X		X	X				X	4
Diflur 48%					X						1
Gerkules 48%					X						1
Gerold 48%							X				1
Mergan 48%										X	1
Dimilin OF6 (ULV)				X	X					X	3
..... **TEFLUBENZURON (1)**											
Nomolt ULV						X					1
PHENYL-PYRASOLS (1 A. I., 5 pesticides)											
FIPRONIL (5)											
Adonis 4%					X	X	X			X	4
Lokstin 4%										X	1
Jekonil 4%										X	1
Mergen VDG						X					1
Regent 80%VDG					X						1

Pesticides (a.i. and trade name)/Countries	AZE	ARM	AFG	GEO	KAZ	KYR	RUS	TAD	TUR	UZB	Total
BINARY MIXTURES (2 mixtures; 2 pesticides)											
Chlorpyriphos + Cypermethrin (1)											
Nurell D								X			1
Thiamethoxam + Lambda- Cyhalothrin (1)											
Jenzhio									X		1
Total	4	1	3	2	9	23	8	3	5	21	57