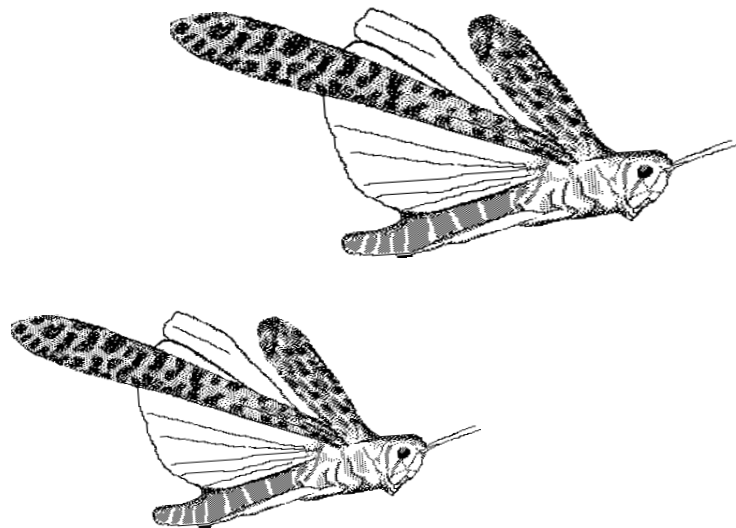


Desert Locust Joint Survey in the Spring Breeding Areas of the I.R. Iran and Pakistan

April-May 2010



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Desert Locust Joint Survey
in the Spring Breeding Areas of Pakistan and I. R. Iran

April – May 2010

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Summary and Recommendations

The Desert Locust survey undertaken in 2010 was the 16th joint survey of the spring breeding areas of Pakistan and I.R. Iran. The survey was carried out for a period of 34 days from 1 April to 4 May 2010. Two locust experts from each country participated in the survey. Locust experts from the concerned districts on each side also accompanied the survey team and offered their full support in locating potential locust breeding habitats.

As usual, the first half the survey (1-18 April) was carried out in Pakistan. The Iranian team was supposed to cross the border into Pakistan at Taftan on 1 April but due to the non receipt of the security clearance from the Pakistani Ministry of Interior, despite waiting several extra days, the Pakistani team had to undertake the survey alone on the Pakistani side. After completion of the first half of the survey in Pakistan, the Pakistani team crossed into I.R. Iran on 18 April 2010 at the Mirjaveh/Taftan border. The Pakistani and Iranian team completed the second half of the joint survey together on the Iranian side. No solitary or gregarious locusts were seen on either side of the border in the routine survey areas. In general, rainfall on both sides was low and soil moisture was not found anywhere. Vegetation in the area was dry or drying and the conditions were not favorable for locust breeding.

The team has several recommendations to improve the organization and usefulness of future joint surveys.

1. The joint survey should be continued in the coming years to monitor Desert Locust activity on both sides of the border and to watch for any possible migration of locust populations from across the Persian Gulf.
2. Whenever new technologies become available, FAO should organize workshops to train the joint survey officers of both countries.
3. Whenever locust control operations occur in either country, a team of locust officers of the DPP and PPO should be invited to participate in order to gain more practical experience. The activity should be sponsored by SWAC.
4. As per the recommendations of the 26th Session of SWAC, Mehdi Ghaemian (I.R. Iran) produced custom maps for laptop and GPS that showed names of the routine survey areas of Iran. Similar maps should be prepared for Baluchistan, Pakistan and used during future joint surveys.
5. GPS units previously provided to Pakistan are now obsolete because their memory batteries have been exhausted. FAO should provide at least two new GPS units to be used during the routine national locust survey as well as the joint survey.
6. If possible, the Flybook in I.R. Iran should be repaired; otherwise, it should be replaced with a Netbook laptop PC. An external drive and extra battery should be ordered for the new Flybook provided to Pakistan by SWAC.
7. The team hopes that security situation in Baluchistan, Pakistan will return to normal and both the countries will undertake regular joint survey activities in 2011 and thereafter.
8. Keeping in view the tough desert job and the high inflation rate, it is recommended that the DSA of the participants may be enhanced by 50%.

9. If possible, a replacement pre-paid SIM card should be procured by SWAC for the Thuraya satellite phone in Pakistan and I.R. Iran so that they can be used during the joint survey.
10. Walkie-talkies provided by FAO are of limited range. FAO is requested to provide four high range sets to each country if possible.

Desert Locust Joint Survey in the Spring Breeding Areas of Pakistan and I.R. Iran

April – May 2010

Introduction

The main objective of the Pakistan-Iran joint survey is to check the potential Desert Locust spring breeding areas on either side of the common border and to use the results for planning locust survey and control operations in the summer-monsoon breeding areas along the Indo-Pakistan border during the following summer. The joint survey was regularly undertaken in the 1960s and 1970s but afterwards they stopped. After a gap of twenty years, the 19th Session of the FAO Commission for Controlling the Desert Locust in Southwest Asia (SWAC) in 1994 recommended that FAO re-establish the joint survey in the spring breeding areas of Pakistan and I.R. Iran in 1995 and thereafter on an annual basis. The present survey of 2010 was the sixteenth in the series of annual joint surveys.

During this year's joint survey, a total distance of 12,650 km was covered on the ground, of 6,500 km were in Pakistan and 6,150 km in I.R. Iran. A total of 74 stops were made in Pakistan and 80 stops were made in I.R. Iran during the survey. In Pakistan, some of the highest frequency breeding areas such as Naru and Borko Desert in Kharan, Prome Valley of Panjgur, Shooly-Bashooly of Turbat, and Kulanch Valley of Pasni were surveyed. In I.R. Iran, potentially favourable breeding areas such as the Jolgeh Desert of Iranshar, Vashnam area in Chabahar, Zarabad area of Konarak, Jaz Murian Basin and Ghale Ganj of Kahnuj were surveyed.

Methodology

The team followed standard operating procedures (SOP) based on the *FAO Desert Locust Guidelines II. Survey*. Surveys were undertaken by foot and vehicle. Upon reaching a survey stop, the team split up and walked in different directions to check the area and make observations regarding locust activity, vegetation condition and density, and soil moisture. The information collected was entered into eLocus2 and transmitted directly to the respective national locust headquarters. The same data was also entered onto the *FAO Desert Locust Survey and Control Forms* and into the Joint Survey Database (JSDB) on the Flybook laptop PC. In general, six to eight stops were usually made each day, seven days a week. Keeping in view the vast desert area of Kharan in Pakistan, two teams were constituted to cover the area in due time making 18 stops as a whole.

The team took advantage of the modern technologies to assist them during the survey. A demonstration version of the custom JSDB was prepared and installed on the Flybook laptop of the Iranian team that proved to be very helpful. A GPS with the Iranian team contained a version of a MODIS dynamic greenness map that was very helpful in locating areas containing green vegetation. Photographs of the interesting locust habitats were also taken using digital cameras. Supplementary information was gathered from shepherds, camel herders and other local people throughout the survey.

Rain data of the major rainfall stations in the survey area was collected from the concerned meteorological office or locust outpost.

At the end of each day, all the survey team members met to discuss the work of that day and to chalk out the program for tomorrow.

Upon completion of the survey, the team returned to Zahedan on 1 May 2010. The locust experts of both countries discussed the results of the survey, exchanged their views and to compiled the joint survey report during the following two days. The Pakistan team returned back on 4 May 2010 after successful completion of the joint task. This year the meeting between the Locust Heads of the two countries could not be organized in Zahedan because the Iranian Locust Head was occupied in preparing for the Desert Locust Master Trainers workshop. A meeting was held at the end of the workshop in Ramsar with the Locust Heads of both countries, the joint survey Team Leaders and the FAO Senior Locust Forecasting Officer to discuss the joint survey results and report.

Results and Discussion

This year low rainfall was received in Baluchistan, Pakistan and I.R. Iran. The vegetation was almost dry or drying. Soil moisture was not available anywhere in the Pakistani side as well as in I.R. Iran. No solitary or gregarious locust activity was recorded during the survey. If no further rainfall occurs, ecological conditions will become more severe and there will be no chance for locust breeding.

For the sake of this report, Baluchistan in both I.R Iran and Pakistan can be divided geographically into three parts:

- i. Northern Baluchistan
- ii. Central Baluchistan
- iii. Southern Baluchistan

i. Northern Baluchistan

The northern part of Baluchistan is the area north of the Taftan Mountains in I.R. Iran and the Ras Koh Mountains in Pakistan. High elevation sandy and rocky plains from Zahedan, I.R. Iran to Nushki, Pakistan are found on the northern side these mountains. The last rainfall in the area on the Pakistani side occurred on 4 March 2010 and it was very low. Consequently, vegetation in the Dalbandin area was dry while in Nushki it was drying. No soil moisture was available anywhere in the area. Tube well irrigated fields of wheat and cumin are present in the Mull area near Nushki. On Iranian side, the last rainfall occurred on 27 February 2010. It was also low and vegetation was drying to dry.

No solitary or gregarious locust activity was seen during the survey in this area.

ii. Central Baluchistan

The central part of Baluchistan extends from south of the Taftan and Ras Koh Mountains to the Kech and Mand Mountain ranges north of Turbat in Pakistan. This

region consists of the Great Sandy Desert west of Kharan Valley, the Rakhshan Valley of Panjgur that extends west to Saravan, Suran, Zaboli valleys in I.R. Iran, and the Jaz Murian Basin from Iranshahr to Kahnuj. The last rainfall on the Pakistani side occurred on 24 February 2010, and it was low to moderate so vegetation in the whole area was drying to dry. Soil moisture was not available. On the Iranian side, the last rainfall occurred on 27 February 2010 and was low to moderate. Vegetation was green in Jaz Murian while it was drying to dry in almost all other areas.

No solitary or gregarious locust activity was seen during the survey in this area.

iii. Southern Baluchistan

The southern parts of Baluchistan consist of coastal areas that extend from Bandar Abbas, Jask, Zarabad and Chabahar in I.R. Iran to Sulaica Valley of Jewani, Kulanch Valley of Pasni, Ormara and Uthal in Pakistan. The areas between Pasni to Ormara and Uthal in Pakistan are famous for locust breeding while areas from Chabahar to Zarabad and Gwater in I.R. Iran are also potentially favourable breeding areas for Desert Locust. On the Pakistani side, it was dry while on the Iranian side vegetation was drying and dry in the entire survey area.

No solitary or gregarious locust activity was seen during the survey in this area.

Recommendations

The team has several recommendations to improve the organization and usefulness of future joint surveys.

1. The joint survey should be continued in the coming years to monitor Desert Locust activity on both sides of the border and to watch for any possible migration of locust populations from across the Persian Gulf.
2. Whenever new technologies become available, FAO should organize workshops to train the joint survey officers of both countries.
3. Whenever locust control operations occur in either country, a team of locust officers of the DPP and PPO should be invited to participate in order to gain more practical experience. The activity should be sponsored by SWAC.
4. As per the recommendations of the 26th Session of SWAC, Mehdi Ghaemian (I.R. Iran) produced custom maps for laptop and GPS that showed names of the routine survey areas of Iran. Similar maps should be prepared for Baluchistan, Pakistan and used during future joint surveys.
5. GPS units previously provided to Pakistan are now obsolete because their memory batteries have been exhausted. FAO should provide at least two new GPS units to be used during the routine national locust survey as well as the joint survey.
6. If possible, the Flybook in I.R. Iran should be repaired; otherwise, it should be replaced with a Netbook laptop PC. An external drive and extra battery should be ordered for the new Flybook provided to Pakistan by SWAC.
7. The team hopes that security situation in Baluchistan, Pakistan will return to normal and both the countries will undertake regular joint survey activities in 2011 and thereafter.

8. Keeping in view the tough desert job and the high inflation rate, it is recommended that the DSA of the participants may be enhanced by 50%.
9. If possible, a replacement pre-paid SIM card should be procured by SWAC for the Thuraya satellite phone in Pakistan and I.R. Iran so that they can be used during the joint survey.
10. Walkie-talkies provided by FAO are of limited range. FAO is requested to provide four high range sets to each country if possible.

APPENDICES

Appendix 1. Survey participants

	Name	Title	City
I.R. Iran			
Team Leader	Ali Babali Fashki	PPO expert	Tehran PPO
Locust Officer	Noraldin Mirlashari	PPO expert	Chabahar
Environmental Asst.	Mansour Pour Eslami	Director asst.	Jiroft
Drivers	Mansour Omidi		Tehran PPO
	Mehdi Ali Yazdi		Zadedan
	Sadegh Molaie		Jiroft
	Soali Chakeri		Chabahar
Pakistan			
Team Leader	Azam Khan	Deputy Director (Locust)	Karachi
Locust Officer	Abdul Sattar	Director asst.	
Maintenance Asst.	Ghulam Nabi	Maintenance asst.	
Drivers	Bilal Ahmed		
	Ahmed Baloch		
	Abdul Khalid		
	Abid Hussain		

Appendix 2. Itinerary

Date	Route	Km	Overnight
1 Apr	Cross Iran/Pakistan border Mirjaveh to Taftan	300	Taftan
2 Apr	Nushki, Dalbadin, Chagi Hills, Nushki	553	Nushki
3 Apr	Nushki, Kharan, Kharan area (Naru)	152	Kharan
4 Apr	Kharan area(Shamsi)	225	Kharan
5 Apr	Kharan area (Uromag and Borko area)	335	Kharan
6 Apr	Kharan, Basima, Nag, Panjgur	140	Panjgur
7 Apr	Panjgur, Prome, Turbat	280	Panjgur
8 Apr	Panjgur, Hoshab, Turbat	285	Turbat
9 Apr	Turbat, Solaika, Turbat	298	Turbat
10 Apr	Turbat, Suntsar, Jiwani	98	Jiwani
11 Apr	Jiwani , Gwadar	189	Gwadar
12 Apr	Gwadar, Kulanch, Pasnil	454	Pasni
13 Apr	Pasni area	350	Pasni
14-Apr	Pasni, Ormara, Uthal	347	Uthal
15 Apr	Uthal, Quetta	335	Quetta
16 Apr	Report day; prepare 1 st half joint Survey results	0	Quetta
17 Apr	Quetta, Nushki, Taftan	700	Taftan
18 Apr	Cross Iran/Pakistan border Taftan to Mirjaveh; Send 1 st half results	200	Zahedan
19 Apr	Zahedan, Khash, Gosht, Saravan	465	Saravan
20 Apr	Saravan, Souran, Zaboli, Iranshahr	490	Iranshahr
21 Apr	Iranshahr, Jolgeh Chah Hashem, Iranshahr	676	Iranshahr
22 Apr	Iranshahr, Espakeh, Nikshahr, Chabahar	480	Chabahar
23 Apr	Chabahar,Beris, Sham, Goater, Chabahar	290	Chabahar
24 Apr	Chabahar, Vashnam, Dashtiari, Chabahar	370	Chabahar
25 Apr	Chabahar, Zar Abad, Jask; Jask area	507	Jask
26 Apr	Jask, Minab, Bandar Abbas	480	Bandar Abbas
27 Apr	Report day; prepare 2 nd half Joint Survy results	0	Bandar Abbas
28 Apr	Bandar Abbas, Manujan, Ghale Ganj, Sowlan, Kahnuj	592	Kahnuj
29 Apr	East Jaz Murian, Kahnuj	530	Kahnuj
30 Apr	Zeh Kalout, Dalgan, Bampour, Sadegal, Iranshahr	550	Iranshahr
1 May	Iranshahr, Zahedan; Send 2 nd half results	320	Zahedan

2 May	Locust Heads/ JS team meeting	0	Zahedan
3 May	Locust Heads/ JS team meeting	0	Zahedan
4 May	Zahedan, Mirjaveh, Pakistni team to PakNushki	200	

Total Distance Covered With Stops Made

Total distance covered in I.R. Iran	6,150 km
Total distance covered in Pakistan	6,500 km
Total distance covered in JS 2010	12,650 km
Total stops made in I.R. Iran	80
Total stops made in Pakistan	74
Total stops made in JS 2010	154

Appendix 3. The FAO Desert Locust Survey and Control Form (blank)

Please send to FAO HQs by fax: +39-06-57055271 or by email: eclo@fao.org (indicate appropriate information as required)

1	SURVEY STOP	1	2	3	4	5	6
1-1	Date						
1-2	Name						
1-3	Latitude (N)						
1-4	Longitude (E or W)						
2 ECOLOGY							
2-1	Area of survey (ha)						
2-2	Habitat (wadi, plains, dunes, crops)						
2-3	Date of last rain						
2-4	Rain amount (mm, low, moderate, high)	L M H ?	L M H ?	L M H ?	L M H ?	L M H ?	L M H ?
2-5	Vegetation (dry, greening, green, drying)						
2-6	Vegetation density (low, medium, dense)	L M D	L M D	L M D	L M D	L M D	L M D
2-7	Soil moisture (wet / dry)	W D	W D	W D	W D	W D	W D
3 LOCUSTS							
3-1	Present or absent	P A	P A	P A	P A	P A	P A
3-2	Area infested (ha)						
4 HOPPERS							
4-1	Hopper stages (H 1 2 3 4 5 6 F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	Appearance(solitary,transient, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	Behaviour (Isolated, scattered, group)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	Hopperdensity(/site,/m ² ,low,medium,High)						
5 BANDS							
5-1	Band stage (H 1 2 3 4 5 F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	Band density (/site,/m ² ,low,medium, high)						
5-3	Band sizes (m ² or ha)						
5-4	Number of bands						
6 ADULTS							
6-1	Maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	Appearance(solitary,transients,gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	Behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	Adult density (/transect, /ha, L, M, H)						
6-5	Breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7 SWARMS							
7-1	Maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	Swarm density (/m ² , low, medium, high)						
7-3	Swarm size (km ² , hectare)						
7-4	Number of swarms						
7-5	Breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	Flying (direction, time passing)						
7-7	Flying height (low, medium, high)	L M H	L M H	L M H	L M H	L M H	L M H
8 CONTROL							
8-1	Pesticide name and formulation						
8-2	Application rate (l/ha, kg/ha)						
8-3	Quantity (litres, kilograms)						
8-4	Area treated (ha)						
8-5	Ground or air	G A	G A	G A	G A	G A	G A
8-6	Estimated % of killing						
9 COMMENTS							

Was GPS used to determine locations? Yes No Is a brief interpretation or analysis of the results included? Yes No

Country: _____ Locust Officer: _____ dated _____

Cleared by: _____ dated _____

Appendix 4. Desert Locust Joint Survey results

SURVEY STOP	1	2	3	4	5
date	06/04/2010	06/04/2010	06/04/2010	06/04/2010	06/04/2010
time	08:00	08:30	09:15	10:00	11:25
name	Girdgap	Ahmedwall	Sarmall	Mull 1	Mull 2
Latitude (N)	29°44'32.00"N	29°29'28.00"N	29°15'21.00"N	29°11'50.00"N	29°09'19.00"N
Longitude (E or W)	066°25'38.00"E	066°27'38.00"E	065°48'14.00"E	065°12'06.00"E	065°50'25.00"E
ECOLOGY					
Area of survey(ha)	100	150	200	150	150
Habitat(wadi,plains,dunes,crops)	Dunes	Wadi	Plains	Crops	Crops
Date of last rain	06/02/2010	04/02/2010	04/03/2010	04/03/2010	04/03/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Green	Green	Green	Green
Vegetation density(LMD)	Dense	Dense	Dense	Dense	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	6	7	8	9	10
date	06/04/2010	06/04/2010	06/04/2010	07/04/2010	07/04/2010
time	11:45	12:00	12:25	07:45	08:15
name	Chatar	Peshak	Yakmach	Borkonali	Borko 1
Latitude (N)	28°54'34.00"N	28°56'48.00"N	28°50'06.00"N	28°15'30.00"N	28°10'11.00"N
Longitude (E or W)	064°53'09.00"E	064°42'32.00"E	064°14'30.00"E	065°18'49.00"E	065°20'21.00"E
ECOLOGY					
Area of survey(ha)	200	250	200	200	100
Habitat(wadi,plains,dunes,crops)	Dunes	Plains	Plains	Dunes	Dunes
Date of last rain	04/02/2010	04/02/2010	04/02/2010	24/02/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	11	12	13	14	15
date	07/04/2010	07/04/2010	07/04/2010	07/04/2010	07/04/2010
time	08:35	09:00	09:25	09:55	10:30
name	Borko 2	Damak	Boparack	Badi	Dali
Latitude (N)	28°04'33.00"N	28°04'06.00"N	28°35'52.00"N	28°31'45.00"N	28°15'27.00"N
Longitude (E or W)	065°24'45.00"E	065°31'30.00"E	065°17'55.00"E	065°11'00.00"E	065°39'42.00"E
ECOLOGY					
Area of survey(ha)	100	50	250	150	40
Habitat(wadi,plains,dunes,crops)	Dunes	Dunes	Dunes	Crops	Crops
Date of last rain	24/02/2010	24/02/2010	04/03/2010	04/03/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	16	17	18	19	20
date	07/04/2010	07/04/2010	07/04/2010	07/04/2010	07/04/2010
time	10:55	11:20	11:45	12:10	12:30
name	Haychah	Ado	Garuk	Espalate	Naru
Latitude (N)	28°25'51.00"N	28°20'52.00"N	28°27'26.00"N	28°31'22.00"N	28°23'21.00"N
Longitude (E or W)	065°06'56.00"E	065°09'04.00"E	065°39'41.00"E	065°25'04.00"E	065°31'40.00"E
ECOLOGY					
Area of survey(ha)	200	250	100	50	100
Habitat(wadi,plains,dunes,crops)	Dunes	Dunes	Plains	Dunes	Dunes
Date of last rain	04/03/2010	06/01/2010	24/02/2010	24/02/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	21	22	23	24	25
date	07/04/2010	07/04/2010	07/04/2010	07/04/2010	07/04/2010
time	12:45	13:00	16:20	16:45	17:15
name	Kook	Tagap	Nalle	Ludgasht	Kitho
Latitude (N)	28°33'06.00"N	28°25'10.00"N	28°21'37.00"N	28°32'14.00"N	28°21'04.00"N
Longitude (E or W)	065°06'18.00"E	065°28'24.00"E	065°25'53.00"E	065°05'38.00"E	065°23'34.00"E
ECOLOGY					
Area of survey(ha)	200	20	100	250	50
Habitat(wadi,plains,dunes,crops)	Wadi	Crops	Crops	Dunes	Dunes
Date of last rain	04/03/2010	24/02/2010	24/02/2010	04/03/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	26	27	28	29	30
date	07/04/2010	08/04/2010	08/04/2010	08/04/2010	08/04/2010
time	17:35	08:10	08:45	09:15	09:45
name	Rachil	Dali	Basima 1	Basima 2	Patik
Latitude (N)	28°20'17.00"N	28°13'53.00"N	28°05'08.00"N	27°51'35.00"N	27°45'19.00"N
Longitude (E or W)	065°21'05.00"E	065°41'25.00"E	065°45'50.00"E	065°47'49.00"E	065°37'11.00"E
ECOLOGY					
Area of survey(ha)	100	200	200	250	150
Habitat(wadi,plains,dunes,crops)	dunes	wadi	wadi	plains	wadi
Date of last rain	24/02/2010	24/02/2010	24/02/2010	04/03/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Drying	Green
Vegetation density(LMD)	Low	Low	Low	Low	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	31	32	33	34	35
date	08/04/2010	08/04/2010	08/04/2010	08/04/2010	09/04/2010
time	10:15	10:45	11:15	11:45	07:50
name	Nag road 1	Nag road 2	Nag panjgoor road 1	Nag panjgoor road 2	Chakol
Latitude (N)	27°32'21.00"N	2°25'12.00"N	27°21'22.00"N	27°15'53.00"N	26°50'44.00"N
Longitude (E or W)	065°00'08.00"E	065°06'28.00"E	065°54'15.00"E	064°45'45.00"E	063°55'11.00"E
ECOLOGY					
Area of survey(ha)	250	300	200	200	200
Habitat(wadi,plains,dunes,crops)	Plains	plains	plains	plains	plains
Date of last rain	24/02/2010	24/02/2010	04/03/2010	24/02/2010	24/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Moderate
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Medium	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	36	37	38	39	40
date	09/04/2010	09/04/2010	09/04/2010	09/04/2010	09/04/2010
time	08:30	08:55	09:30	09:55	10:20
name	Sangain	Jahian	Malang bagaar	Sipan	Prome
Latitude (N)	26°49'36.00"N	26°43'14.00"N	26°42'46.00"N	26°41'09.00"N	26°38'46.00"N
Longitude (E or W)	063°54'26.00"E	063°41'04.00"E	063°28'27.00"E	063°20'14.00"E	063°19'39.00"E
ECOLOGY					
Area of survey(ha)	250	300	250	250	200
Habitat(wadi,plains,dunes,crops)	Plains	plains	wadi	plains	wadi
Date of last rain	24/02/2010	24/02/2010	22/02/2010	22/02/2010	22/02/2010
Rain estimate (LMH)	Moderate	Moderate	Moderate	Moderate	Moderate
Vegetation(dry,drying,green,greening)	Drying	Drying	Green	Drying	Green
Vegetation density(LMD)	Dense	Dense	Dense	Dense	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	41	42	43	44	45
date	09/04/2010	09/04/2010	09/04/2010	10/04/2010	10/04/2010
time	11:00	11:35	11:55	08:00	08:25
name	Sorian	Sanhikalet	Sangikalet	Rachi	Bilgadar
Latitude (N)	26°38'53.00"N	26°41'03.00"N	26°44'03.00"N	26°18'08.00"N	26°11'16.00"N
Longitude (E or W)	063°35'25.00"E	064°00'40.00"E	064°09'40.00"E	063°57'02.00"E	064°01'37.00"E
ECOLOGY					
Area of survey(ha)	300	200	200	200	250
Habitat(wadi,plains,dunes,crops)	plains	wadi	Wadi	Wadi	plains
Date of last rain	22/02/2010	22/02/2010	22/02/2010	22/02/2010	22/02/2010
Rain estimate (LMH)	Moderate	Moderate	Moderate	Low	Low
Vegetation(dry,drying,green,greening)	Green	Drying	Drying	Dry	Dry
Vegetation density(LMD)	Medium	Medium	Medium	Medium	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	46	47	48	49	50
date	10/04/2010	10/04/2010	10/04/2010	11/04/2010	11/04/2010
time	08:55	09:20	10:00	08:20	08:50
name	Hoshab 1	Hoshab 2	Purbet road	Turbat	Sholi 1
Latitude (N)	26°01'51.00"N	26°01'47.00"N	26°03'00.00"N	25°50'13.00"N	25°37'16.00"N
Longitude (E or W)	063°45'11.00"E	063°45'11.00"E	063°32'21.00"E	062°42'09.00"E	062°14'16.00"E
ECOLOGY					
Area of survey(ha)	200	200	250	200	200
Habitat(wadi,plains,dunes,crops)	Wadi	Wadi	Wadi	Plains	Wadi
Date of last rain	12/03/2010	12/03/2010	12/03/2010	07/02/2010	07/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Dry	Drying	Dry	Drying
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	51	52	53	54	55
date	11/04/2010	11/04/2010	11/04/2010	12/04/2010	12/04/2010
time	08:50	09:25	10:00	08:15	09:00
name	Sholi 2	Sajjee	Garuk	Nagur 1	Nagur
Latitude (N)	25°35'15.00"N	25°26'46.00"N	25°18'01.00"N	25°15'34.00"N	25°16'49.00"N
Longitude (E or W)	062°06'31.00"E	062°04'35.00"E	062°12'17.00"E	062°15'23.00"E	062°07'21.00"E
ECOLOGY					
Area of survey(ha)	300	200	250	250	200
Habitat(wadi,plains,dunes,crops)	plains	plains	plains	Dunes	Plains
Date of last rain	07/02/2010	07/02/2010	07/02/2010	07/02/2010	07/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	56	57	58	59	60
date	12/04/2010	12/04/2010	12/04/2010	13/04/2010	13/04/2010
time	09:30	10:00	10:30	08:10	08:30
name	Paleri	munatri	Jewani	Guvani	Nailant
Latitude (N)	25°15'57.00"N	25°05'54.00"N	25°02'43.00"N	25°16'17.00"N	25°19'47.00"N
Longitude (E or W)	061°57'34.00"E	061°46'50.00"E	061°44'00.00"E	063°19'59.00"E	062°42'22.00"E
ECOLOGY					
Area of survey(ha)	250	250	200	250	250
Habitat(wadi,plains,dunes,crops)	Plains	plains	dunes	dunes	plains
Date of last rain	07/02/2010	07/02/2010	07/02/2010	22/02/2010	18/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Moderate
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Drying	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	61	62	63	64	65
date	13/04/2010	13/04/2010	13/04/2010	13/04/2010	13/04/2010
time	09:10	09:30	10:00	10:45	11:15
name	Chakli	Doki	Ghano	Jui	Pasni road
Latitude (N)	25°22'30.00"N	25°23'19.00"N	25°24'16.00"N	25°26'25.00"N	25°26'23.00"N
Longitude (E or W)	063°08'10.00"E	063°07'39.00"E	063°10'06.00"E	063°09'09.00"E	063°08'52.00"E
ECOLOGY					
Area of survey(ha)	250	200	250	250	250
Habitat(wadi,plains,dunes,crops)	Dunes	Dunes	wadi	plains	plains
Date of last rain	18/02/2010	18/02/2010	18/02/2010	22/02/2010	22/02/2010
Rain estimate (LMH)	Moderate	Moderate	Moderate	Moderate	Moderate
Vegetation(dry,drying,green,greening)	Dry	Dry	Green	Green	Dry
Vegetation density(LMD)	Low	Low	Medium	Dense	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	66	67	68	69	70
date	13/04/2010	14/04/2010	14/04/2010	14/04/2010	14/04/2010
time	11:45	07:50	08:30	08:55	09:30
name	Dok	Shadicore	Romro	Umersahi	bugi
Latitude (N)	25°26'39.00"N	25°23'59.00"N	25°23'19.00"N	25°23'43.00"N	25°28'53.00"N
Longitude (E or W)	063°08'59.00"E	063°27'46.00"E	063°43'06.00"E	063°52'51.00"E	063°55'54.00"E
ECOLOGY					
Area of survey(ha)	200	200	250	300	250
Habitat(wadi,plains,dunes,crops)	Dunes	plain	wadi	Plains	Dunes
Date of last rain	22/02/2010	22/02/2010	22/02/2010	22/02/2010	22/02/2010
Rain estimate (LMH)	Low	Moderate	Moderate	Moderate	Moderate
Vegetation(dry,drying,green,greening)	Drying	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A				
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	71	72	73	74	
date	14/04/2010	14/04/2010	14/04/2010	14/04/2010	
time	10:30	11:00	11:30	11:55	
name	Macula	Kordan	urmara	Sapat	
Latitude (N)	25°30'51.00"N	25°25'03.00"N	25°16'28.00"N	25°29'40.00"N	
Longitude (E or W)	064°04'50.00"E	064°26'04.00"E	064°32'24.00"E	065°52'31.00"E	
ECOLOGY					
Area of survey(ha)	150	250	200	250	
Habitat(wadi,plains,dunes,crops)	Dunes	Plains	Dunes	Dunes	
Date of last rain	22/02/2010	22/02/2010	22/02/2010	22/02/2010	
Rain estimate (LMH)	moderate	moderate	moderate	moderate	
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	
Vegetation density(LMD)	Medium	low	Dense	Dense	
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	
LOCUST					
Present or Absent	A	A	A	A	
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	1	2	3	4	5
date	19/04/2010	19/04/2010	19/04/2010	19/04/2010	20/04/2010
time	9:30	10:00	11:15	12:00	12:35
name	Khash 1	Khash 2	Shamsabad 1	Shamsabad 2	Gharhoshak
Latitude (N)	28°10'02.00"N	28°04'21.00"N	27°31'19.00"N	27°29'42.00"N	27°25'49.00"N
Longitude (E or W)	061°13'48.00"E	061°23'24.00"E	062°08'27.00"E	062°10'16.00"E	062°16'14.00"E
ECOLOGY					
Area of survey(ha)	100	100	150	150	150
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Drying	Drying	Drying	Drying
Vegetation density(LMD)	Medium	Medium	Low	Medium	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	6	7	8	9	10
date	19/04/2010	19/04/2010	20/04/2010	20/04/2010	20/04/2010
time	12:55	16:50	08:00	08:45	09:10
name	Gharhoshak	Nahok	Soran	Shandan	Chahe 22 bahman
Latitude (N)	27°25'49.00"N	27°24'24.00"N	27°18'30.00"N	27°22'56.00"N	27°24'53.00"N
Longitude (E or W)	062°16'14.00"E	062°20'40.00"E	061°59'36.00"E	061°54'17.00"E	061°51'24.00"E
ECOLOGY					
Area of survey(ha)	150	200	250	100	200
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Drying	Dry	Drying	Drying
Vegetation density(LMD)	Medium	Low	Medium	Medium	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	11	12	13	14	15
date	20/04/2010	20/04/2010	20/04/2010	21/04/2010	21/04/2010
time	10:25	11:00	11:45	8:20	09:00
name	Garpashkoh	Khoshab	Ghader abad	Firozabad	Chahali
Latitude (N)	27°28'24.00"N	27°10'01.00"N	27°08'25.00"N	27°11'35.00"N	27°25'49.00"N
Longitude (E or W)	061°43'31.00"E	061°46'57.00"E	061°34'26.00"E	060°11'35.00"E	059°47'13.00"E
ECOLOGY					
Area of survey(ha)	200	100	200	150	100
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Dunes
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Drying	Drying	green	Drying
Vegetation density(LMD)	Medium	Medium	Medium	Medium	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	16	17	18	19	20
date	21/04/2010	21/04/2010	21/04/2010	21/04/2010	22/04/2010
time	10:00	10:30	11:00	11:45	08:15
name	Mand	Chahshor	Baleshti	Chaeshagh	Khairabad
Latitude (N)	27°11'35.00"N	27°06'49.00"N	27°06'22.00"N	27°06'01.00"N	26°58'18.00"N
Longitude (E or W)	060°04'21.00"E	058°59'06.00"E	058°57'45.00"E	058°52'29.00"E	060°34'56.00"E
ECOLOGY					
Area of survey(ha)	100	150	250	250	250
Habitat(wadi,plains,dunes,crops)	Dunes	plains	Dunes	dunes	plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Drying	Dry	Drying	Drying
Vegetation density(LMD)	Low	Dense	Low	Medium	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	21	22	23	24	25
date	22/04/2010	22/04/2010	22/04/2010	22/04/2010	22/04/2010
time	08:45	09:15	09:45	10:25	11:05
name	Parpiran	Espakeh 1	safabad	Espakeh 2	Moman
Latitude (N)	26°54'04.00"N	26°49'08.00"N	26°49'48.00"N	26°50'57.00"N	25°33'26.00"N
Longitude (E or W)	060°28'35.00"E	060°17'47.00"E	060°14'38.00"E	060°10'03.00"E	060°28'08.00"E
ECOLOGY					
Area of survey(ha)	150	200	250	150	200
Habitat(wadi,plains,dunes,crops)	dunes	Plains	plains	dunes	plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Dry	Dry	Drying	Dry
Vegetation density(LMD)	Medium	Medium	Low	Medium	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	26	27	28	29	30
date	22/04/2010	22/04/2010	23/04/2010	23/04/2010	23/04/2010
time	11:40	12:15	08:15	08:45	09:30
name	Rasolabad	Park	Cable mohammad	Rigdim	Kohdim
Latitude (N)	25°28'25.00"N	25°27'08.00"N	25°25'07.00"N	25°27'54.00"N	25°27'52.00"N
Longitude (E or W)	060°30'14.00"E	060°36'00.00"E	060°52'08.00"E	060°53'12.00"E	060°52'01.00"E
ECOLOGY					
Area of survey(ha)	350	150	250	300	250
Habitat(wadi,plains,dunes,crops)	dunes	Plains	plains	plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Medium	Dense	Low	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	31	32	33	34	35
date	23/04/2010	23/04/2010	23/04/2010	23/04/2010	23/04/2010
time	10:00	10:30	11:15	11:45	12:30
name	Vashnam 1	Vashnam 2	Vashnam 3	Maleki	Vashnam 4
Latitude (N)	26°25'29.00"N	25°24'36.00"N	25°25'00.00"N	25°26'25.00"N	25°25'04.00"N
Longitude (E or W)	060°48'51.00"E	060°44'.20"E	060°45'03.00"E	060°45'20.00"E	060°46'04.00"E
ECOLOGY					
Area of survey(ha)	150	200	150	200	150
Habitat(wadi,plains,dunes,crops)	Plains	plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	36	37	38	39	40
date	24/04/2010	24/04/2010	24/04/2010	24/04/2010	24/04/2010
time	08:30	09:00	09:45	10:25	11:00
name	Ramin	Lipar	Cacho	Bris	Pasabandar
Latitude (N)	25°16'26.00"N	25°16'09.00"N	25°15'75.00"N	25°13'39.00"N	25°05'27.00"N
Longitude (E or W)	060°46'03.00"E	060°50'34.00"E	060°52'58.00"E	060°56'54.00"E	061°29'38.00"E
ECOLOGY					
Area of survey(ha)	150	150	200	150	200
Habitat(wadi,plains,dunes,crops)	Dunes	Dunes	Plains	Beach	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Dry
Vegetation density(LMD)	Low	Low	Low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	41	42	43	44	45
date	24/04/2010	25/04/2010	25/042010	25/04/2010	26/042010
time	11:35	08:10	08:45	09:25	10:00
name	Goater	Bansont	Borsar	Kahir	Taran
Latitude (N)	25°09'47.00"N	25°30'29.00"N	25°34'37.00"N	25°34'50.00"N	25°32'18.00"N
Longitude (E or W)	061°29'38.00"E	060°18'08.00"E	060°10'45.00"E	060°05'24.00"E	059°59'39.00"E
ECOLOGY					
Area of survey(ha)	100	200	200	250	300
Habitat(wadi,plains,dunes,crops)	Beach	Plains	plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Drying
Vegetation density(LMD)	Low	Low	low	Low	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	46	47	48	49	50
date	25/04/2010	25/04/2010	25/04/2010	25/042010	25/04/2010
time	10:45	11:20	11:45	16:00	16:45
name	Birdaf	Poshti	Lirdaf	Gabrik	Sirmach
Latitude (N)	25°26'47.00"N	25°29'44.00"N	25°40'45.00"N	25°46'14.00"N	25°44'59.00"N
Longitude (E or W)	059°46'49.00"E	059°27'06.00"E	059°04'03.00"E	058°25'58.00"E	058°15'02.00"E
ECOLOGY					
Area of survey(ha)	300	250	200	200	200
Habitat(wadi,plains,dunes,crops)	Plains	Dunes	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	green	Dry	Drying	Green
Vegetation density(LMD)	medium	Medium	Medium	Low	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	51	52	53	54	55
date	25/04/2010	26/04/2010	26/04/2010	26/04/2010	26/04/2010
time	17:25	07:45	08:25	09:00	09:45
name	Yekdar	Gigan	Baghan	Kangan	Katanbala
Latitude (N)	058°05'21.00"E	057°24'21.00"E	057°35'17.00"E	057°26'31.00"E	057°19'00.00"E
Longitude (E or W)	25°42'57.00"N	25°48'39.00"N	25°50'42.00"N	25°52'08.00"N	25°56'55.00"N
ECOLOGY					
Area of survey(ha)	200	250	200	200	250
Habitat(wadi,plains,dunes,crops)	Plains	plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Dry	Dry	Dry	Drying
Vegetation density(LMD)	Low	Low	Low	Low	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	56	57	58	59	60
date	26/04/2010	26/04/2010	26/04/2010	26/04/2010	28/04/2010
time	10:25	10:55	16:30	17:00	Solan
name	Minab 1	Minab 2	Hassan langi	Dehnow	09:45
Latitude (N)	26°51'24.00"N	26°57'33.00"N	27°22'30.00"N	27°20'46.00"N	27°11'31.00"N
Longitude (E or W)	057°05'00.00"E	057°07'05.00"E	056°49'37.00"E	056°31'23.00"E	058°34'12.00"E
ECOLOGY					
Area of survey(ha)	250	200	200	200	150
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Crops
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Drying	Drying	Drying	Drying	Drying
Vegetation density(LMD)	Medium	Medium	Medium	Medium	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	61	62	63	64	65
date	28/04/2010	28/04/2010	28/04/2010	28/04/2010	28/04/2010
time	10:30	11:05	11:35	12:15	16:00
name	Zehan	Ziarat	Mojaki	Jazmorian 1	Jazmorian 2
Latitude (N)	27°14'09.00"N	27°11'19.00"N	27°25'00.00"N	27°26'38.00"N	27°27'21.00"N
Longitude (E or W)	058°35'11.00"E	058°32'04.00"E	058°28'23.00"E	058°32'13.00"E	058°30'52.00"E
ECOLOGY					
Area of survey(ha)	150	200	300	250	250
Habitat(wadi,plains,dunes,crops)	Crops	Dunes	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Moderate	Moderate	Moderate
Vegetation(dry,drying,green,greening)	Drying	Drying	Drying	Drying	Green
Vegetation density(LMD)	Medium	Medium	Medium	Dense	Dense
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	66	67	68	69	70
date	28/04/2010	28/04/2010	29/04/2010	29/04/2010	29/04/2010
time	16:45	17:15	09:10	09:45	10:25
name	East jaz	Jazmorian 3	shamsabad	Eshkand	Chakak
Latitude (N)	27°28'16.00"N	27°26'37.00"N	27°31'57.00"N	27°33'43.00"N	27°36'08.00"N
Longitude (E or W)	058°30'04.00"E	058°21'31.00"E	058°31'55.00"E	058°32'27.00"E	058°32'52.00"E
ECOLOGY					
Area of survey(ha)	300	250	250	300	300
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Moderate	moderate	Moderate	Moderate	Moderate
Vegetation(dry,drying,green,greening)	Green	Drying	Drying	Drying	Drying
Vegetation density(LMD)	Dense	Medium	Low	Low	Low
Soil moisture(wet,dry)	Wet	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

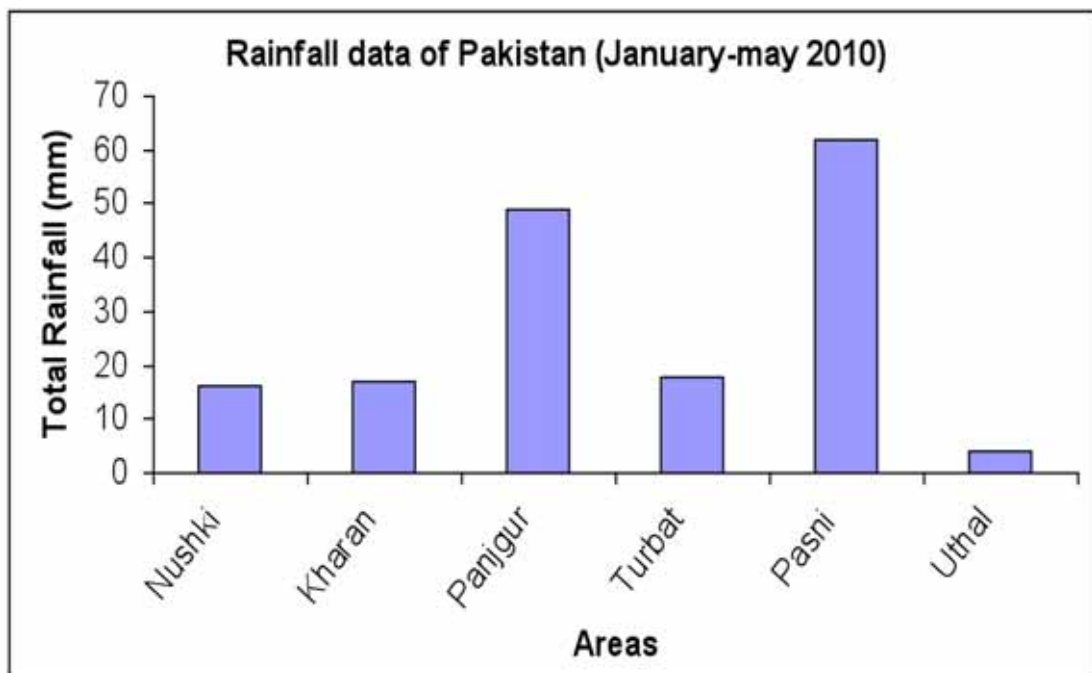
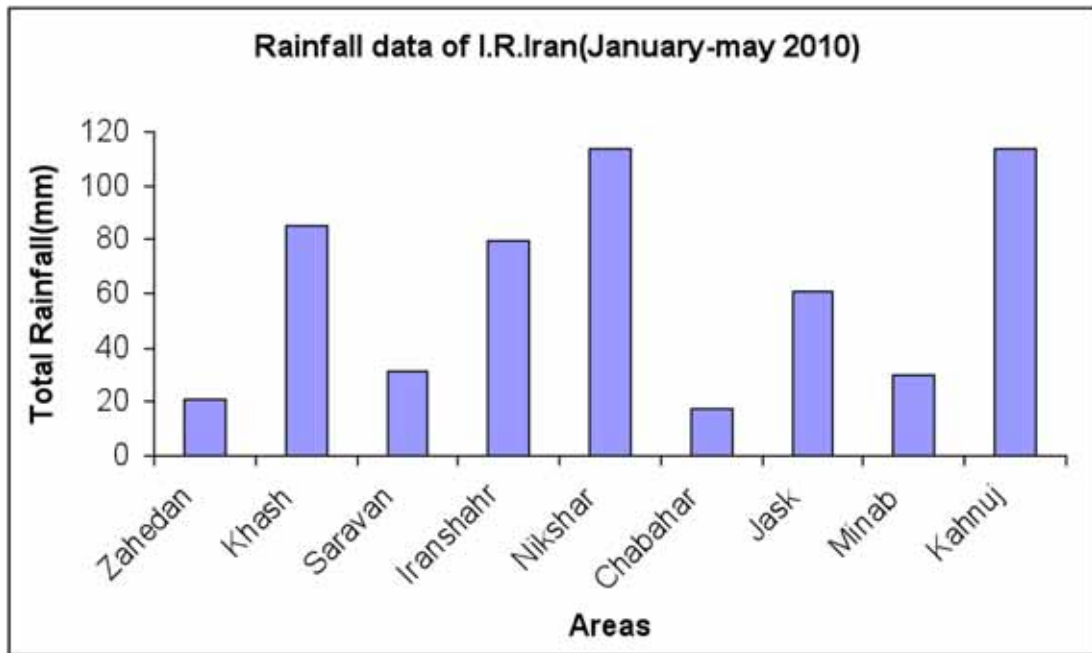
SURVEY STOP	71	72	73	74	75
date	29/04/2010	29/04/2010	29/04/2010	30/04/2010	30/04/2010
time	11:00	11:30	12:00	08:15	08:55
name	Koli chah	Dornaz khaton	Chah sardar	Zehkalut	Pang
Latitude (N)	27°38'10.00"N	27°41'44.00"N	27°42'21.00"N	27°47'34.00"N	27°42'32.00"N
Longitude (E or W)	058°33'49.00"E	058°35'10.00"E	058°35'59.00"E	058°39'35.00"E	058°54'08.00"E
ECOLOGY					
Area of survey(ha)	250	250	250	200	200
Habitat(wadi,plains,dunes,crops)	Plains	Plains	Plains	Plains	Plains
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Moderate	Moderate	Moderate	Low	Low
Vegetation(dry,drying,green,greening)	Green	Drying	Drying	Drying	Drying
Vegetation density(LMD)	Medium	Medium	Medium	Medium	Medium
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
ADULTS					
maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

SURVEY STOP	76	77	78	79	80
date	30/04/2010	30/04/2010	30/04/2010	30/04/2010	30/04/2010
time	09:30	09:55	10:45	11:15	12:00
name	Chah alvand	Kondar	Chah mohammad	Sangan	Sardegal
Latitude (N)	27°32'28.00"N	27°31'27.00"N	27°25'19.00"N	27°20'53.00"N	27°13'26.00"N
Longitude (E or W)	059°18'34.00"E	059°18'27.00"E	059°51'03.00"E	060°10'27.00"E	060°20'57.00"E
ECOLOGY					
Area of survey(ha)	250	200	200	200	200
Habitat(wadi,plains,dunes,crops)	Plains	Dunes	Plains	Plains	Dunes
Date of last rain	27/02/2010	27/02/2010	27/02/2010	27/02/2010	27/02/2010
Rain estimate (LMH)	Low	Low	Low	Low	Low
Vegetation(dry,drying,green,greening)	Dry	Drying	Drying	Dry	Green
Vegetation density(LMD)	Medium	Medium	Medium	Medium	Low
Soil moisture(wet,dry)	Dry	Dry	Dry	Dry	Dry
LOCUST					
Present or Absent	A	A	A	A	A
Area infested (ha)					
HOPPERS					
Hopper stage (H123456F)					
Appearance (STG)					
Behaviour (ISG)					
Hopper density (/site or /m2)					
BANDS					
Band stage (H12345F)					
Band density (/m2 or LMH)					
Band density (/m2 or LMH)					
number of bands					
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maturity (Immature, Mature)					
appearance (STG)					
behaviour (ISG)					
Adult density (/transect or /ha)					
Breeding (Copulating, Laying)					
SWARMS					
Maturity (Immature, Mature)					
Swarm density (/m2 or LMH)					
Swarm size (km2 or ha)					
Number of swarms					
Breeding (Copulating, Laying)					
SwarmFlyingDirection					
SwarmFlyingTimePassing					
SwarmFlyingHeight					
CONTROL					
PesticideName					
Application rate (l/ha or kg/ha)					
Quantity					
AreaTreated					
ControlType					
Estimated % kill					
Comments					

Appendix 5. Rainfall data

Monthly rainfall station totals in mm (January – May 2010)

	JAN	FEB	MAR	APR	MAY	TOTAL
Pakistan						
Nushki	12		04			16
Kharan	02	15				17
Panjgur	07	42				49
Pasni		62				62
Turbat		18				18
Uthal		04				04
I.R. Iran						
Zahedan		20.7				20.7
Khash	03	64.5				85.2
Saravan	03.3	27.8				31.1
Iranshahr	03.7	75.9				79.6
Chabahar	9.6	08				17.6
Nikshahr	21.4	92.6				114
Jask		60.6				60.6
Minab	9.8	20.2				30
Kahnoj	2.9	110.6				113.5



Appendix 6. Photos



Soil moisture is dry in Iranshahr, I.R. Iran



Green vegetation in Jaz Murian (Kahnuj), I.R. Iran



Dry terrain near Basima, Pakistan



Potential habitat in Prome Valley (Panjgur, Pakistan)



Sandy dunes in Gholge Chahhashem, I.R. Iran



Lunch break from Panjgur to Turbat, Pakistan



Dry conditions near Pasni, Pakistan



Dry area near Soran, I.R. Iran



Sand dunes along Ormara to Uthal route, Pakistan



Vehicle repair from Uthal to Quetta, Pakistan



Vashnum Plains near Chabahar, I.R. Iran



Checking for locust hoppers, I.R. Iran



Completing the survey form, I.R. Iran

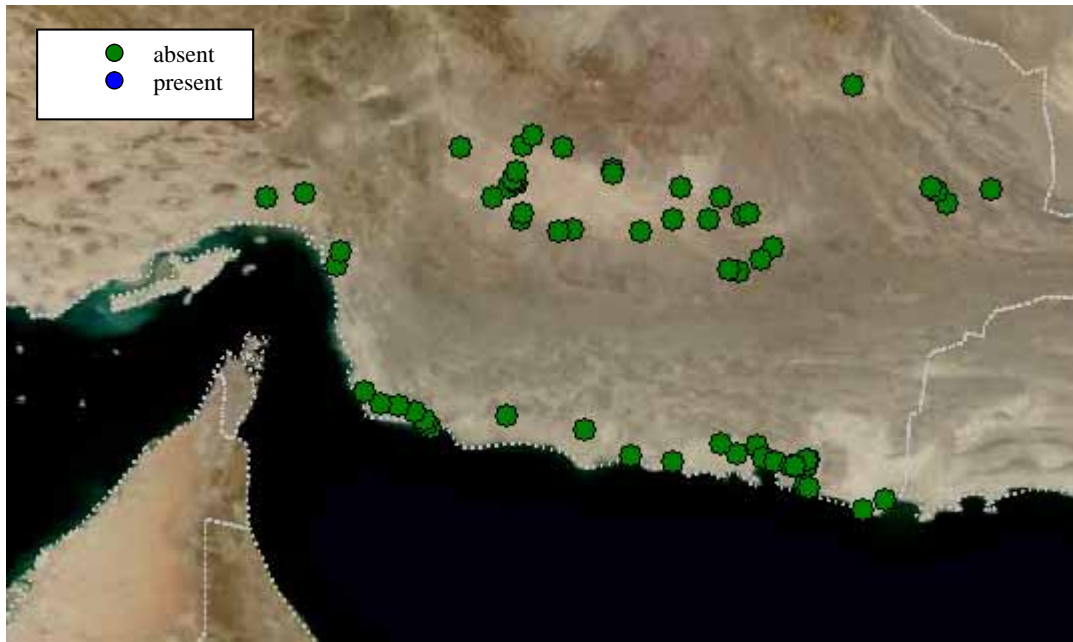


Foot transect survey, I.R. Iran

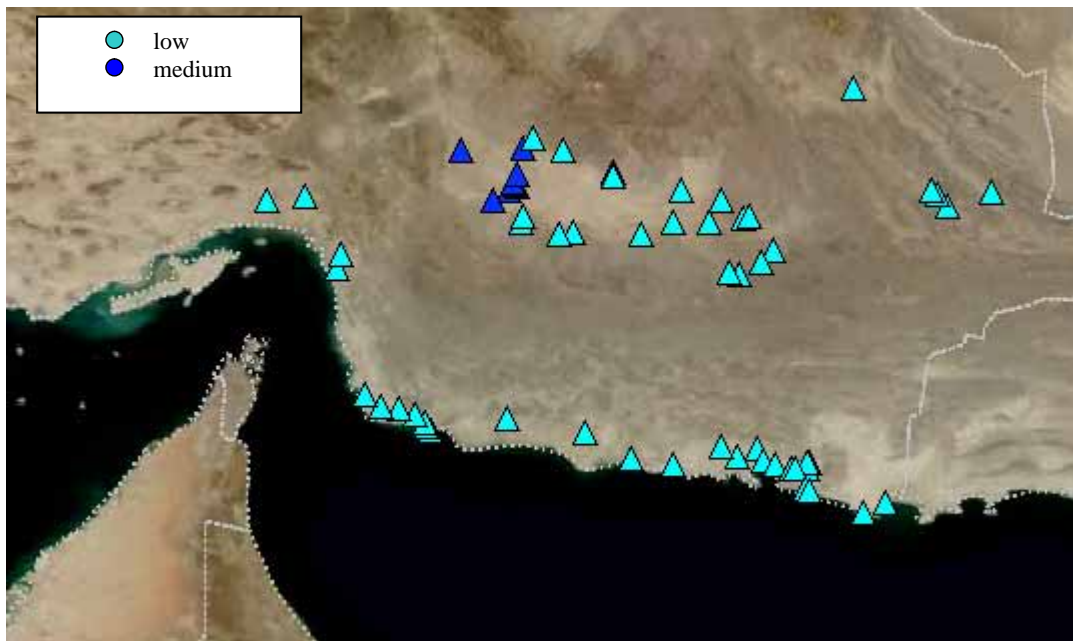


2010 Joint Survey team. *Standing left to right* Gholam Nabi (Asst., Pakistan), Abdul Sattar (Locust Officer, Pakistan), Mansour Pour Eslami (Asst., I.R. Iran), Ali Babali (Team Leader, I.R. Iran), Azam Khan (Team Leader, Pakistan), Noraldin Mirlashari (Locust Officer, I.R. Iran); *Standing left to right* Sadegh Molaei (Driver, I.R. Iran), Mehdi Ali Yazdi (Driver, I.R. Iran), Soali Chakeri (Driver, I.R. Iran), Mansour Omidi (Driver, I.R. Iran)

Appendix 7. Survey maps



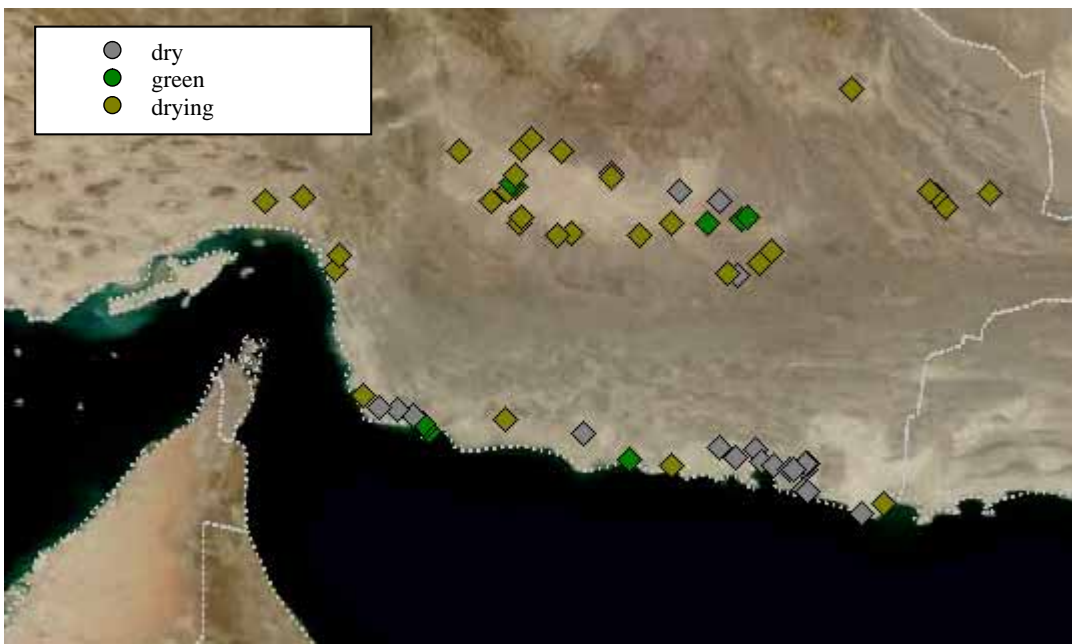
Desert Locust presence



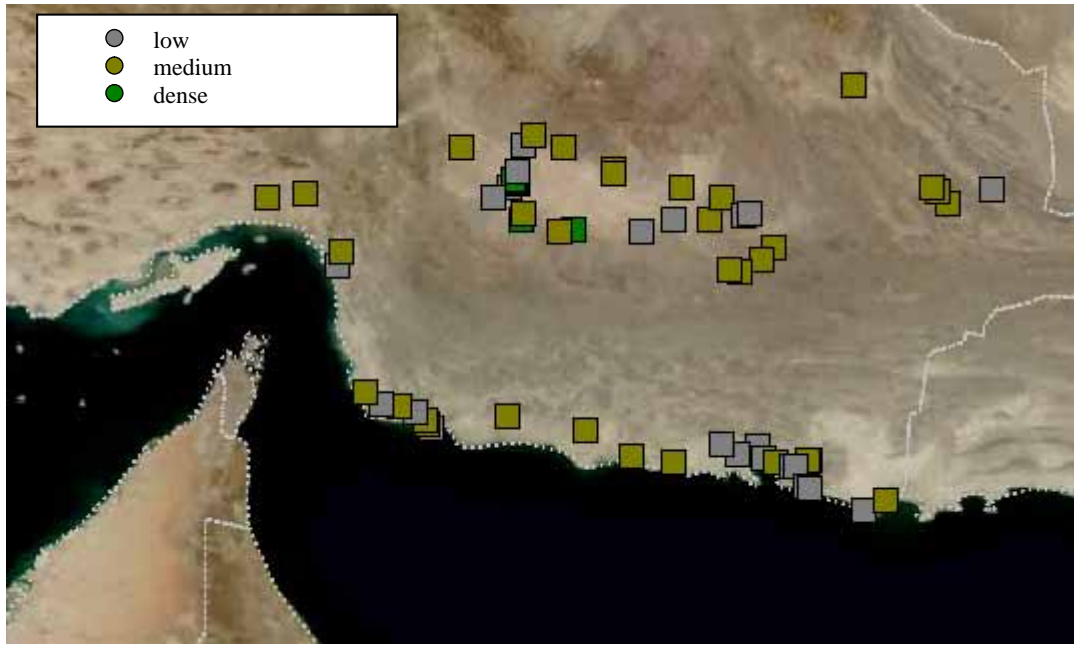
Rainfall



Soil conditions



Vegetation conditions



Vegetation density

Appendix 8. Suggested itinerary for 2011 Joint Survey

DAY	DATE	ROUTE	[NIGHT HALT]
1	01/04/2011	I.R. Iran team cross into Pakistan at Mirjaveh	[Taftan]
2	02/04/2011	Taftan, Dalbadin, Chagi Hills, Nushki	[Nushki]
3	03/04/2011	Nushki, Kharan, Kharan area (Naroo)	[Kharan]
4	04/04/2011	Kharan area (Shamsi)	[Kharan]
5	05/04/2011	Kharan area (Ormage and Borko areas)	[Kharan]
6	06/04/2011	Kharan, Basima, Nag, Panjgur	[Panjgur]
7	07/04/2011	Panjgur, Prome, Panjgur	[Panjgur]
8	08/04/2011	Panjgur, Hoshab, Turbat	[Turbat]
9	09/04/2011	Turbat, Solaika, Turbat	[Turbat]
10	10/04/2011	Turbat, Suntsar, Jiwani	[Jiwani]
11	11/04/2011	Jiwani, Gwadar	[Gwadar]
12	12/04/2011	Gwadar, Kulanch, Pasni	[Pasni]
13	13/04/2011	Pasni area	[Pasni]
14	14/04/2011	Pasni, Ormara, Uthal	[Uthal]
15	15/04/2011	Uthal, Quetta	[Quetta]
16	16/04/2011	Report day, <i>prepare 1st half joint survey results</i>	[Quetta]
17	17/04/2011	Quetta, Nushki, Taftan	[Taftan]
1	18/04/2011	Pakistan team cross border point Taftan/Mirjaveh	[Zahedan]
2	19/04/2011	Zahedan, Khash, Gosht, Saravan	[Saravan]
3	20/04/2011	Saravan, Souran, Zaboli, Iranshahr	[Iranshahr]
4	21/04/2011	Iranshahr, Jolgeh Chah Hashem, Iranshahr	[Iranshahr]
5	22/04/2011	Iranshahr, Espaken, Nikshahar, Chahbahar	[Chahbahar]
6	23/04/2011	Chahbahar, Beris, Sham, Govater, hahbahar	[Chahbahar]
7	24/04/2011	Chahbahar, Vashnam, Dashtiari, Negur, Chahbahar	[Chahbahar]
8	25/04/2011	Chahbahar, Zarabad, Jask, Jask area	[Jask]
9	26/04/2011	Jask, Minab, Bandar Abbas	[B. Abbas]
10	27/04/2011	Report day, <i>prepare 2nd half joint survey results</i>	[B. Abbas]
11	28/04/2011	B. Abbas, Manujan, Ghale Ganj, Sowlan, Kahnuj	[Kahnuj]
12	29/04/2011	East Jaz Murian, Kahnuj	[Kahnuj]
13	30/04/2011	Zeh Kalout, Dalgan, Bampour, Sardegal, Iranshahr	[Iranshahr]
14	01/05/2011	Iranshahr, Zahedan, <i>sent 2nd half results</i>	[Zahedan]
15	02/05/2011	<i>Locust Heads / JS team meeting, prepare JS report</i>	[Zahedan]
16	03/05/2011	<i>Locust Heads / JS team meeting, prepare JS report</i>	[Zahedan]
17	04/05/2011	Zahedan, Mirjaveh, <i>Pakistani Team cross the border</i>	