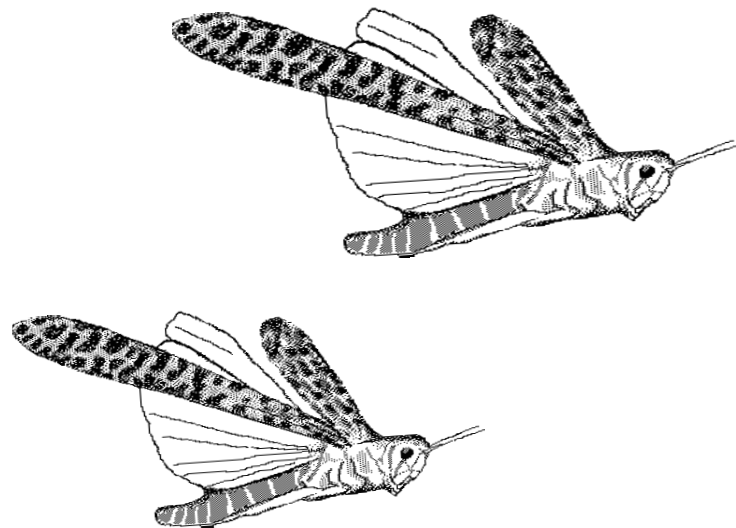


# Desert Locust Joint Survey in the Spring Breeding Areas of the I.R. Iran and Pakistan

April - May 2000



FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS

Rome, 2000



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

**April - May 2000**

**by**

**Zafar Ali Khan  
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**FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS**

**Rome, July 2000**

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## RECOMMENDATIONS

It is recommended by the participants that the Department of Plant Protection Organization of I.R. Iran at the Federal level should be strengthened by providing communication system equipment to the field staff and locust officers should be responsible directly to their Headquarters in Tehran.

Training at the regional level should be organized by FAO for the staff of Plant Protection to cope with any locust emergency and to become familiar with locust survey methods and use of GPS and other equipment.

Regular survey of the winter/spring breeding areas should be started in both countries from 1 February to 30 June each year to check for locust breeding and associated movement from the Persian Gulf.

Border meetings during the survey period between locust officers of both Pakistan and I.R. Iran should be arranged on the 7<sup>th</sup> of each month at Mand/Pishin to exchange locust information.

Keeping in view of the experience during the past two years, it is suggested that the Plant Protection Organization of I.R. Iran should complete their official formalities soon after receiving the letter from FAO because each year the Pakistani delegation has to stay over an extra 2-3 days in Zahidan which disrupts the entire locust survey schedule.

The locust officers of the respective areas should be informed about the movement of the Joint Locust Survey Team and they must receive the team at the border of their territories to brief the team about the locust activity in their respective areas and accompanied them during the survey of this area.

It is recommended that the Joint Locust Survey should be continued for the next year, 2001, to become familiar with the locust situation, topography of the area and any expected movement of locusts in the winter/spring breeding areas of both countries. It is also helpful in the assessment for eventual summer breeding in Pakistan and India and associated planning.

It has been recommended by the Iranian participants that whenever locust control operations occur in Pakistan, the officials of Plant Protection Organization of I.R. Iran may be invited for practical training in locust control which should be sponsored by the FAO.

It is recommended that the Joint Locust Survey of Iran and Pakistan be started from the 1<sup>st</sup> April next year as it was done in the previous years.

## **ACKNOWLEDGEMENTS**

The participants of both countries are grateful to the Food and Agriculture Organization (FAO) Headquarters for financial assistance and support and to the FAO Representatives in I.R. Iran and Pakistan for finalizing the survey programme and the related arrangements. We are thankful to the Director General Plant Protection Organization, Government of I.R. Iran and Director General, Department of Plant Protection, Government of Pakistan for providing necessary transport, accommodation and other facilities. The help and cooperation of the staff of Plant Protection Organization, Sistan-Balochistan, Hormozgan and Jiroft of I.R. Iran and of the Department of Plant Protection in Balochistan province of Pakistan is sincerely acknowledged. Last, but not the least, we appreciate the favour extended by Keith Cressman, Locust Forecasting Officer, FAO, Rome for editing the draft report and finalizing its subsequent publication.

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

**April - May 2000**

## **INTRODUCTION**

This was the sixth in a series of annual joint Desert Locust surveys that started in 1995. The main objective was to survey the potential breeding areas of Desert Locust in I.R. Iran and Pakistan that are known to threaten adjoining areas in the South West Asia and the Arabian Peninsula. In addition to the usual areas, the team consisting of two locust officers and one-maintenance assistant from each country also surveyed the deserts of Hormozgan and Kerman of I.R. Iran. Fourteen days of the month long survey period were in I.R. Iran and the rest were in Pakistan (see the itinerary section below). The host countries provided good transport and other facilities. About 8000 kms were traveled and necessary stops and overnight halts were made. The survey was conducted according to the schedule with some minor changes, for example, the survey team reached Khuzdar via Awaran from Turbat instead of Panjgur on 10-05-2000 and proceeded for Quetta on 11-05-2000.

The weather during the survey was hot and dry. The vegetation in the entire area was mostly thin, patchy and dry. Soil moisture, with few exceptions, was unavailable. The solitary locust population was very low, suggesting that the coming season will be calm. The survey work of such a vast area in a short time was possible through the expert advice and adequate funding from FAO and, of course, due to efforts by the two teams and the associated staff of both countries.

## **METHODOLOGY**

The FAO Desert Locust Guidelines (Survey II) were followed almost essentially. With mutual agreement, the survey route was charted and arrangements for the necessary transport, equipment, fuel and spares were made. Necessary clearances were obtained and travel arrangements were made. Overnight stops, messing and health care were given due consideration. Survey of the Iranian desert was carried out from 15-04-2000 to 26-04-2000 and of the Pakistani desert from 29-04-2000 to 10-05-2000 (see itinerary below).

Keeping in view of the prevailing conditions, assessment of solitary behaving locusts was made. This was done to detect any existing breeding sites. This was considered necessary to augment satellite analysis and weather data. The basis of assessment were observations made at the survey stops. The locust infestation density was assessed by downside (into the wind) foot transects of 200 m through vegetation. Temperature and relative humidity were recorded. The coordinates of the survey stops were determined by GPS. The survey parameters at each location included topography, locust presence, appearance, behaviour, maturity, density, and size, rain received, vegetation cover and soil moisture. Photographs of localities were also taken. Information from desert people and locust related organizations was gathered. The observations were entered onto the prescribed FAO forms and later e-mailed to the FAO Headquarters, Rome.



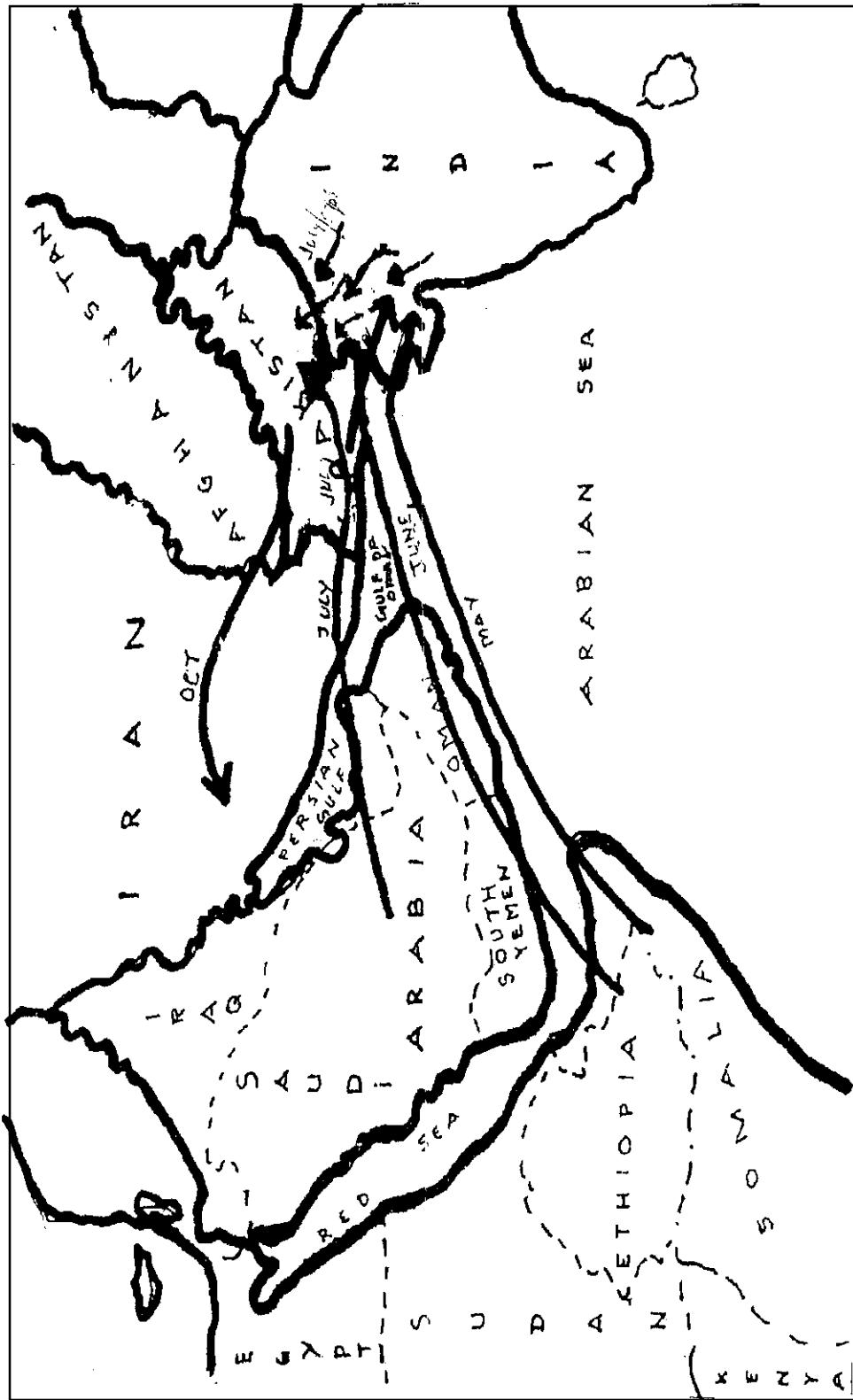
## RESULTS

The weather was fair and hot in both the countries during the survey. The entire area had received no rain during the survey period with the exception of Prome and Grasha, both in Pakistan. The soil moisture at all the survey stops was mostly dry and unavailable for locusts. The wind was usually southerly. The weather conditions had a negative effect on vegetation which was usually thin and dry. The prolonged severe drought has also resulted in the death of livestock. Medium rainfall along with a hailstorm was observed during the survey in the Grasha area (2740N/6601E) at 20:00 hrs. on 10.05.2000. The plants encountered in the desert areas included species of *Artemesia*, *Cynodon*, *Calligonum*, *Hamada*, *Heliotropium*, *Indigofera*, *Lycium*, *Panicum*, *Pennisetum*, *Tamarix*, etc.

Desert Locust activity in the desert areas was insignificant and the situation was totally calm. The habitat was, on an overall basis, unfavorable for locust breeding. The coming season is likely to be safe and no significant activity is likely to occur.

Experience suggests that Desert Locust adults use seasonal rivers and streams where ample vegetation and soil moisture are available for migration into the interior and inaccessible desert areas such as Jaz Murian, Saravan and Sardegol in I.R. Iran and Naro, Borko and Awaran in Pakistan. The latter are on the way towards the summer breeding areas along the Indo-Pakistan border. Adults, and more often swarms, lay eggs in these areas where locust numbers can increase and gregarization can occur with eventual migration towards the summer breeding areas.

# DESERT LOCUST MIGRATION ROUTES



## OBSERVATIONS OF FLORA, FAUNA AND TOPOGRAPHY DURING THE SURVEY

### I.R. IRAN

#### **Zahidan – Saravan**

The entire area consists of vast bared rocky hills. The soil is sandy clay. The vegetation was semi-green to dry between Zahidan and Saravan. The dominant perennial plants observed in that area were mainly *Sorghum sp.* and *Tamarix sp.* which were semi-green in low lying areas while dry in other places. The annual vegetation was found to have dried out throughout the areas.

#### **Saravan – Suran – Zaboli – Iranshehr**

The area is covered with sandy and rocky soil but consists of small dunes in some places. The major perennial vegetation was *Sorghum sp.* *Heliotropium sp.* and annual vegetation had dried out.

#### **Iranshehr – Chabahar**

This area is mainly mountainous, primarily of high elevation sandy and rocky plains that extend to clay soils. The major plants among perennials were *Sorghum sp.* *Acacia sp.* *Phoenix dactylifera*, *Phoenix sylvestris*, etc.

#### **Chabahar – Gawater – Dashtiari**

The coastal plains are mountainous broken by rocky plains and sandy soils mainly close to the sea while sandy clay soil in the interior areas. Vegetation consisted of perennials such as *Acacia sp.*, *Sorghum sp.* Saltbrush was also available in these areas.

#### **Chabahar – Vashnam**

The areas are mainly plains with small dunes. The vegetation in the entire area had completely dried out due to prevailing drought conditions. Among the annual vegetation, the major plants *Indigofera cordifolia* and *Mimosa pudica* were abundant.

#### **Chabahar – Zarabad – Jask**

The areas are mainly plains covered with sandy clay soil and dunes. Major perennial plants were *Tamarix sp.* and *Sorghum sp.* Annual vegetation was available but were not identified. Drought conditions were observed in the Jask area.

#### **Jask – Minab - Bandar Abbas**

The areas are mainly plains with dunes in Sirik where rocky sandy soil prevails in most places. Vegetation in several riversides was observed, mainly *Acacia sp.* which was mostly green while dry conditions prevailed in upland areas which were nearly devoid of vegetation. The area consists of mainly cultivated land.

#### **Bandar Abbas – Kehnuj**

The area is mountainous, covered with mainly rocky sandy soil. No rainfall was reported. Dry conditions prevailed. Cultivation in some areas was observed.

#### **Kehnuj – Solan – Kehnuj**

The entire area was of plains covered with sandy clay soil. Some dunes were observed in Solan. Perennial vegetation such as *Acacia sp.* and *Sorghum sp.* were the major plants available in those areas.

### **Kehnuj – Jiroft – Bam - Dalgan – Iranshehr**

There was chain of mountains between Jiroft, Bam and Bazman. In Dalgan, the area consists of plains with heavy dunes and a cultivated belt where surveys were undertaken. Some local species of grasshoppers were observed but no locusts were seen. The Jaz Murian Basin has many places which are well known for being potential breeding areas but consists of a major area which is non approachable, composed of sand covered hills, salty plains and dunes.

### **Iranshehr – Espakeh – Iranshehr**

The areas mainly consists of desert but some spots of clay soil are also present. The dominant plant observed in the area was *Tamarix sp.* Besides this, no other plants were observed during survey.

### **Iranshahr – Bampur – Zahidan**

Major desert areas were observed in Shamsabad and Sardegol areas near Bampur. Vegetation was mostly drying.

## **PAKISTAN**

### **Taftan – Dalbandin – Nushki**

The entire area consists of vast rocky and sandy plains which extends from Taftan to Nushki. The vegetation was found to be drying. The major plants observed in the areas were *Tamarix sp.*, *Sorghum sp.* and *Panicum turgidum*. During the survey, no locusts were observed in this area but insignificant numbers of local grasshoppers were seen in the Dalbandin area.

### **Nushki – Kharan**

The area consists mainly of hilly places with some spots having dunes. Cultivation was observed at different places. During the survey, a few Tree Locusts were observed. Some grasshoppers were also observed. No Desert Locust was seen. The vegetation was green and dense in some low-lying areas but found drying outside of these. The major plants were *Acacia sp.*, *Sorghum sp.* and *Tamarix sp.*

### **Kharan – Naro – Borko – Kharan**

The area contains loose heavy dunes surrounded by rocky hills. There are chains of mountains surrounding large plains with sandy soil at places covered with a thick layer of sand which sometimes forms small dunes. This may provide breeding places for locusts. The prolonged drought prevailing in these areas have damaged the vegetation. *Tamarix sp.* happens to be the major species here.

### **Kharan – Basima – Nag – Panjgur**

The topography of the entire area between Kharan and Basima is hilly with some spots covered with sand. Rocky soil was present between Basima and Nag areas. *Tamarix sp.* is the dominant perennial in these places.

### **Pangur – Parome – Panjgur**

The area is mainly hilly near Panjgur while plain covered with sandy clay soil in Parome. The latter area received moderate to heavy rains on 21.04.2000 and, as a result, the vegetation was turning green. The major plants observed were *Tamarix sp.* and *Sorghum sp.* Although the concentration of weeds appeared to be dense but no locusts were observed.

### **Panjgur – Turbat**

The entire area is mostly comprised of chains of rocky mountains which consists of 8 hills. In between the mountains, there are some valleys and plains where the vegetation was found to be green. However in upland areas, the vegetation had started to dry out. The major plant species were *Tamarix sp.*, *Prosopis cincenia*, *Cynodon dactylon*, *Heliotropium sp.* and some date palm trees.

### **Turbat – Sulaika – Turbat**

The area contains plains with dunes and there are some spots which are well known for being potential breeding sites where extensive locust control work was done a few years ago. The vegetation was mainly *Acacia sp.* and *Prosopis sp.* Due to high temperatures, the vegetation was drying.

### **Turbat – Pasni**

The areas between Turbat to Pasni mainly constitute a chain of barren mountains. The stream running in between the mountains was found to be covered with a thick layer of sand where annual and perennial shrubs were present.

### **Pasni – Kalamat – Pasni**

The area consists of heavy clay hills and dunes along with a coastal belt. The vegetation was semi green near the coastal area and was mainly *Tamarix sp.*, *Heliotropium sp.*

### **Pasni – Kulanch – Gawadar**

In the main part of the coastal and sub-coastal plains of Pasni and Gawadar, the vegetation was green. However on the sub-coastal plains south of Suntsar, i.e. Gabd – Kalatuk, the vegetation had dried out due to the prolonged drought. The major plants observed in the coastal plains were *Tamarix sp.*, *Panicum turgidum* and some species of saltbrush and *Sorghum*.

### **Gawadar – Shooli – Turbat**

These are the coastal plains which are well known for epidemic of locust populations. The Shooli area is a well-known potential breeding area of locust in Pakistan. The vegetation was found drying due to prolonged draught conditions prevailing over the entire breeding area. As a result of which both annual and perennial plants were devastated.

### **Turbat – Awaran – Khuzdar**

The entire area consists of rocky sandy valleys with small dunes and river streams. Drought is prevailing because the area received only light rainfall on 05.05.2000 in some parts. The vegetation near Awaran was semi green. Plants prevailing in the area were *Tamarix sp.*, *Sorghum sp.*, *Panicum turgidum*, *Penisistum divisum*, *Colligonum commosum*.

### **Khuzdar – Quetta**

The areas contain mountains, valleys and plains. There are cultivations of wheat, vegetables and date palm trees. No locusts were reported. Since the past several decades it remains the transient route of locust swarms from the spring breeding areas of Balochistan to the summer breeding areas along the Indo-Pakistan border.

**ITINERARY FOR IRAN/PAKISTAN JOINT LOCUST SURVEY 2000 PROPOSED BY FAO**

<b>Days</b>	<b>Date</b>	<b>Route (Night Halt)</b>
1	15-Apr-2000	Pakistan team cross into Iran at Mirjaveh (Saravan).
2	16-Apr-2000	Saravan Zaboli - Iranshahr (Iranshehr)
3	17-Apr-2000	Iranshahr Chabahar (Chabahar)
4	18-Apr-2000	Chabahar Gwater - Dashtiari (Chabahar)
5	19-Apr-2000	Chabahar Vashnam (Chabahar)
6	20-Apr-2000	Chabahar Zarabad (Zarabad)
7	21-Apr-2000	Zarabad Jask (Jask)
8	22-Apr-2000	Jask Kahnuj (Kahnuj)
9	23-Apr-2000	Kahnuj Solan - Kahnuj (Kahnuj)
10	24-Apr-2000	Kahnuj Dalgan (Dalgan)
11	25-Apr-2000	Dalgan Espakeh - Iranshehr (Iranshehr)
12	26-Apr-2000	Bampur area (Iranshehr)
13	27-Apr-2000	Iranshehr Zahidan (Zahidan)
1	28-Apr-2000	Cross into Pakistan at Mirjaveh (Dalbandin)
2	29-Apr-2000	Dalbandin Nushki (Nushki)
3	30-Apr-2000	Nushki Kharan (Kharan)
4	01-May-2000	Kharan Borko and Naroo area (Kharan)
5	02-May-2000	Kharan Panjgur (Panjgur)
6	03-May-2000	Panjgur Parome area (Panjgur)
7	04-May-2000	Panjgur Turbat (Turbat)
8	05-May-2000	Turbat Sulaika area (Turbat)
9	06-May-2000	Turbat Pasni (Pasni)
10	07-May-2000	Pasni area (Pasni)
11	08-May-2000	Pasni Gwadar (Gwadar)
12	09-May-2000	Gwadar Turbat via Suntsar (Turbat)
13	10-May-2000	Turbat Panjgur (Panjgur)
14	11-May-2000	Panjgur Quetta (Quetta)
15	12-May-2000	Halt Quetta (Quetta)
16	13-May-2000	Quetta Dalbandin (Dalbandin)
17	14-May-2000	Dalbandin Taftan (Taftan)
18	15-May-2000	Iran Team crosses into Iran at Taftan

**ITINERARY (ACTUAL DURING THE SURVEY)**

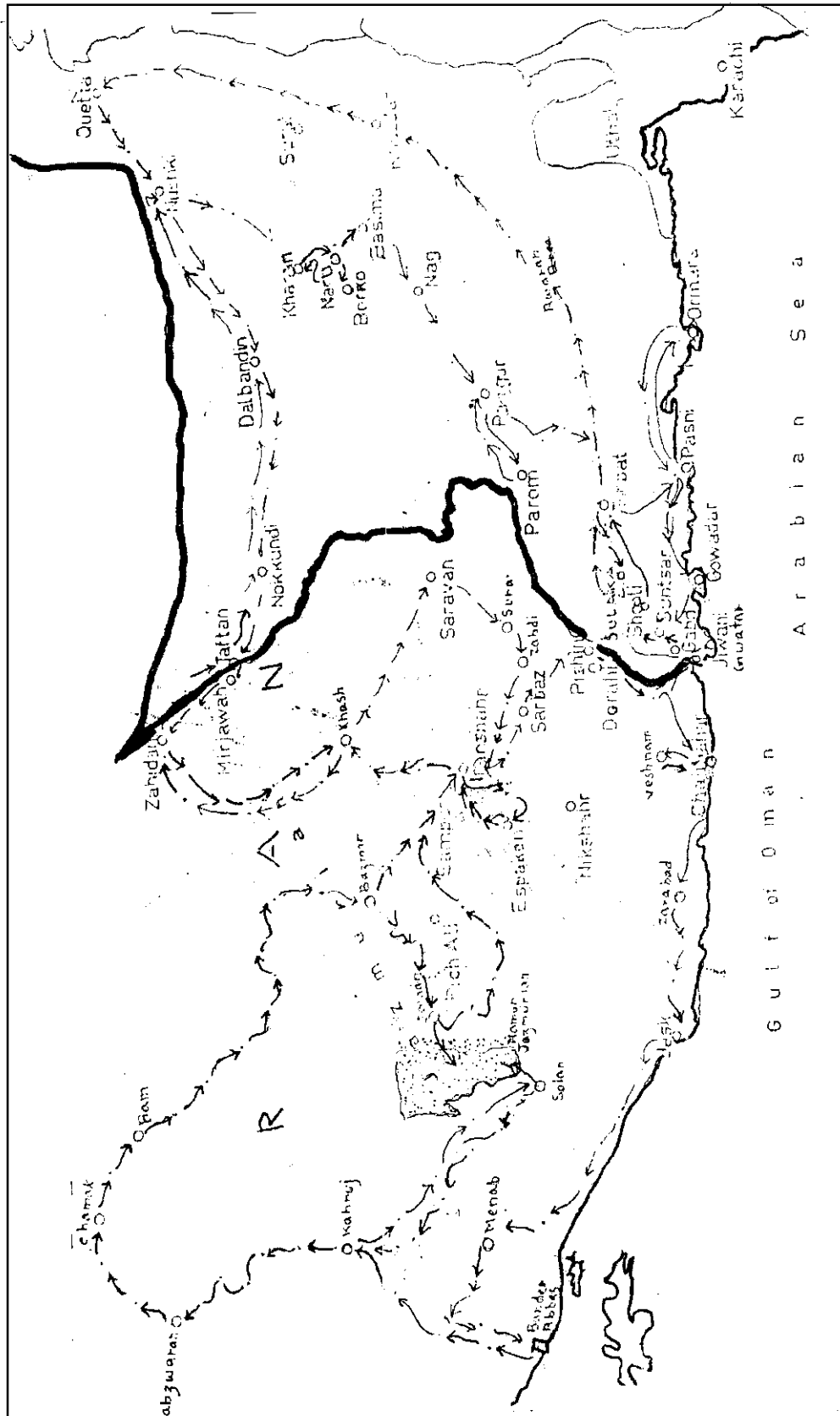
**ISLAMIC REPUBLIC OF IRAN**

Date	Place		KM
	From	To	
15-04-2000	Pakistani team cross the border into Iran		
15-04-2000	Mirjaveh	Zahidan - Saraven	430
16-04-2000	Saravan	Suran-Zaboli-Iranshehr	250
17-04-2000	Iranshehr	Pishin-Chabahar	350
18-04-2000	Chabahar	Gwater - Chabahar	240
19-04-2000	Chabahar	Vashnam - Chabahar	120
20-04-2000	Chabahar	Zarabad - Jask	305
21-04-2000	Jask	Minab-Bandar Abbas	405
22-04-2000	Bandar Abbas	Kehnuj	200
23-04-2000	Kehnuj	Solan-Kehnuj	200
23-04-2000	Kehnuj	Jiroft-Bam	400
24-04-2000	Bam	Bazman-Dalgan-Iranshehr	550
25-04-2000	Iranshehr	Ispakeh - Iranshehr	220
26-04-2000	Iranshehr	Khash - Zahidan	330
27-04-2000	Zahidan	Halt	
28-04-2000	Zahidan	Mirjaveh	100
29-04-2000	Joint Survey team cross the Border in to Pakistan		
		<b>Total</b>	<b>4100</b>

**ISLAMIC REPUBLIC OF PAKISTAN**

Date	Place		KM
	From	To	
29-04-2000	Taftan	Dalbadin - Nushki	553
30-04-2000	Nushki	Patkin - Kharan	152
01-05-2000	Kharan	Naro - Kharan	147
02-05-2000	Kharan	Basima-Nag.Panjgur	357
03-05-2000	Panjgur	Prome - Panjgur	196
04-05-2000	Panjgur	Khosab - Turbat	341
05-05-2000	Turbat	Sulaika - Turbat	103
06-05-2000	Turbat	Pasni	170
07-05-2000	Pasni. Kalamat	Rumra - Pasni	140
08-05-2000	Pasni	Kulanch - Gawadar	258
09-05-2000	Gwadar	Sunstar - Turbat	272
10-05-2000	Turbat	Awaran - Khuzdar	525
11-05-2000	Khuzdar	Quetta	329
12-05-2000	Quetta Halt		
13-05-2000	Quetta Halt		
14-05-2000	Quetta to Taftan		651
15-05-2000	Iranian team crass the Border		
		<b>Total</b>	<b>4194</b>
<b>Total Kilometers</b>			<b>8294</b>

# JOINT LOCUST SURVEY OF IRAN AND PAKISTAN 2000





**METEOROLOGICAL OBSERVATIONS DURING THE JOINT SURVEY IN I.R. IRAN**

Date	Time	Locality	Coordinates	Temp °C	R/H%	Wind	
						(from)	(to)
16.04.2000	13:25	Khoshab Hut	2709N-6148E	40	27	SW	NE
16.04.2000	16:00	Qadirabad	2708N-6134E	37	28	S	N
18.04.2000	8:30	Ramine	2516N-6046E	28	54	SE	NW
18.04.2000	9:00	Leapar	2516N-6048E	29	54	SE	NW
18.04.2000	9:30	Shamm	2512N-6106E	29	64	SE	NW
18.04.2000	10:05	Bariss Dusht	2510N-6108E	31	63	SE	NW
18.04.2000	11:15	Gwater	2509N-6130E	32	55	S	N
18.04.2000	12:00	Briss	2506N-6116E	35	56	SE	NW
18.04.2000	12:20	Dusht	2511N-6106E	36	58	SE	NW
19.04.2000	9:30	Veshnam I	2523N-6045E	30	67	SE	NW
19.04.2000	10:00	Veshnam II	2524N-6046E	33	56	SE	NW
19.04.2000	10:30	Veshnam III	2523N-6047E	32	51	SE	NW
19.04.2000	11:10	Brigdar	2526N-6042E	38	50	SE	NW
20.04.2000	7:25	Kahir	2535N-6006E	29	80	SE	NW
20.04.2000	7:40	Rodar	2534N-6003E	30	71	SE	NW
20.04.2000	8:15	Bir	2527N-5948E	31	67	SE	NW
20.04.2000	8:45	Bandini	2528N-5935E	33	62	SE	NW
20.04.2000	9:00	Pushti	2530N-5927E	33	49	SE	NW
21.04.2000	11:00	Sadiga	2539N-5852E	37	48	SE	NW
21.04.2000	11:30	Sidig	2541N-5842E	34	47	E	W
21.04.2000	11:45	Kaki	2532N-5925E	38	52	S	N
21.04.2000	12:00	95 km before Jask	2544N-5840E	38	43	E	W
21.04.2000	12:30	Yekdar	2542N-5800E	33	40	E	W
21.04.2000	12:45	Jask	2540N-5747E	36	50	E	W
21.04.2000	14:50	Jask	2543N-5748E	36	42	E	W
21.04.2000	15:15	Mishi	2550N-5738E	38	41	SE	NW
21.04.2000	16:35	Sirik	2642N-5704E	35	61	S	N
22.04.2000	18:00	Jaghin	2728N-5716E	38	41	SW	NE
22.04.2000	18:15	Saras	2731N-5732E	36	37	W	E
22.04.2000	19:15	Bargah	2739N-5739E	33	37	W	E
23.04.2000	11:15	Chahlock	2725N-5756E	42	35	W	E
23.04.2000	11:45	Chah Reza	2721N-5806E	42	34	W	E
23.04.2000	13:00	Karkon	2710N-5831E	44	32	NE	SW
23.04.2000	13:35	Solan	2711N-5834E	46	31	NE	SW
24.04.2000	12:00	Chah Alvand I	2733N-5918E	42	34	W	E
24.04.2000	12:25	Chah Alvand II	2732N-5918E	44	28	W	E
24.04.2000	12:45	Chah Muhammad	2734N-5919E	45	30	E	W
24.04.2000	13:10	Gul Moorti	2730N-5928E	43	30	W	E
24.04.2000	16:20	Shamsabad	2714N-6021E	43	29	W	E
24.04.2000	17:10	Sardegal	2714N-6024E	42	29	W	E
25.04.2000	9:40	Chah Draz	2708N-6007E	37	35	W	E
25.04.2000	9:55	Espakeh I	2707N-6002E	39	35	W	E
25.04.2000	10:15	Espakeh II	2704N-6003E	39	35	SW	NE
25.04.2000	10:30	Espakeh II	2658N-6008E	40	35	SW	NE

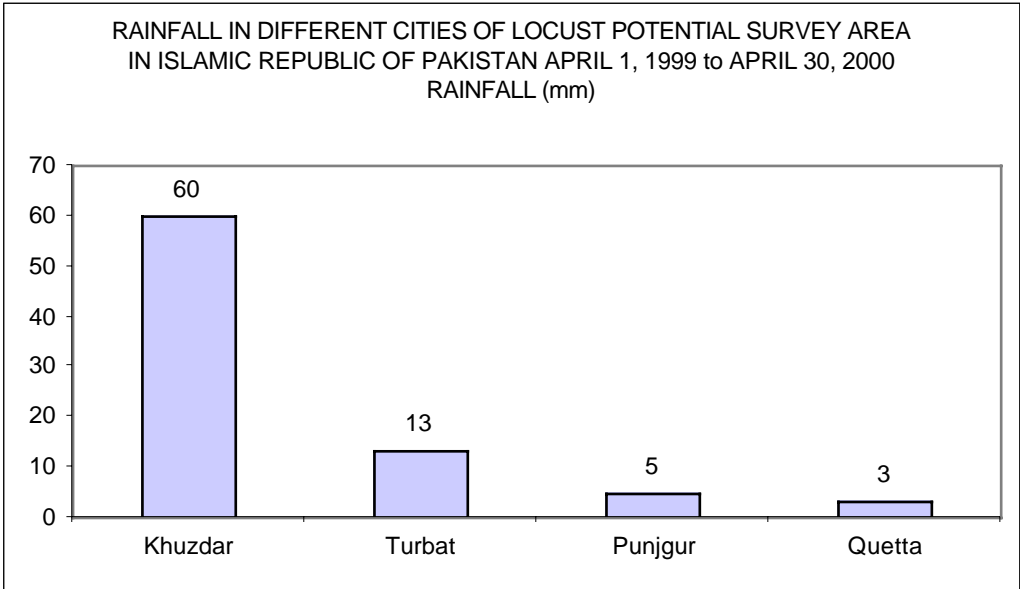
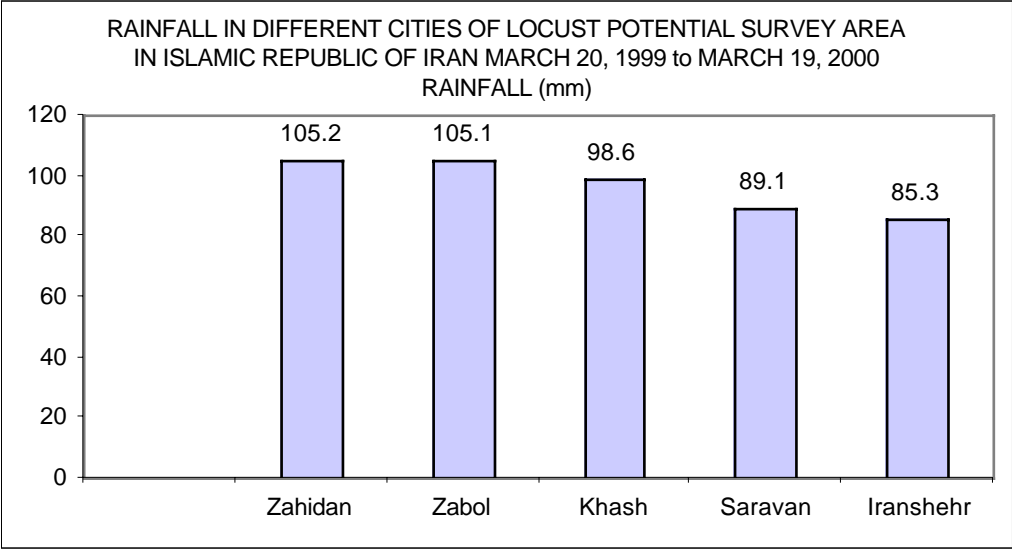
**METEOROLOGICAL OBSERVATIONS DURING THE JOINT SURVEY IN PAKISTAN**

Date	Time	Locality	Coordinates	Temp °C	R/H%	Wind (from) (to)
29.04.2000	16:30	Dhak Area I	2846N-6260E	40	32	S N
29.04.2000	16:50	Dhak Area II	2845N-6324E	39	36	S N
29.04.2000	17:25	Dhak Area III	2845N-6369E	39	36	S N
29.04.2000	17:45	Dalbadin	2853N-6424E	37	35	S N
29.04.2000	18:30	Pishak	2857N-6435E	35	34	E W
29.04.2000	19:05	Noukcha	2858N-6449E	34	34	NE SW
29.04.2000	19:20	Chhattor	2853N-6455E	33	34	E W
30.04.2000	10:30	Watto	2928N-6559E	33	39	NW SE
30.04.2000	11:00	Reco	2918N-6558E	33	34	SW NE
30.04.2000	11:45	Patken	2904N-6548E	37	35	SW NE
30.04.2000	12:15	Barshonki	2855N-6540E	37	35	SW NE
30.04.2000	19:00	Bhoporag	2834N-6519E	39	35	S N
30.04.2000	19:15	Gwashk	2834N-6518E	36	35	S N
01.05.2000	10:15	Naro I	2821N-6535E	38	37	S N
01.05.2000	10:55	Naro II	2822N-6532E	38	36	N S
01.05.2000	11:20	Phat	2823N-6530E	38	35	W E
01.05.2000	12:00	Naly	2823N-6528E	40	35	N S
01.05.2000	13:20	Garuk	2826N-6541E	42	35	N S
02.05.2000	9:45	Dali	2816N-6541E	34	38	SE NW
02.05.2000	10:30	Basima area	2807N-6545E	35	38	SE NW
02.05.2000	10:50	Kuragai	2803N-6546E	37	37	SE NW
02.05.2000	12:30	Bagh	2747N-6541E	38	36	SE NW
02.05.2000	13:00	Nag I	2724N-6510E	38	37	SE NW
02.05.2000	13:45	Nag II	2726N-6503E	38	31	SE NW
02.05.2000	17:00	Kareechi	2720N-6451E	36	38	SE NW
03.05.2000	11:00	Chackal	2653N-6359E	37	39	SW NE
03.05.2000	11:15	Bazar	2652N-6357E	38	38	SW NE
03.05.2000	11:45	Dharak Dhaph	2648N-6350E	38	38	SW NE
03.05.2000	12:45	Prome Jhain	2642N-6325E	41	36	SW NE
03.05.2000	13:15	Sirprome	2641N-6320E	41	37	SE NW
03.05.2000	13:45	Alam Baik Prome	2641N-6318E	41	37	SE NW
04.05.2000	10:30	Fateh Ali	2644N-6403E	36	40	NW SE
04.05.2000	11:00	Saidan	2638N-6354E	38	36	NW SE
05.05.2000	10:05	Kaniani Kaur	2555N-6247E	38	40	Variable
05.05.2000	10:25	Bandghah	2554N-6246E	39	41	SW NE
05.05.2000	10:40	Sulaika I	2553N-6245E	39	39	SW NE
05.05.2000	10:50	Sulaika II	2553N-6244E	39	40	SW NE
05.05.2000	11:00	Sulaika III	2553N-6243E	40	40	SW NE
05.05.2000	11:25	Sulaika IV	2552N-6244E	41	37	SW NE
05.05.2000	11:35	Waadh	2552N-6244E	41.5	36	SW NE
06.05.2000	10:15	Padarak	2551N-6313E	38	44	SE NW
06.05.2000	11:00	Garoki	2541N-6319E	39.5	43	SE NW
06.05.2000	11:20	Bhari I	2534N-6324E	40	42	SW NE
06.05.2000	11:50	Bhari II	2533N-6325E	42	37	SW NE

**METEOROLOGICAL OBSERVATIONS DURING THE JOINT SURVEY IN PAKISTAN (cont.)**

Date	Time	Locality	Coordinates	Temperature	R/H%	Wind (from) (to)
06.05.2000	12:30	Tumpgi	2526N-6325E	42	36	Variable
07.05.2000	8:55	Shadikour	2524N-6328E	33	52	SW NE
07.05.2000	9:30	Brangoli	2526N-6340E	38.5	44	SW NE
07.05.2000	9:55	Romra	2523N-6342E	34	54	SW NE
07.05.2000	10:20	Sunnadi	2523N-6344E	34.5	53	SW NE
07.05.2000	10:50	Ispiak	2524N-6346E	35	48	SW NE
07.05.2000	11:00	Sunnari	2523N-6348E	35	52	SW NE
07.05.2000	11:20	Bal	2522N-6352E	34	56	SW NE
07.05.2000	12:30	Kalmat	2521N-6352E	31	56	SW NE
08.05.2000	8:35	Pasni	2512N-6326E	30.5	70	Calm
08.05.2000	9:15	Sheezani	2521N-6314E	32.5	66	SW NE
08.05.2000	10:00	Sardasht	2526N-6311E	34.5	50	SW NE
08.05.2000	10:30	Gorach	2527N-6303E	36	48	SW NE
08.05.2000	11:15	Kalag	2527N-6255E	39	49	SW NE
08.05.2000	12:00	Wonday Nagore	2525N-6251E	38.5	45	SW NE
08.05.2000	13:00	Karwat	2517N-6236E	32	62	SW NE
09.05.2000	9:40	Garoke	2518N-6212E	31.5	80	SE NW
09.05.2000	10:30	Saijee	2526N-6202E	34	50	SE NW
09.05.2000	12:00	Shooli I	2535N-6207E	39	44	SE NW
09.05.2000	12:30	Shooli II	2535N-6208E	39	46	SE NW
09.05.2000	13:10	Chatti	2537N-6215E	39	42	SE NW
10.05.2000	11:15	Malhar	2507N-6421E	35	50	Calm
10.05.2000	14:00	Awaran	2628N-6511E	43	42	E W
10.05.2000	16:45	Nok Daira	2542N-6523E	42	40	-
10.05.2000	17:45	Bundaki	2650N-6524E	42	39	SE NW

**RAINFALL DATA FOR 1999 - 2000**



**METEOROLOGICAL DATA OF DIFFERENT CITIES IN THE SURVEY AREA: 1999-2000**

**I.R. IRAN (20 March 1999 - 19 March 2000)**

S.NO	PERIOD	CITY	Temperature °C		Rainfall (mm)
			Maximum	Minimum	
1	20.03.1999 to 19.04.1999	Zahidan	-	5	0
2		Iranshehr	40	-	0
3	20.04.1999 to 20.05.1999	Zahidan	-	12	0
4		Zabol & Iranshehr	42	-	0
5		Saravan & Khash	-	-	2.1
6	21.05.1999 to 20.05.1999	Zahidan	-	16	0
7		Iranshehr	46	-	0
8	21.06.1999 to 21.07.1999	Zahidan	-	16	13.3
9		Iranshehr	46	-	0
10		Zabol & Saravan	-	-	13.3
11	22.07.1999 to 21.08.1999	Zahidan	-	15	0
12		Iranshehr	45	-	11.6
13	22.08.1999 to 21.09.1999	Zahidan	-	3	0
14		Iranshehr	43	-	0
15	22.09.1999 to 21.10.1999	Zahidan	-	8	0
16		Iranshehr	37	-	0
17		Khash	-	-	4.7
18	22.10.1999 to 20.11.1999	Zahidan	-	-3	0
19		Iranshehr	31	-	0
20	21.11.1999 to 20.12.1999	Zahidan	-	-4	18.1
21		Chabahar	28	-	0
22		Zabool & Khash	-	-	18.1
23	21.12.1999 to 19.01.2000	Zahidan & Khash	-	-4	0
24		Chabahar	27	-	0
25	20.01.2000 to 18.02.2000	Zahidan	-	-5	73.7
26		Chabahar	28	-	0
27		Zabool & Khash	-	-	73.7
28		Saravan & Iranshehr	-	-	73.7
29	19.02.2000 to 19.03.2000	Zahidan & Khash	-	-1	0
30		Chabahar	28	-	0
31		Zahidan	-	-	0.1

**METEOROLOGICAL DATA OF DIFFERENT CITIES IN THE SURVEY AREA: 1999-2000 (cont.)**

**PAKISTAN (1 April 1999 - 30 April 2000)**

Month	City	Temperature °C		R. Humidity (%)		Rainfall (mm)
		Maximum	Minimum	Maximum	Minimum	
April, 1999	Quetta	33.7	18.3	69	43	0
		33.5	18.3	64	37	0
	Turbat	40.5	22.3	48	15	0
	Panjgur	31.2	17.6	69	45	0
	Pasni	34.3	19.5	95	49	0
May, 1999	Quetta	17.4	8.4	82	42	0
	Khuzdar	23.3	11.4	88	57	4
	Turbat	32.3	22.8	89	41	0
	Panjgur	28.4	18.7	78	47	0
	Pasni	29.4	16.3	96	56	0
June, 1999	Quetta	34.5	22.3	82	45	0
	Khuzdar	38.0	22.4	63	35	0
	Turbat	39.7	23.6	89	41	8
	Panjgur	40.2	21.5	85	47	0
	Pasni	38.3	22.3	96	56	0
July, 1999	Quetta	32.3	19.7	91	51	0
	Khuzdar	39.0	22.3	78	48	13
	Turbat	38.4	23.4	83	42	0
	Panjgur	35.2	22.6	87	51	0
	Pasni	37.3	25.3	88	64	0
August, 1999	Quetta	26.3	17.3	78	32	0
	Khuzdar	37.4	20.4	80	42	13
	Turbat	38.5	24.3	85	40	0
	Panjgur	35.6	21.4	87	45	0
	Pasni	32.5	24.7	85	59	0
September, 1999	Quetta	33.3	23.2	80	41	0
	Khuzdar	35.4	21.3	87	43	25
	Turbat	37.3	23.4	84	44	0
	Panjgur	36.8	21.3	88	52	5
	Pasni	37.6	22.4	92	53	0
October, 1999	Quetta	31.2	15.0	92	51	0
	Khuzdar	31.5	16.4	62	47	0
	Turbat	40.7	22.0	70	45	0
	Panjgur	31.8	14.7	69	38	0
	Pasni	35.7	21.3	95	45	0
November, 1999	Quetta	24.7	5.2	65	38	0
	Khuzdar	33.0	20.1	67	37	0
	Turbat	33.0	20.1	91	36	0
	Panjgur	28.3	13.5	67	41	0
	Pasni	30.2	19.3	100	47	0

**METEOROLOGICAL DATA OF DIFFERENT CITIES IN THE SURVEY AREA: 1999-2000 (cont.)**

**PAKISTAN (cont.)**

Month	City	Temperature °C		R. Humidity (%)		Rainfall (mm)
		Maximum	Minimum	Maximum	Minimum	
December, 1999	Quetta	14.3	2.4	93	61	0
	Khuzdar	23.7	6.5	67	14	0
	Turbat	29.9	12.3	80	32	0
	Khuzdar	30.3	11.5	95	44	0
	Pasni	23.5	5.5	91	26	0
January, 1999	Quetta	11.4	6.2	71	51	3
	Khuzdar	14.5	6.1	81	56	0
	Turbat	26.3	14.4	87	43	0
	Panjgur	19.8	3.2	82	33	0
	Pasni	22.5	14.4	88	47	0
February, 2000	Quetta	13.5	1.2	91	41	0
	Khuzdar	13.2	7.5	76	39	5
	Turbat	31.5	13.2	65	19	5
	Panjgur	22.3	6.5	65	39	0
	Pasni	27.5	13.2	91	57	0
March, 2000	Quetta	18.3	8.1	92	51	0
	Khuzdar	24.3	11.4	69	41	0
	Turbat	33.6	17.4	69	24	0
	Panjgur	25.3	9.3	70	31	0
	Pasni	29.2	13.4	86	49	0
April, 2000	Quetta	28.4	11.2	69	53	0
	Khuzdar	32.5	15.7	47	6	0
	Turbat	41.2	20.5	68	20	0
	Panjgur	35.6	16.3	58	27	0
	Pasni	34.7	18.4	100	46	0

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