

PAKISTAN SPACE & UPPER ATMOSPHERE RESEARCH COMMISSION



Application of satellite remote sensing for monitoring of crops and environment

Monitoring of crops

**The project is being carried out
in collaboration with
M/o Food & Agriculture**

Objectives

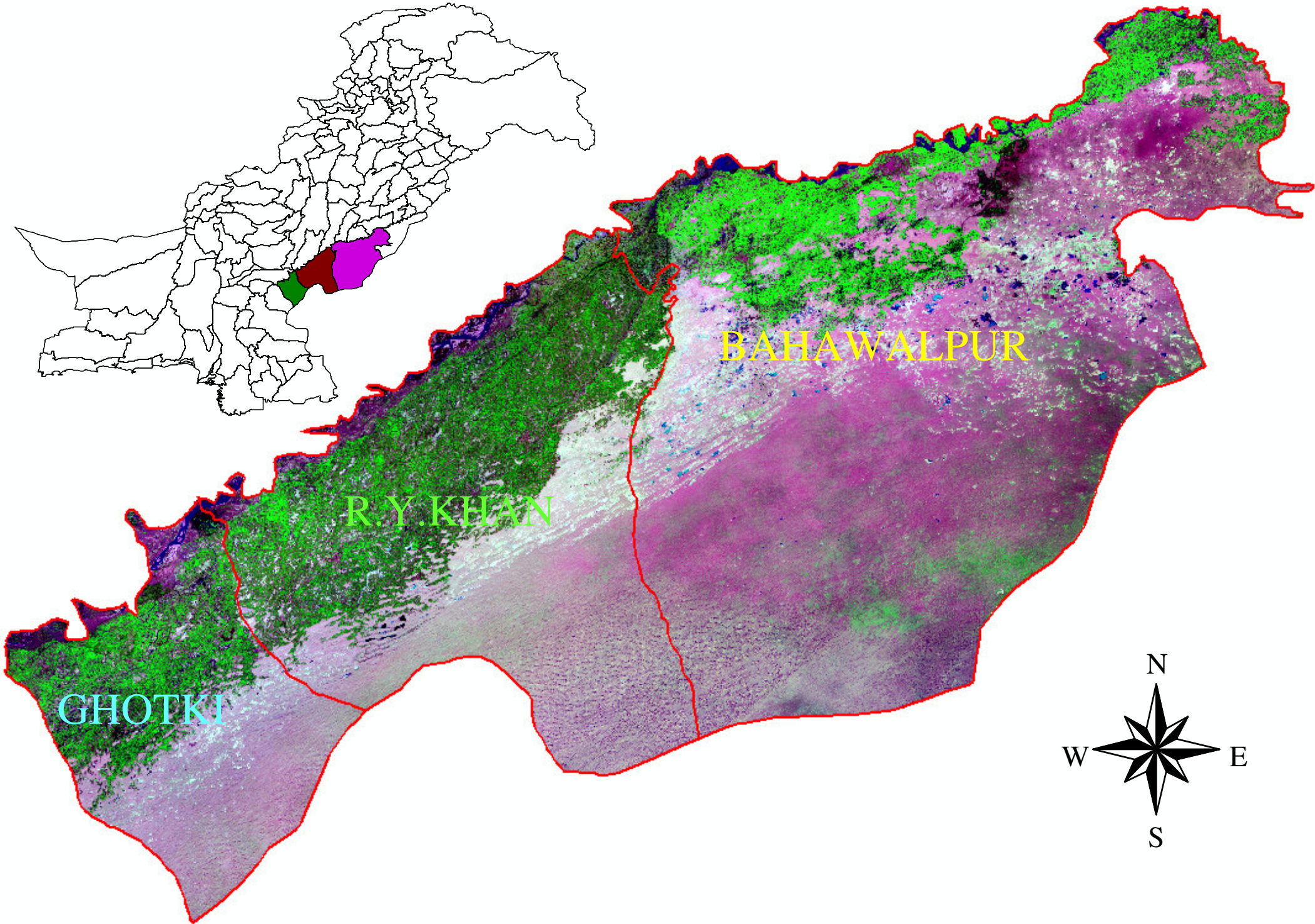
- **Crop area and yield estimation**
- **Capacity building of crops reporting services in the provinces and federal institutions**

Coverage 2005-06

Province	Districts
Punjab	02
Sindh	01
Total	03

* Wheat, Cotton and Rice

PROJECT AREAS : 2005-06

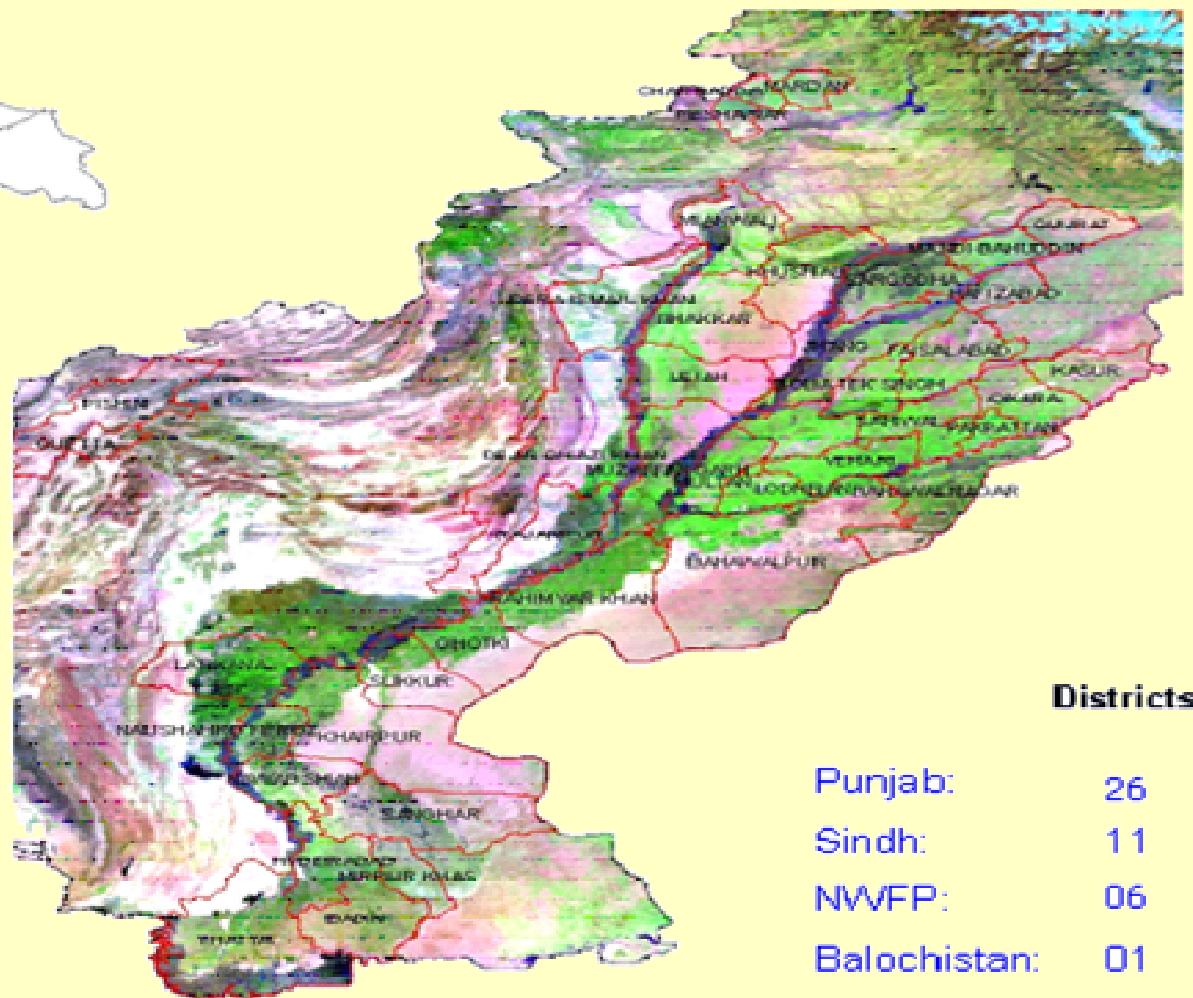
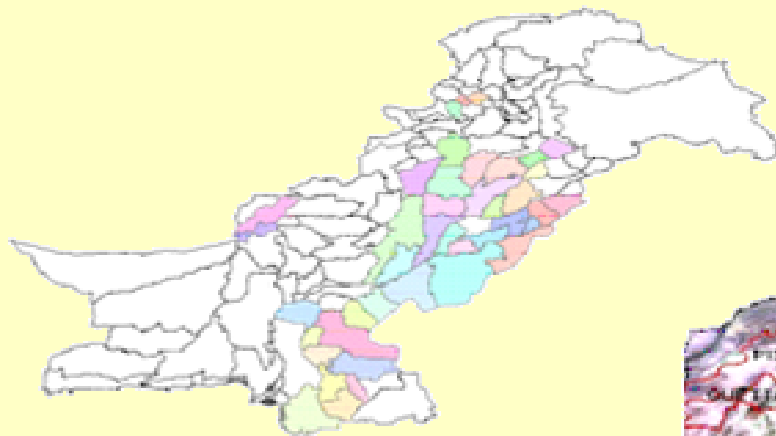


Coverage 2006-07

Province	Districts
Punjab	26
Sindh	11
NWFP	06
Balochistan	01
Total	44

* Wheat, Cotton, Rice, Sugarcane and Maize

Project Coverage 2006-07



Crops

Sugar cane
Cotton
Wheat
Rice
Maize

Districts

Punjab:	26
Sindh:	11
NWFP:	06
Balochistan:	01

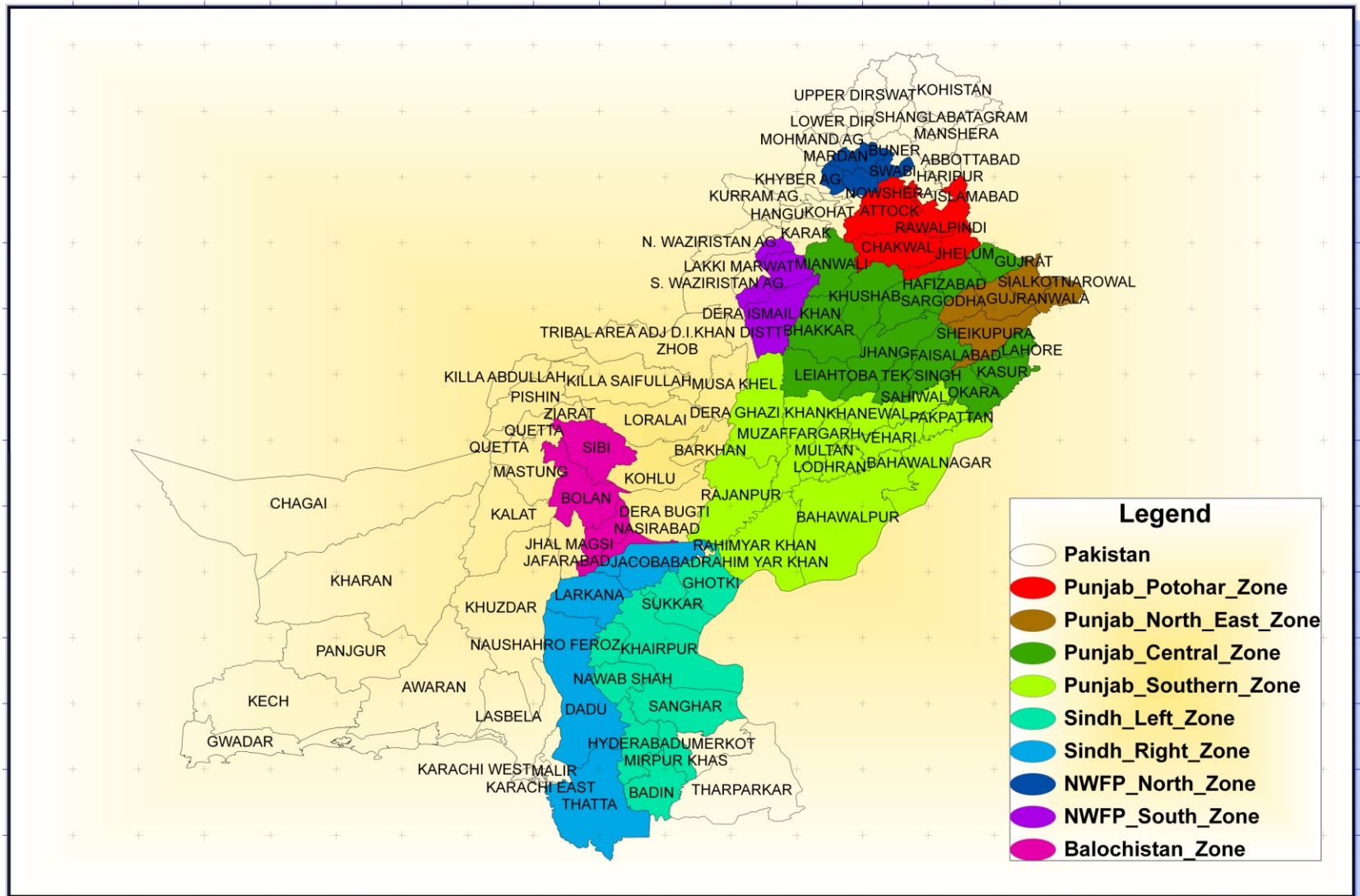
Coverage 2007-08

YEAR	Provinces	Districts
Kharif (Cotton, rice, sugarcane, maize)	Punjab	35
	Sindh	17
	NWFP	06
	Balochistan	03
	Total	61
Rabi (Wheat)	Covered the entire country in toto	

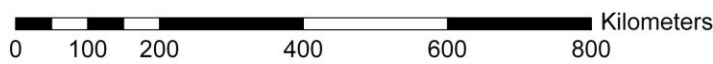
Crop area estimation

- **Area frame development**
- **Image classification techniques**

Area Frame



61°0'0"E 62°0'0"E 63°0'0"E 64°0'0"E 65°0'0"E 66°0'0"E 67°0'0"E 68°0'0"E 69°0'0"E 70°0'0"E 71°0'0"E 72°0'0"E 73°0'0"E 74°0'0"E 75°0'0"E 76°0'0"E 77°0'0"E 78°0'0"E 79°0'0"E



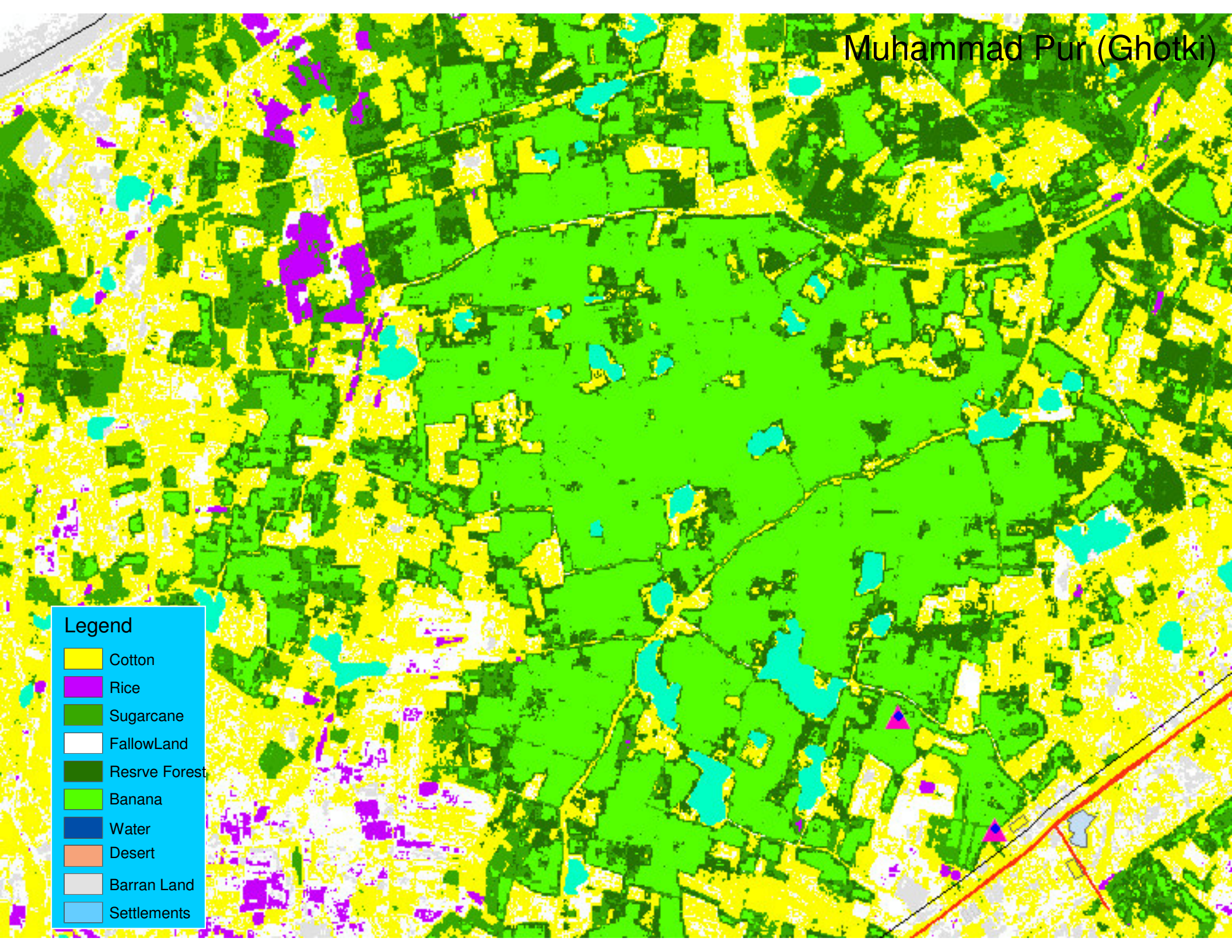
Methodology

- **Wall to wall imagery of the area of interest (AOI) two times during growing period of a crop**
- **Development of satellite image mosaics**
- **Development of spectral signatures**
- **Maximum likelihood technique**

Classified Images

2005-06

Muhammad Pur (Ghotki)



Atal Muradani (Gr)

Residential

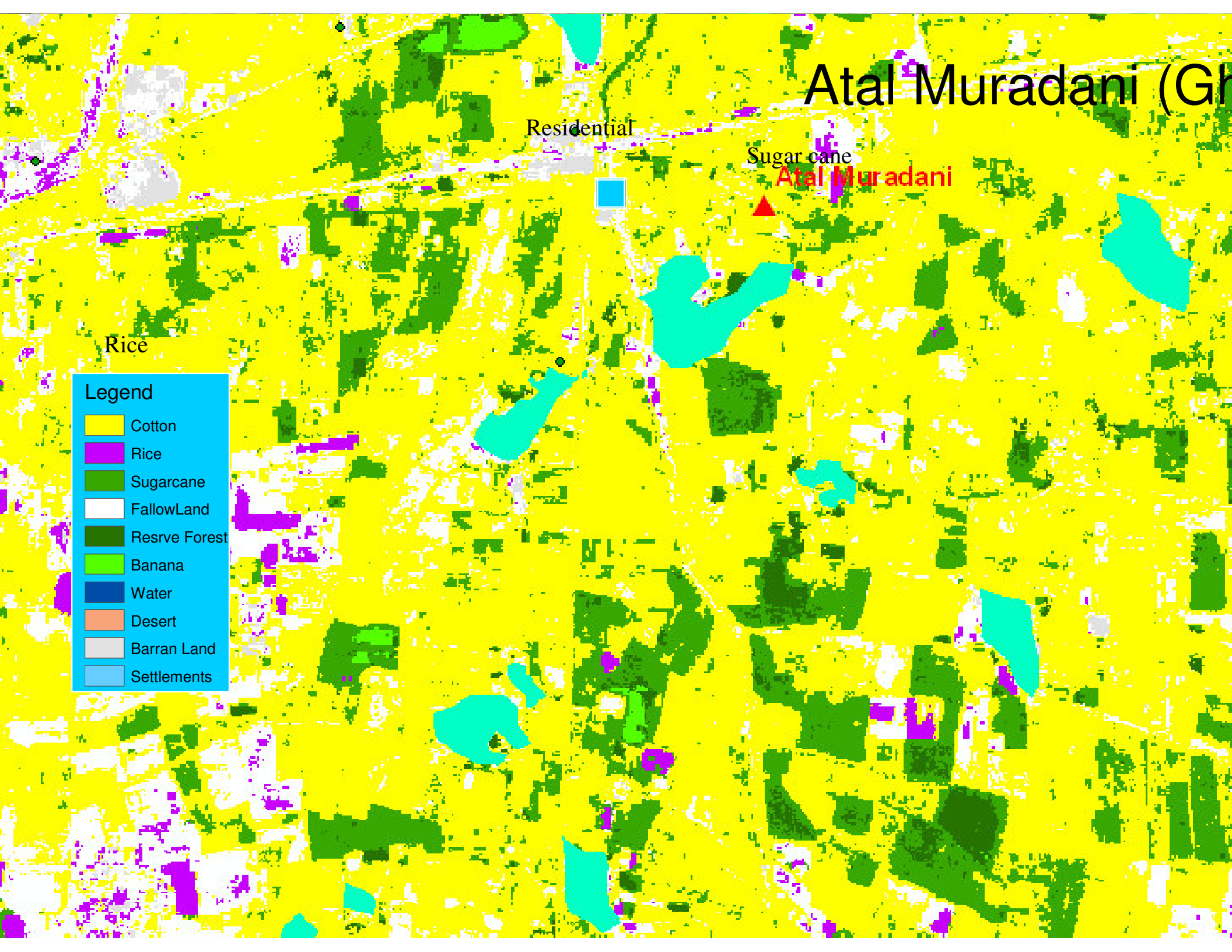
Sugar cane

Atal Muradani

Rice

Legend

- Cotton
- Rice
- Sugarcane
- FallowLand
- Resrve Forest
- Banana
- Water
- Desert
- Barran Land
- Settlements

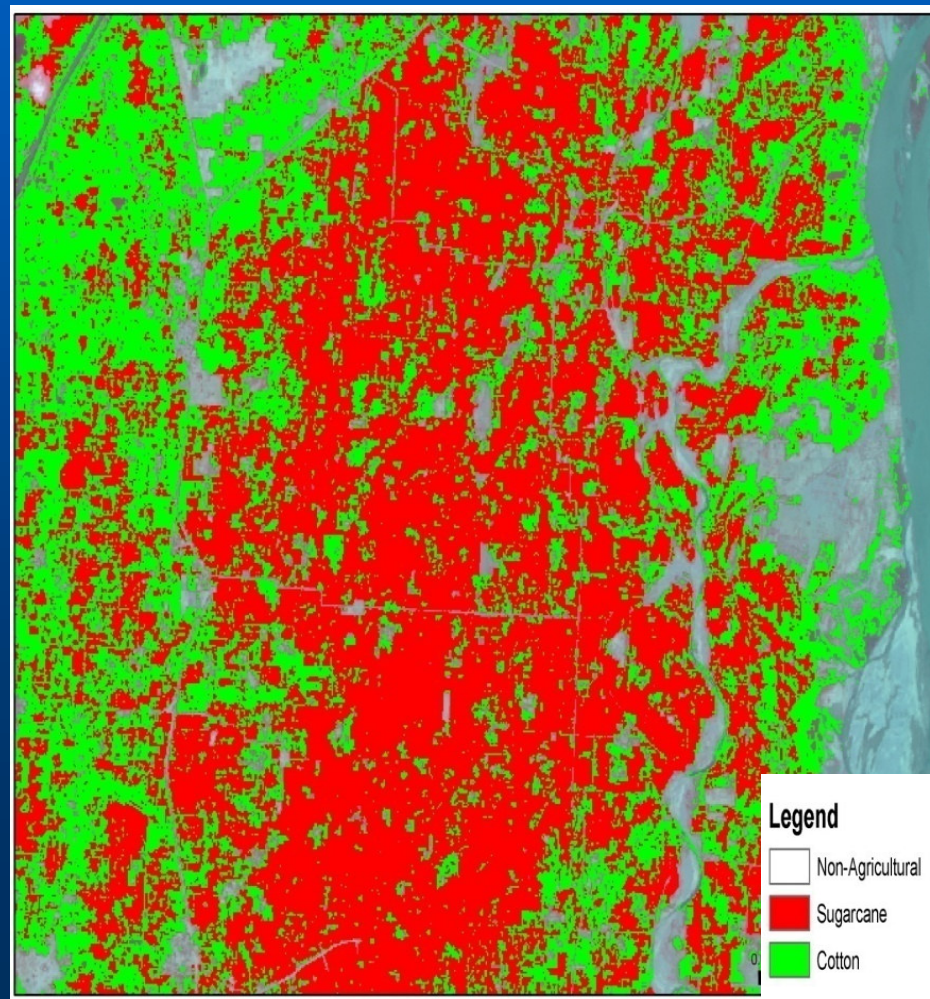


Classified Images

2006-07

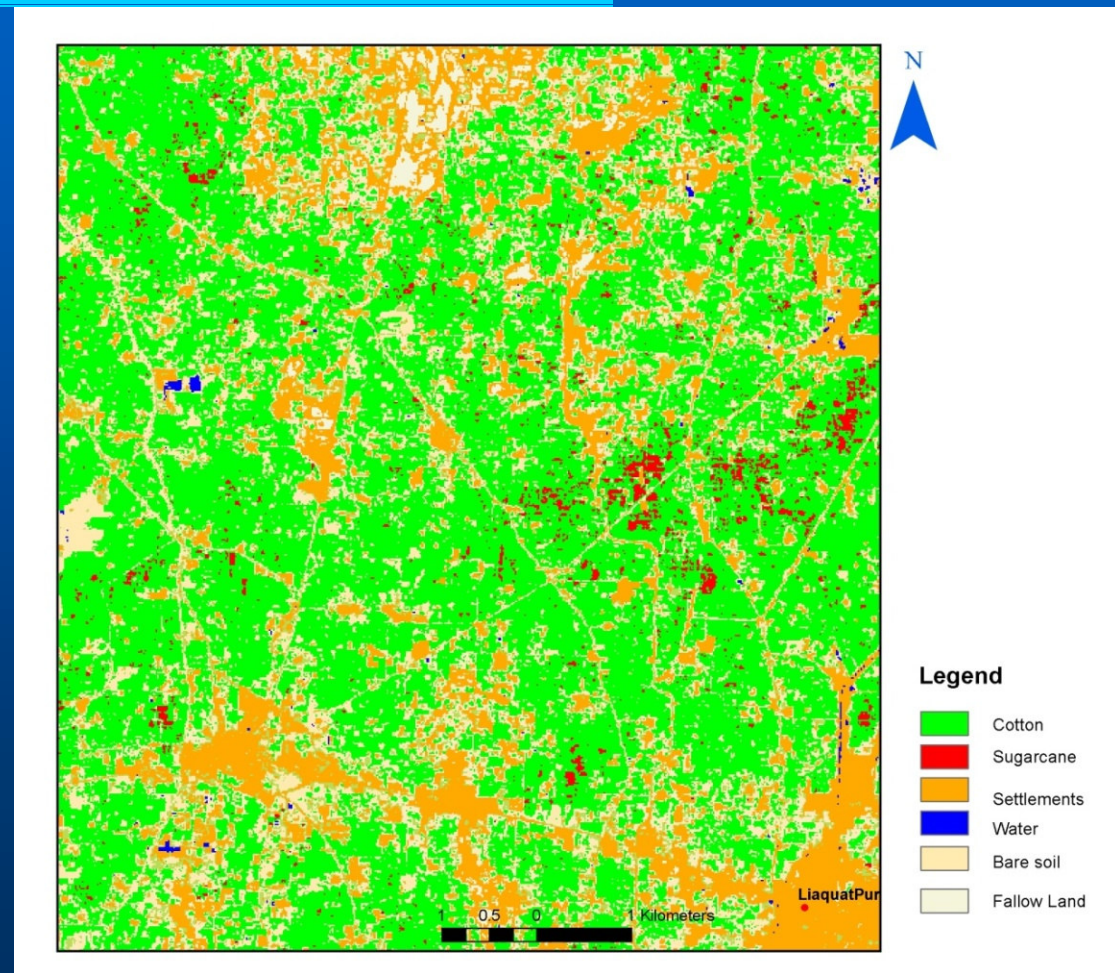
Sugarcane : Aug, 06

RAJANPUR



Cotton

Rahim Yar Khan – Aug, 06



Sugarcane: Charsada - June 2006



Legend

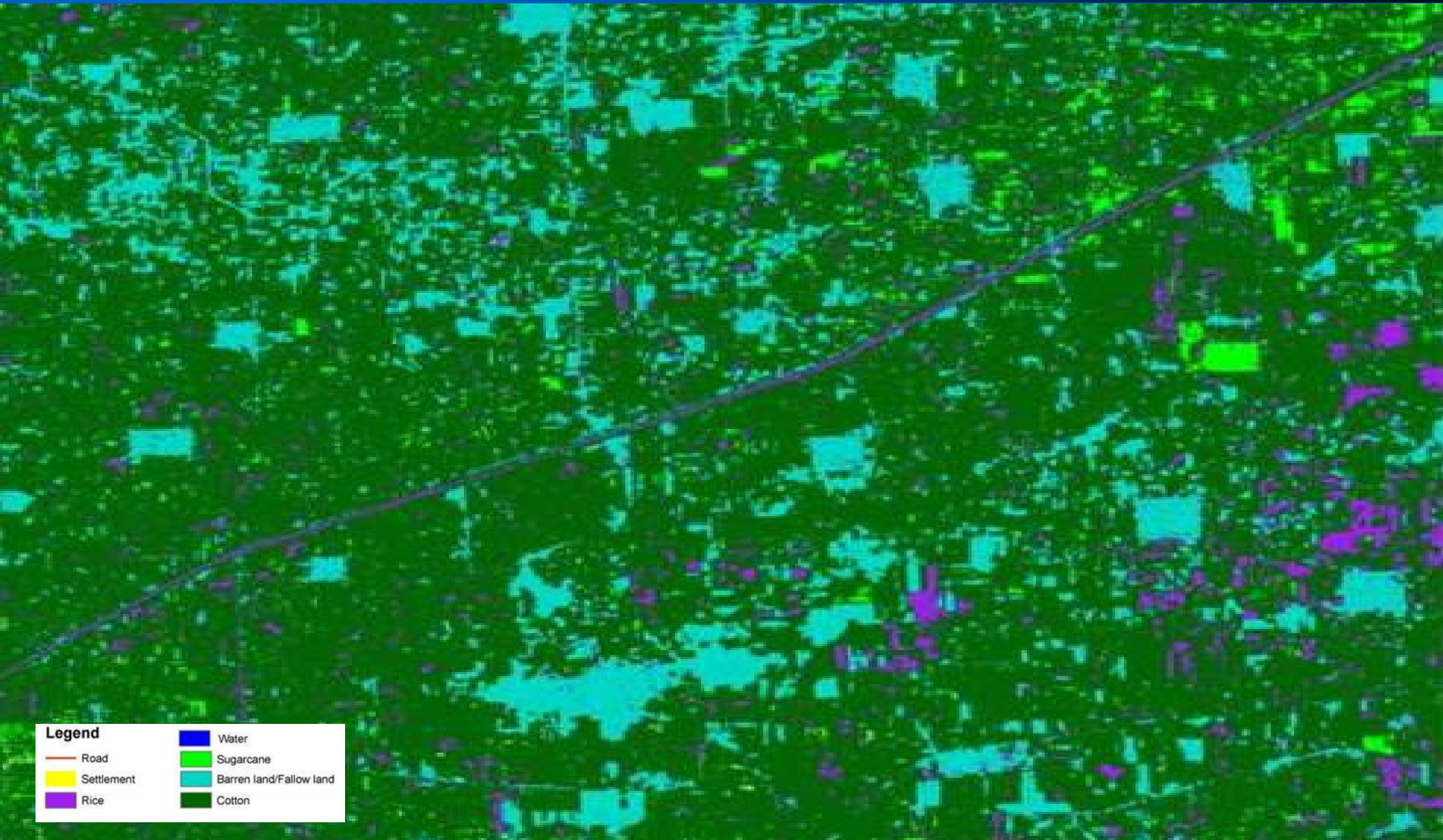
- Sugarcane
- Other Crops

Classified Images

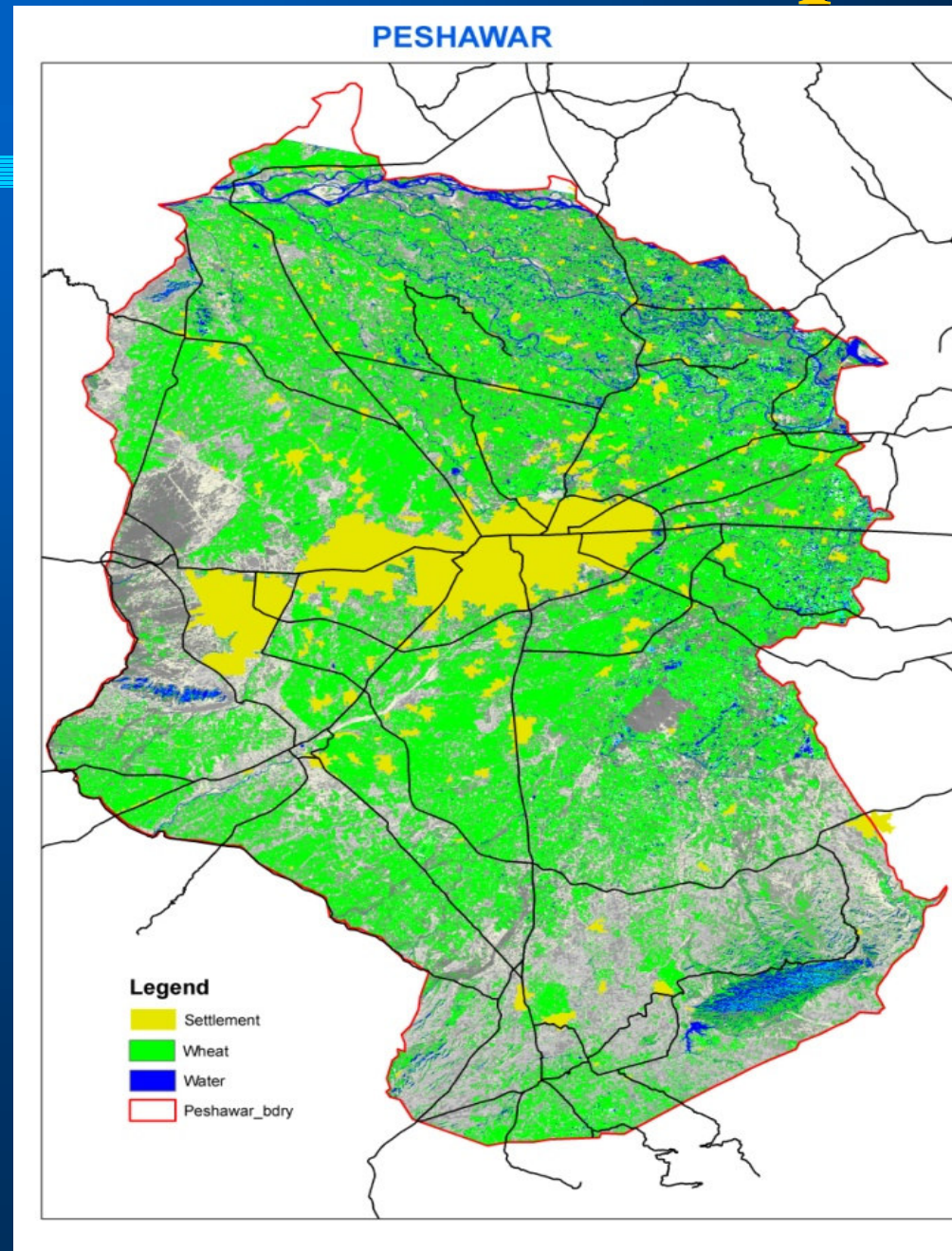
2007-08

Cotton

Bahawalpur-2007



Wheat: Peshawar – April 2008



Crop yield estimation

- **NDVI imagery**
- **Agromet data**
- **Crop cut data**
- **Fertilizer data**

Wheat estimate 2007-08 , 20th Apr 2008

Provinces	SUPARCO (000 tons)
Punjab	15,890
Sindh	2,720
NWFP	990
Balochistan	750
Pakistan	20,350

* 3% difference with the final estimates released in
October 2008

Wheat Crop 2008-09

(13th Apr 2009)

Province	Area	Production	Yield
	(000 ha)	(000 tons)	(kg/ha)
Punjab	6624.4	17183.3	2594
Sindh	1074.0	3361.1	3129
NWFP	762.0	1038.9	1363
Bal	392.0	806.1	2056
Total	8852.4	22389.4	2529

* 4% difference between SUPARCO est. and FCA forecast



Transfer of technology

Transfer of technology Program

SUPARCO

3 x 13 trainings executed as planned for stakeholders

SPOT
IMAGE
FRANCE

1 x 35 training program executed for SUPARCO 18 & stakeholder 17 persons

FAO/ULG

2 x 15 planned;
one program executed May 2007(SUPARCO 9,
stakeholders 6 persons); second in May 2008

Participation

- **Economic Wing of MINFA**
- **Agricultural policy institute, MINFA**
- **Crop Reporting Services, Punjab, Sindh, NWFP and Balochistan**
- **Pak-Met Department**
- **SUPARCO**
- **FBS**
- **Agricultural Department, AJK**

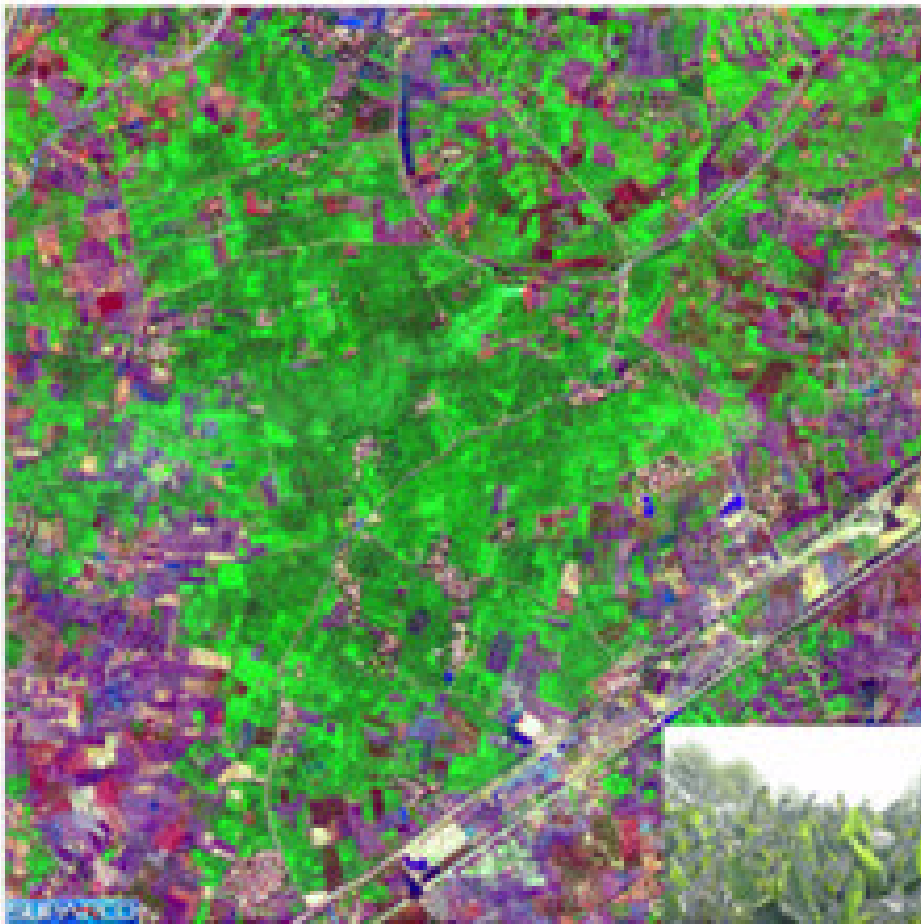
ENVIRONMENT

Muhammadpur Ghotki :Frost damage

Banana Plantation

Pre-Frost

Muhammadpur, Ghotki (Dec 16, 2005)



Banana Plantation

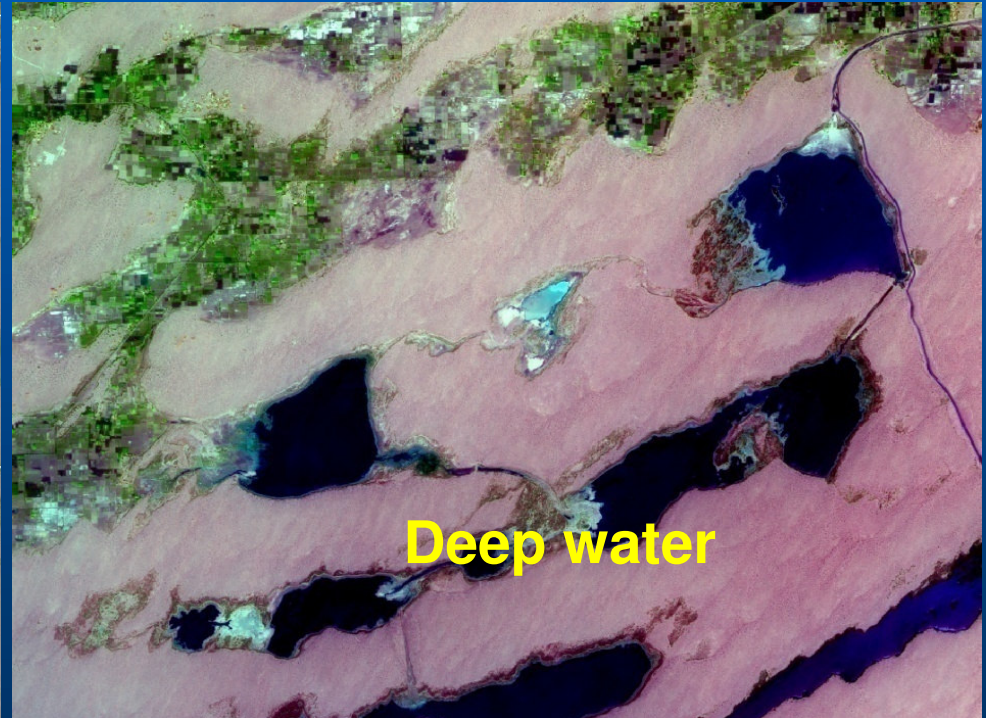
Post-Frost

Muhammadpur, Ghotki (Jan 12, 2006)



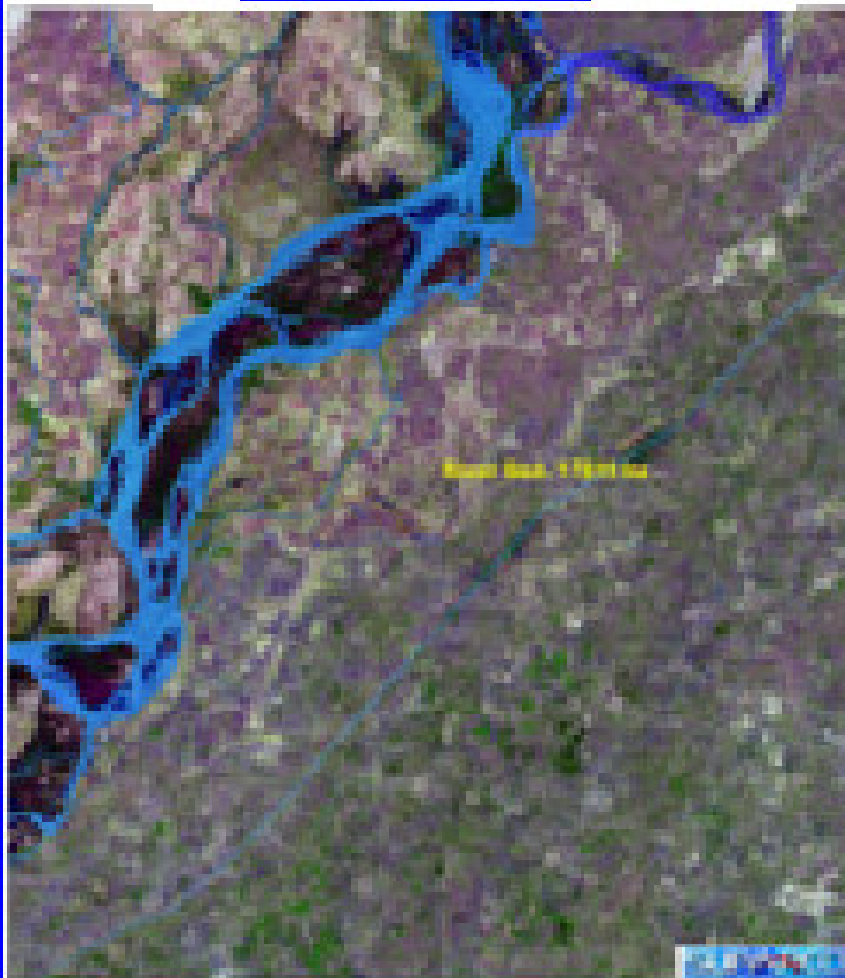
Surface drainage system

Cholistan

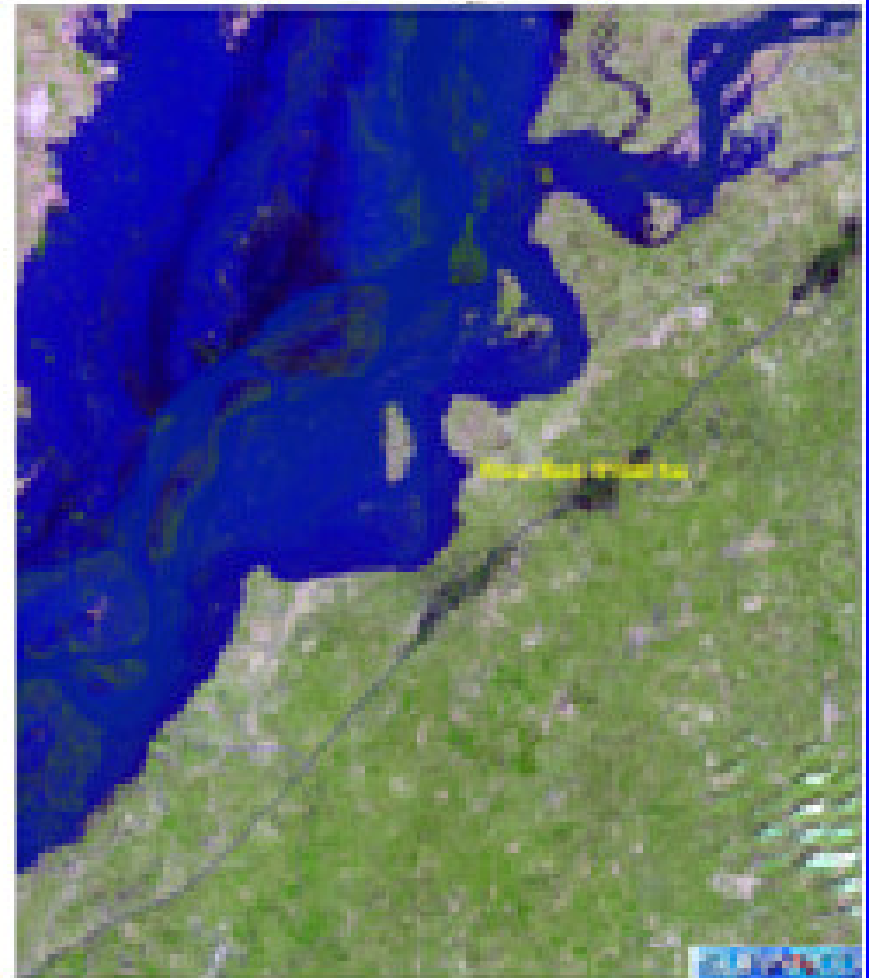


Indus in flood: RYK-Rajan pur section

June 07, 2005



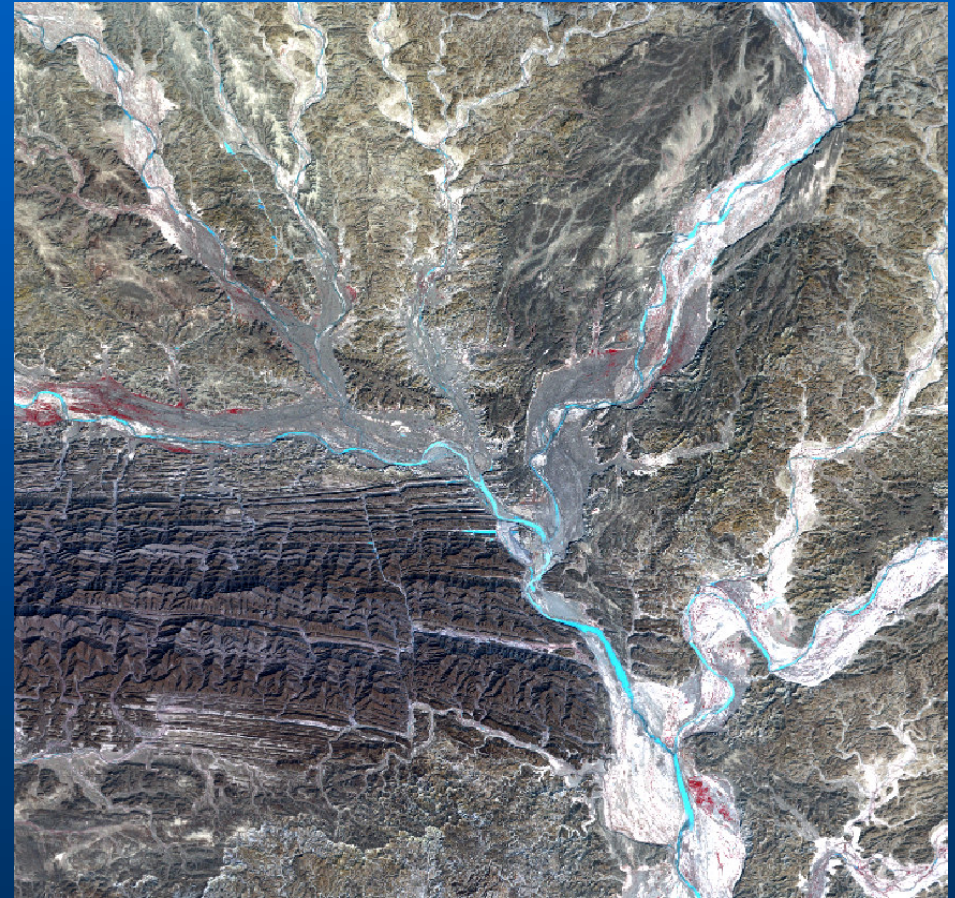
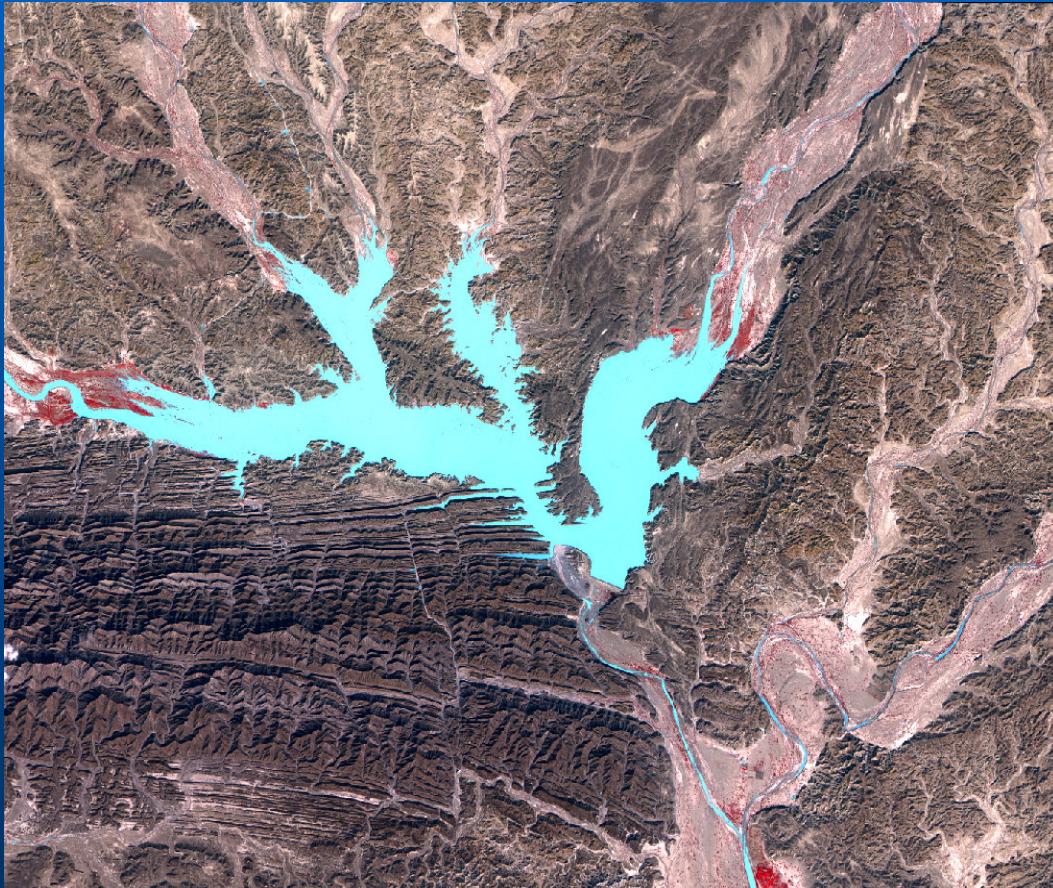
July 09, 2005



SHADI KOR DAM

06-02-2005

17-02-2005



EARTHQUAKE DAMAGE ASSESSMENT

8 Oct 2005

EARTHQUAKE AFFECTED AREA



* Main Cities
 • Villages
 — Major roads
 — Damaged Roads
 Residential
 Landslides
 Tribal Boundary
Damaged Area
 Catastrophic (More than 70%)
 Extensive (40% to 70%)
 Moderate (Less than 40%)

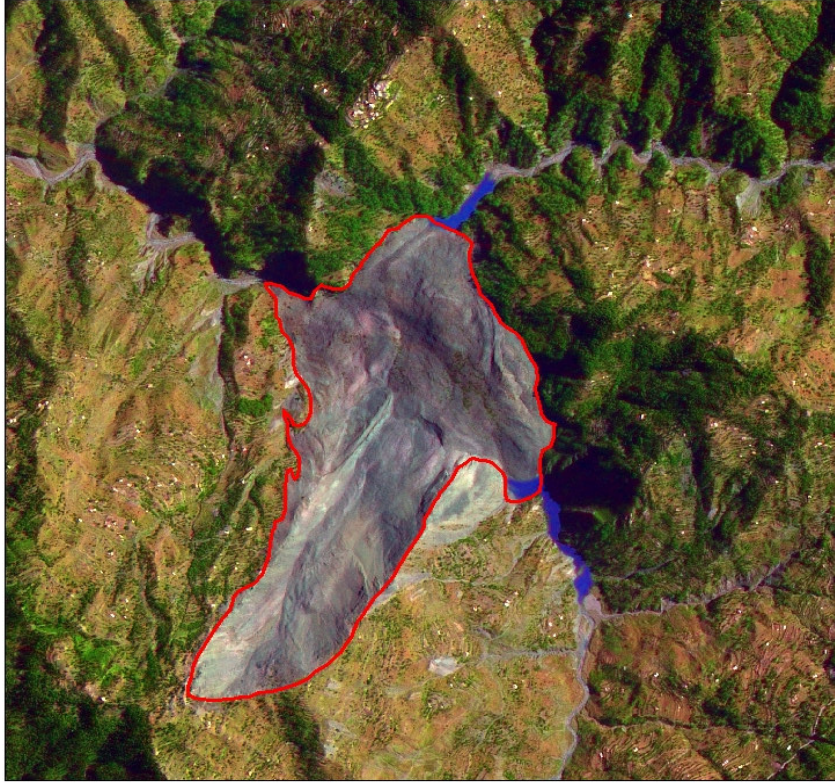
Earthquake Date: 8 Oct, 2005
 Data extracted from post earthquake SPOT-5
 2.5 m color imagery acquired at 0:00, Islamabad
 Proj: UTM Zone 42 N
 Spheroid: WGS 84

		Executive Summary																			
		A J K										N W F P									
District	Total	Districts																			
		Attock	Bahawalpur	Bahawalpur North	Bahawalpur South	Bahawalpur West	Bahawalpur East	Bahawalpur South West	Bahawalpur South East	Bahawalpur North West	Bahawalpur North East	Bahawalpur South West	Bahawalpur South East	Bahawalpur North West	Bahawalpur North East	Bahawalpur South West	Bahawalpur South East	Bahawalpur North West	Bahawalpur North East	Bahawalpur South West	Bahawalpur South East
Population (thousands)	208,875	119,230	130,644	61,741	189,251	246,435	139,208	565,798	219,890	115,215	209,810	218,055	73,205	84,023	71,951	99,098	209,225	222,601	679,811	259,260	
Area (sq km)	482.51	229.20	324,447	87.60	257.11	303.85	4,064.60	3,809.37	437.65	899.21	248.30	67,636	208.20	159,844	317.34	325,721	505.00	648.00	1,147,601	3,442.00	
Area Affected (sq km)	488.05	401.88	381.92	109.70	314.20	639.82	384.93	846.78	284.76	648.18	593.11	12,421	148.81	81,281	113.41	401.61	288.00	772.38	1,017.87	467.88	
Area Affected as % of Total Area	101.15	175.08	117.72	124.11	115.41	208.81	94.63	22.25	73.80	1.51	31.05	12.21	2.88	15.84	6.46	9.04	6.26	0.80	11.18	28.21	
Population Affected (thousands)	130	8,091	8,951	8,890	8,100	8,890	8,891	8,460	3,221	4,481	8,377	8,391	8,391	8,391	8,391	8,391	8,391	8,391	8,391	8,391	
Population Affected as % of Total Population	62.25	6.76	6.84	14.39	4.25	3.60	6.26	1.45	1.45	0.25	3.94	3.84	11.45	9.86	11.67	8.55	4.00	3.56	12.84	3.24	

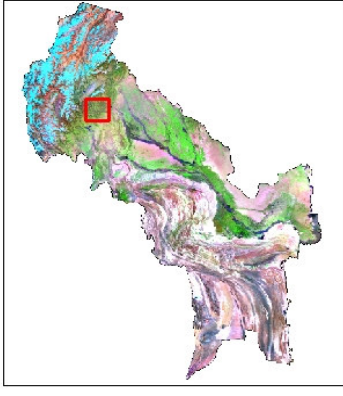
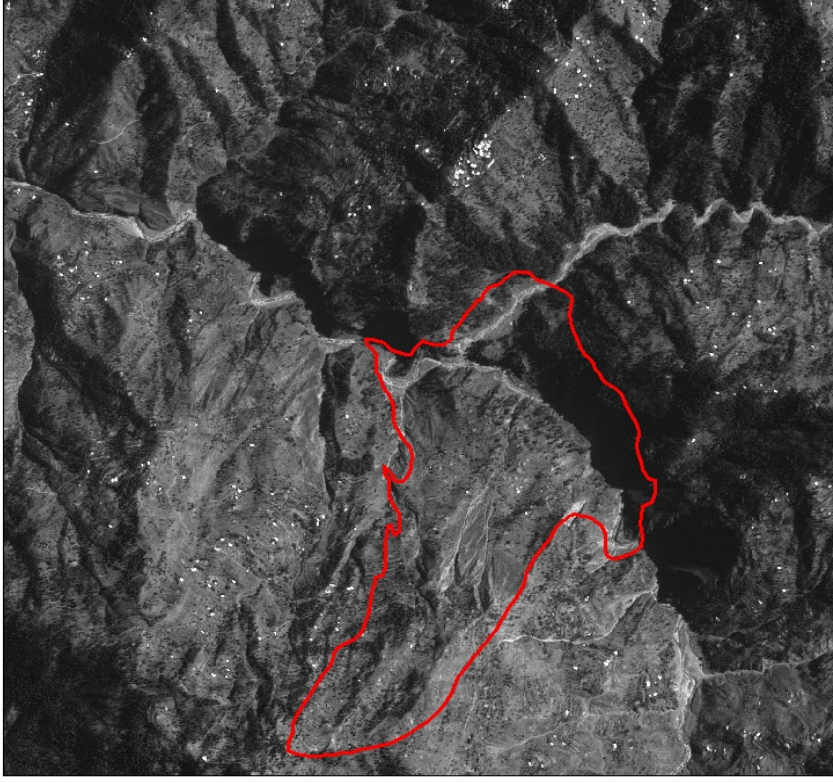


Dandbeh, Hattian Muzaffarabaad

Post Earthquake 21-10-2005



Pre Earthquake 22-10-2004



Landslide



Forest



Blocked Stream

A Landslide at 73° 43' 42" E and 34° 08' 20" N caused by severe Earthquakes on October 8, 2005 south of Hattian. Blocked the Streams near Dandbeh village in Muzaffarabad District.

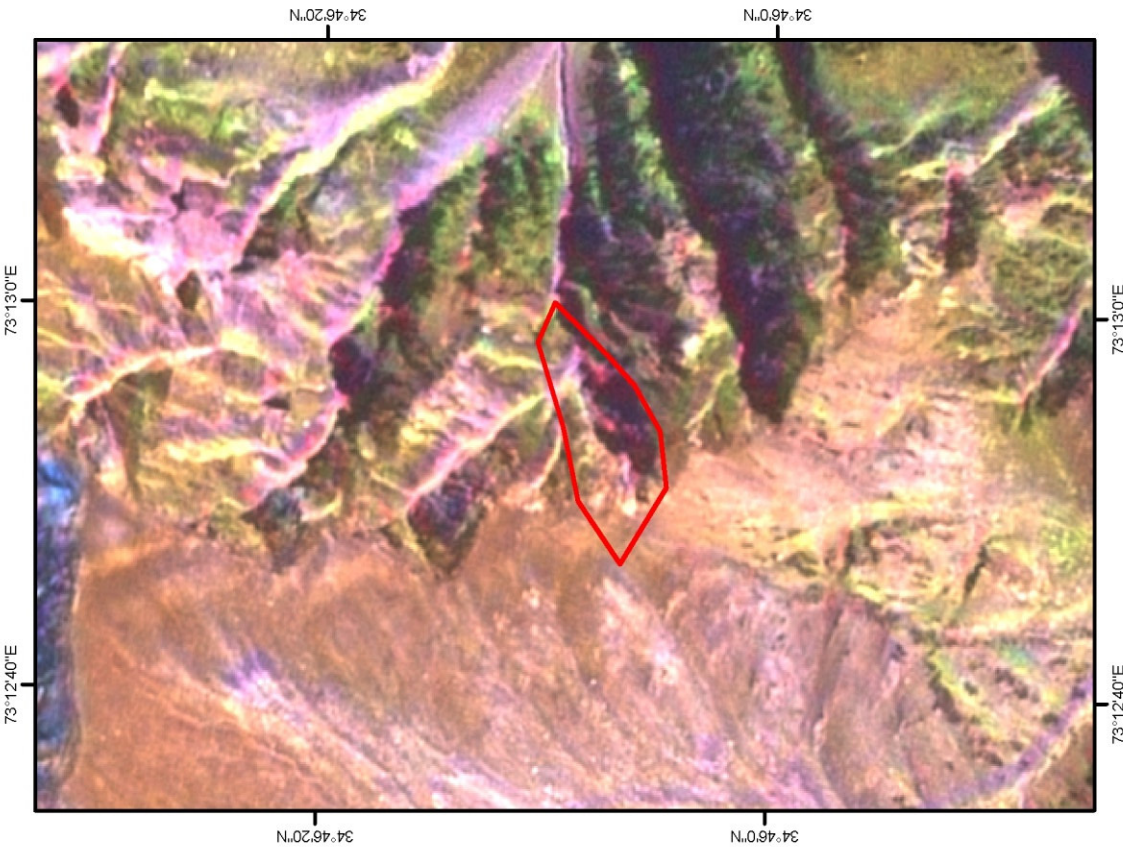
Land Slide Area = 181,3440 Ha



DEFORESTATION

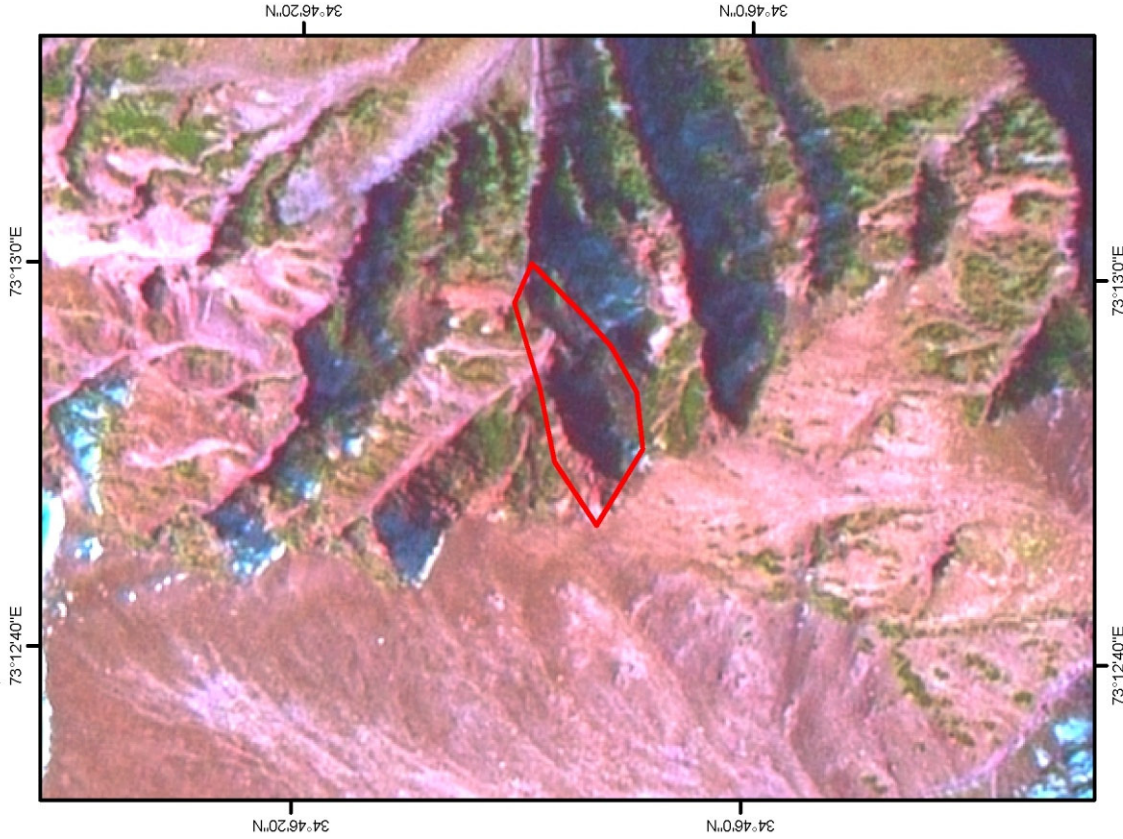
SPOT5, 2.5 m

Date: 31-10-2007



SPOT5, 2.5 m

Date: 20-10-2005



Thank you