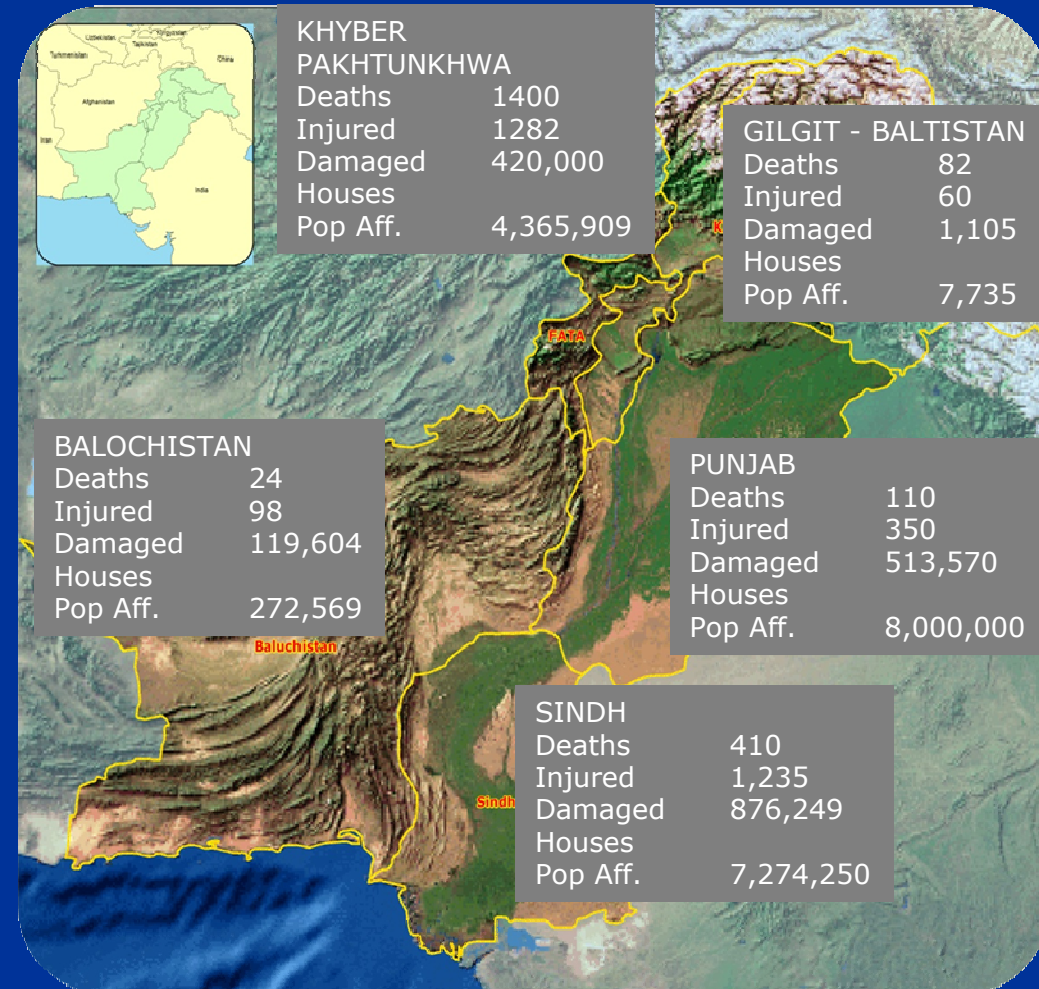# Monitoring of 2010 Floods in Pakistan

Pakistan Floods - 2010

Population affected   20 million+

Area affected (Sq km)   150,000+

Deaths   2000+

Injured   3000+

Houses damaged   1,910,439

Damaged crop area (ha)   2,300,000

" Pakistan floods are a 'slow-motion tsunami' "

Ban Ki-moon, UN Secretary General

KHYBER PAKHTUNKHWA
Deaths	1400
Injured	1282
Damaged Houses	420,000
Pop Aff.	4,365,909

GILGIT - BALTISTAN
Deaths	82
Injured	60
Damaged Houses	1,105
Pop Aff.	7,735

BALOCHISTAN
Deaths	24
Injured	98
Damaged Houses	119,604
Pop Aff.	272,569

PUNJAB
Deaths	110
Injured	350
Damaged Houses	513,570
Pop Aff.	8,000,000

SINDH
Deaths	410
Injured	1,235
Damaged Houses	876,249
Pop Aff.	7,274,250

Use of satellite remote sensing data was the only means to rapidly monitor the extent of inundation

Spot Receiving Station

Aqua / Terra Receiving Station

Pakistan Floods – 2010

Steps Initiated

- A core team was assembled for rapid mapping of affected areas to support relief and early recovery operations utilizing pre and post flood satellite imagery

- Coordination with National Disaster Management Agency (NDMA), Ministry of Food & Agriculture and other relevant organizations

- Requested UN-SPIDER for activation of International Charter Space and Major Disasters

Satellite Tasking / Acquisition

- Spot constellation was programmed through Spot Image for imaging the affected areas and downloading of data at the ground station in Islamabad

- Aqua & Terra satellite data was received and processed at Karachi for daily monitoring of the affected areas on regional scale

- Through the International Charter Space and Major Disasters data was received from Landsat, Geoeye, QuickBird
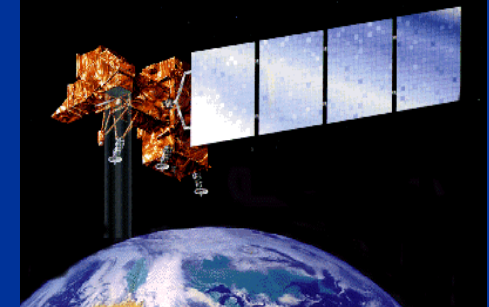
QuickBird

Spot
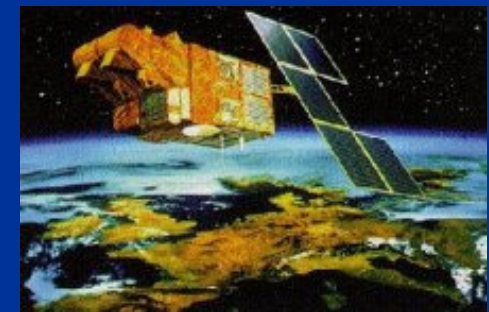
Aqua

Landsat

Terra

Geoeye

Results

- Monitoring flood in near real time

- Provision satellite maps to national disaster management agencies

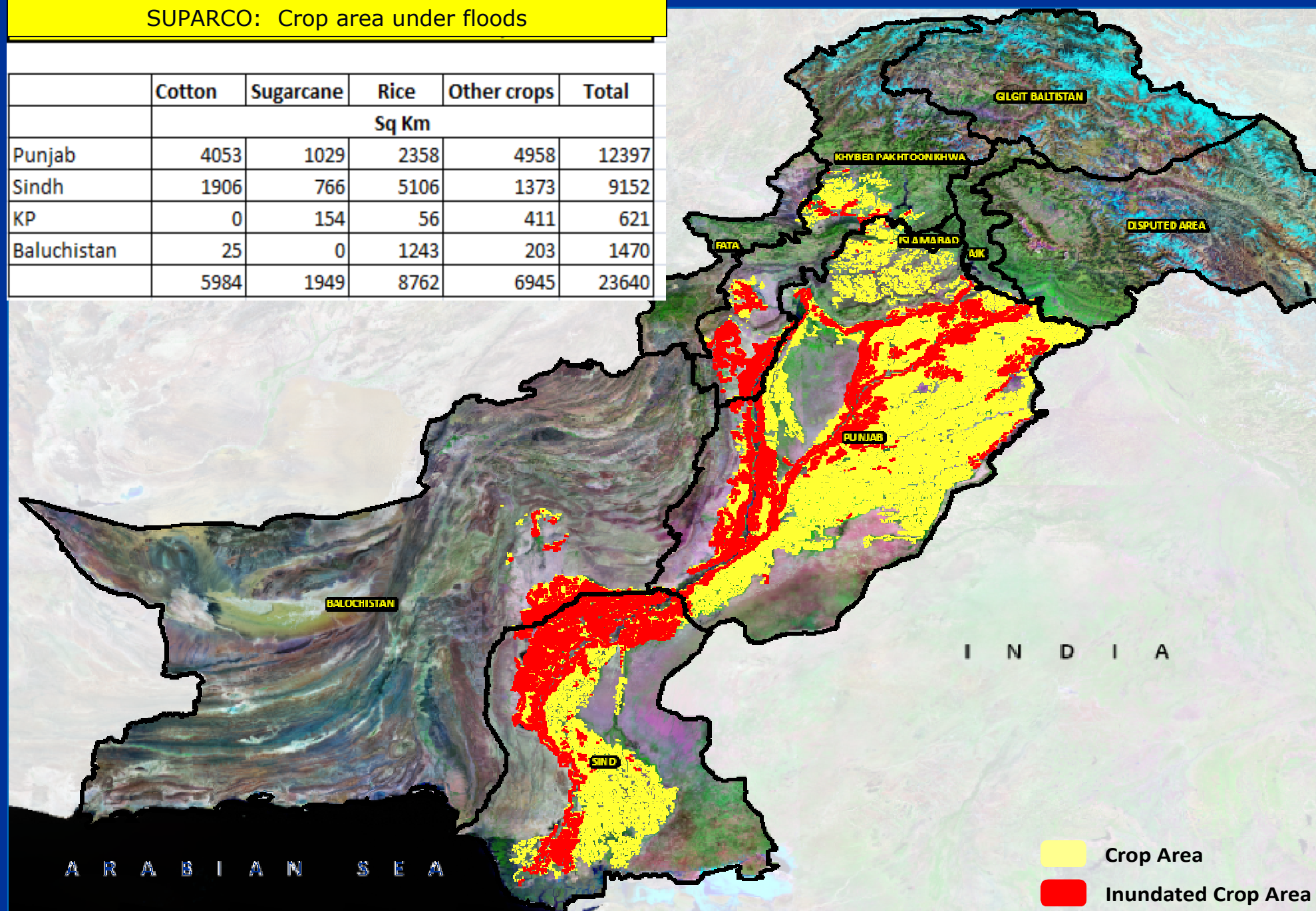- Submit damage assessment reports of infrastructure and crops to concerned ministries

Pakistan Floods - 2010

SUPARCO: Crop area under floods

	Cotton	Sugarcane	Rice	Other crops	Total
	Sq Km				
Punjab	4053	1029	2358	4958	12397
Sindh	1906	766	5106	1373	9152
KP	0	154	56	411	621
Baluchistan	25	0	1243	203	1470
	5984	1949	8762	6945	23640

Crop Area

Inundated Crop Area

Rapid Damage Assessment

S. No.	DISTRICT	Total Area (Sq km)	Inundated Area (Sq km)	%age Inundated
1	MUZAFFARGARH	8411.5	6854.6	81.5
2	JHANG	6188.6	2087	33.7
3	MANDI BAHAUDDIN	2832.4	846	29.9
4	MIANWALI	5875.1	1338.3	22.8
5	CHINIOT	2801.4	625	22.3
6	RAJANPUR	12372.3	2394.3	19.4
7	HAFIZABAD	2454.9	465.2	18.9
8	GUJRAT	2925.1	542.7	18.6
9	LEIAH	6238	933.4	15
10	KHUSHAB	6633.5	980.6	14.8
11	JHELUM	3751.3	510.6	13.6
12	SARGODHA	6082.3	777.9	12.8
13	DERA GHAZI KHAN	11762.6	1489.9	12.7
14	SIALKOT	2592.5	313.4	12.1

Rapid Damage Assessment

Damage to Sugarcane Crop

Punjab				
Districts	Area Damaged ('000' ha)	Yield Loss (tons/ha)	Damage Factor	Projected Production Loss (million tons)
Bhakkar	2.6	42.1	0.8	0.1
D.G.Khan	1.1	51.7	0.8	0.0
Gujranwala	0.2	37.8	0.0	0.0
Gujrat	0.7	39.0	0.0	0.0
Hafizabad	0.7	37.8	0.0	0.0
Jhang	17.3	48.4	0.2	0.2
Khanewal	0.9	50.8	0.0	0.0
Khushab	3.3	43.4	0.0	0.0
Layyah	4.4	51.5	0.8	0.2
M.B.Din	9.8	41.9	0.0	0.0
Mianwali	1.4	46.4	0.8	0.1
Multan	0.5	41.5	0.0	0.0
Muzaffargarh	22.5	50.9	0.8	0.9
Rahim Yar Khan	7.5	30.0	0.8	0.2
Rajanpur	9.8	63.1	0.8	0.5
Sargodha	13.7	45.9	0.0	0.0
Sialkot	0.2	29.9	0.0	0.0
T.T.Singh	6.4	50.7	0.0	0.0
Total	102.8	47.9	0.4	2.2

11

Rapid Damage Assessment

INUNDATION DURATION STATISTICS

Sr. No.	Province		District	Total District Area (Sq. km)	Total Affected Area (sq. km)	31-jul	5-Aug	10-Aug	15-Aug	20-Aug	25-Aug	30-Aug	5-Sep	10-Sep	15-Sep	20-Sep	25-Sep	30-SSep	Inundation Duration	Status as on 30 September
1	AJK	1	MIRPUR	765	167		↑ 100%	↑ 100%											05 Days	100 % Receded
2	AJK	2	BHIMBER	1652	105		↑ 100%	↑ 51%	↑ 100%										10 Days	100 % Receded
3	BALOCHISTAN	1	BOLAN	8546	3034			↑ 100%	↓ 19%		↓ 60%	↓ 4%	↓ 13%	↓ 2%					40 Days	2 % Still Inundated
4	BALOCHISTAN	2	JAFARABAD	2487	1926			↑ 73%	↓ 58%	↑ 42%	↑ 12%	↑ 3%	↓ 4%	↑ 7%		↓ 4%	↑ 12%	↓ 12%	45 Days	45 % Still Inundated
5	BALOCHISTAN	3	NASIRABAD	3222	1264			↑ 85%	↓ 58%	↑ 15%	↑ 15%	↓ 3%	↓ 3%	↓ 4%		→ 7%	↓ 2%	↓ 2%	45 Days	8 % Still Inundated
6	BALOCHISTAN	4	JHAL MAGSI	3859	929			↑ 60%	↑ 14%	↑ 6%	↓ 32%	↑ 20%		↓ 19%		↓ 10%	↓ 11%	↓ 11%	45 Days	28 % Still Inundated
7	BALOCHISTAN	5	LORALAI	9955	286			↑ 100%	↑ 100%										05 Days	100 % Receded
8	BALOCHISTAN	6	SIBI	4963	250			↑ 100%	↑ 100%										05 Days	100 % Receded
9	BALOCHISTAN	7	DERA BUGTI	10286	229			↑ 99%		↑ 1%		↑ 100%							20 Days	100 % Receded
10	BALOCHISTAN	8	QILLA SAIFULLAH	12446	229			↑ 100%	↑ 100%										05 Days	100 % Receded
11	FATA	1	SOUTH WAZIRISTAN AGENCY	5034	84			↑ 100%	↑ 100%										05 Days	100 % Receded
12	FATA	2	MOHAMAD AGENCY	2280	47		↑ 100%	↑ 100%											05 Days	100 % Receded
13	FATA	3	BAJAUR AGENCY	1502	31		↑ 100%	↑ 100%											05 Days	100 % Receded
14	FATA	4	KURRAM AGENCY	3469	20		↑ 100%	↑ 100%											05 Days	100 % Receded
15	KHYBER PAKHTOON KHWA	1	D. I. KHAN	9466	6014	↑ 66%	↓ 43%	↑ 100%	↓ 44%	↑ 2%	↓ 6%	↓ 25%	↓ 8%	↓ 1%					50 Days	9 % Still Inundated
16	KHYBER PAKHTOON KHWA	2	TANK	3167	1108	↑ 58%	↓ 15%	↑ 100%	↑ 20%	↓ 5%	↓ 21%	↓ 28%	↓ 7%	↓ 2%					50 Days	2 % Still Inundated
17	KHYBER PAKHTOON KHWA	3	LAKKI MARWAT	3126	316		↑ 100%	↑ 100%											05 Days	100 % Receded
18	KHYBER PAKHTOON KHWA	4	NOWSHERA	1806	287	↑ 78%	↑ 22%			↑ 82%	↓ 3%	↑ 100%							30 Days	100 % Receded
19	KHYBER PAKHTOON KHWA	5	SWABI	1474	241	↑ 75%	↑ 25%		↓ 37%		↓ 16%	↑ 100%							30 Days	100 % Receded
20	KHYBER PAKHTOON KHWA	6	HARIPUR	2113	220		↑ 100%		↑ 100%										10 Days	100 % Receded
21	KHYBER PAKHTOON KHWA	7	CHARSADDA	1091	215	↑ 57%	↑ 43%	↑ 100%											10 Days	100 % Receded
22	KHYBER PAKHTOON KHWA	8	LOWER DIR	1697	149		↑ 100%	↑ 100%											05 Days	100 % Receded
23	KHYBER PAKHTOON KHWA	9	KOHAT	3495	147	↑ 78%			↓ 47%	↑ 22%	↓ 9%	↑ 100%							30 Days	100 % Receded
24	KHYBER PAKHTOON KHWA	10	BANNU	2299	138		↑ 100%	↑ 100%											05 Days	100 % Receded
25	KHYBER PAKHTOON KHWA	11	SWAT	5087	130		↑ 100%	↑ 100%											05 Days	100 % Receded
26	KHYBER PAKHTOON KHWA	12	MANSEHRA	4310	62		↑ 100%	↑ 100%											05 Days	100 % Receded
27	KHYBER PAKHTOON KHWA	13	MARDAN	1617	59		↑ 100%	↑ 100%											05 Days	100 % Receded
28	KHYBER PAKHTOON KHWA	14	KOHISTAN	7628	43		↑ 100%	↑ 100%											05 Days	100 % Receded
29	KHYBER PAKHTOON KHWA	15	PESHAWAR	1410	29	↑ 55%	↑ 44%	↑ 100%											10 Days	100 % Receded
30	KHYBER PAKHTOON KHWA	16	SHANGLA	1278	11		↑ 100%	↑ 100%											05 Days	100 % Receded
31		1	MUZAFFARGARH	8412	4783	↑ 16%	↑ 11%	↑ 64%	↓ 31%	↓ 9%		↓ 15%	↓ 11%	↓ 5%		↓ 8%	↑ 14%	↓ 14%	55 Days	16 % Still Inundated
32		2	RAJANPUR	12372	3772	↑ 10%	↓ 3%	↑ 83%	↓ 32%	↑ 9%	↓ 7%	↓ 1%	↓ 1%	↓ 10%	↑ 4%	↓ 18%	↓ 16%	↓ 16%	55 Days	28 % Still Inundated
33		3	JHANG	6189	3003	↑ 20%	↑ 31%	↑ 49%	↓ 54%	↓ 5%		↓ 5%	↓ 21%	↓ 1%			↓ 3%	↓ 3%	55 Days	11 % Still Inundated
34		4	DERA GHAZI KHAN	11763	2840	↑ 49%	↑ 26%	↑ 25%	↓ 38%	↓ 5%	↓ 3%	↓ 16%	↓ 20%	↓ 1%	↑ 1%		↓ 6%	↓ 6%	55 Days	12 % Still Inundated
35		5	KHUSHAB	6634	1460	↑ 100%	↓ 55%	↓ 10%	↓ 35%	↑ 5%	↓ 5%	↑ 11%	↓ 6%						50 Days	5 % Still Inundated

Jacobabad

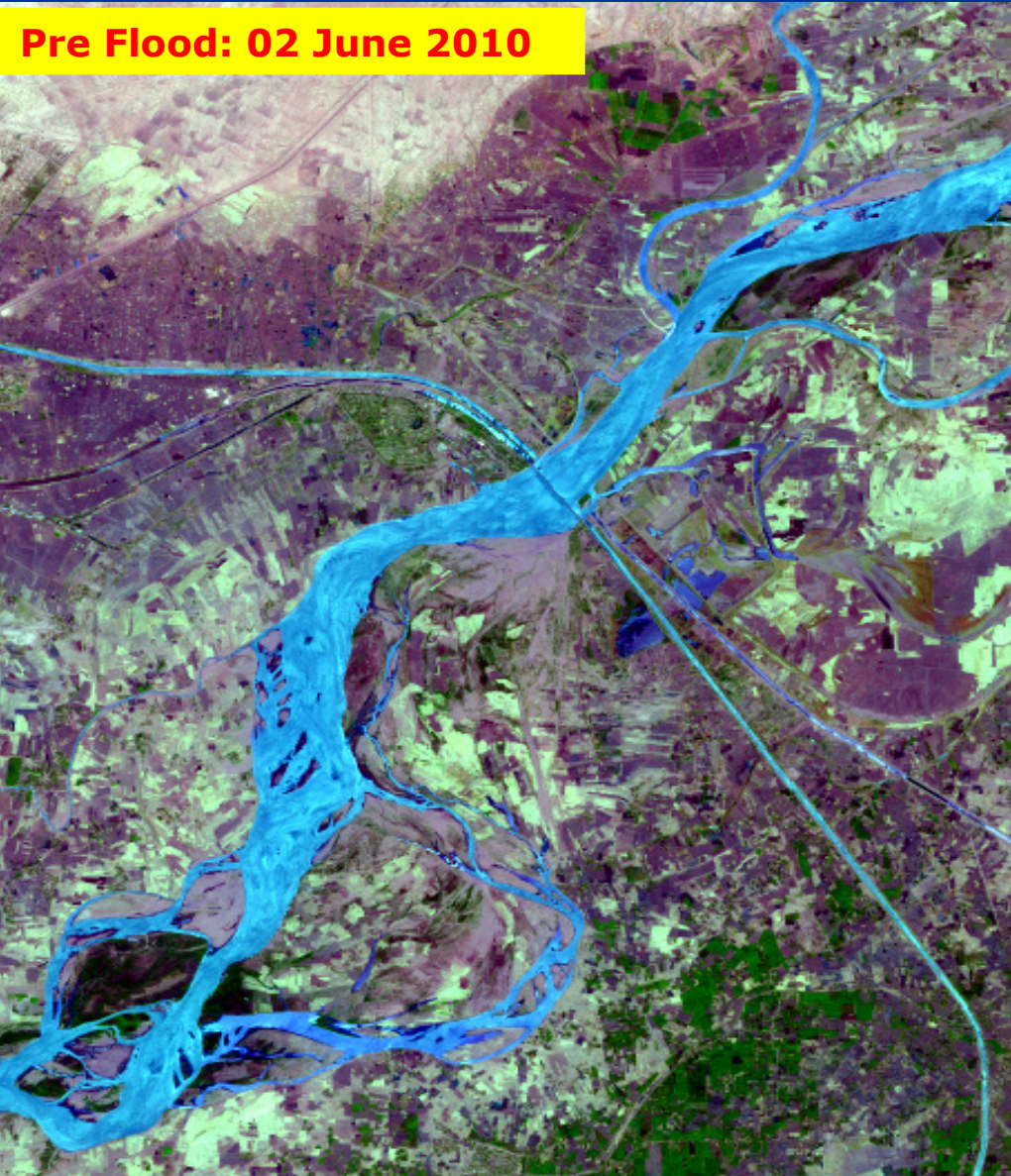**Pre Flood: 18 Jan 2009**
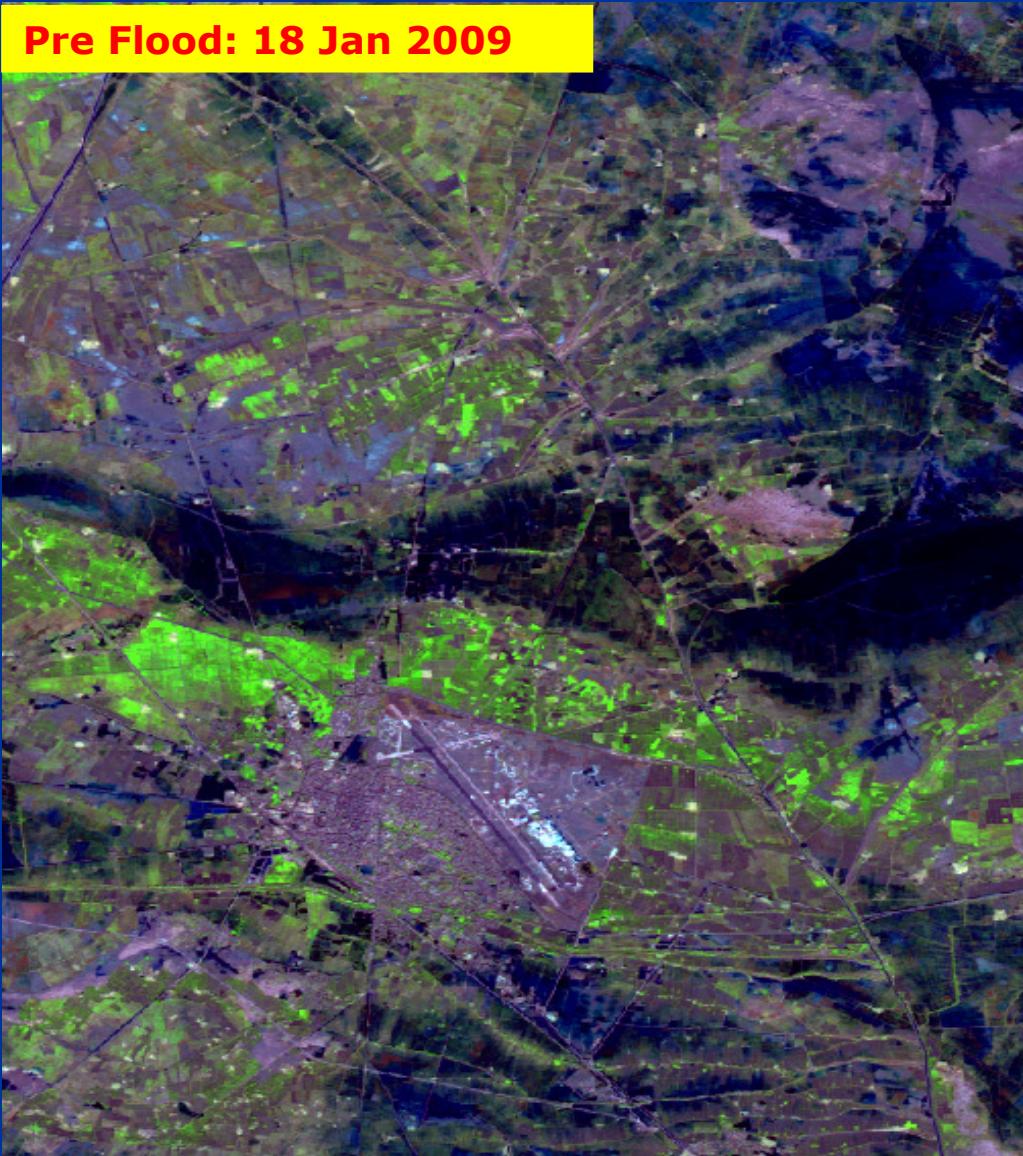
Post Flood: 03 Sep 2010

01 Jun 2010

27 Aug 2010

Gudu Barrage
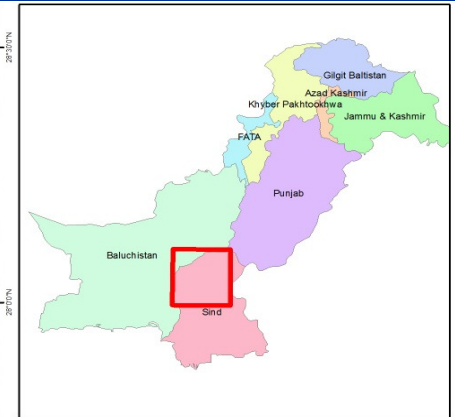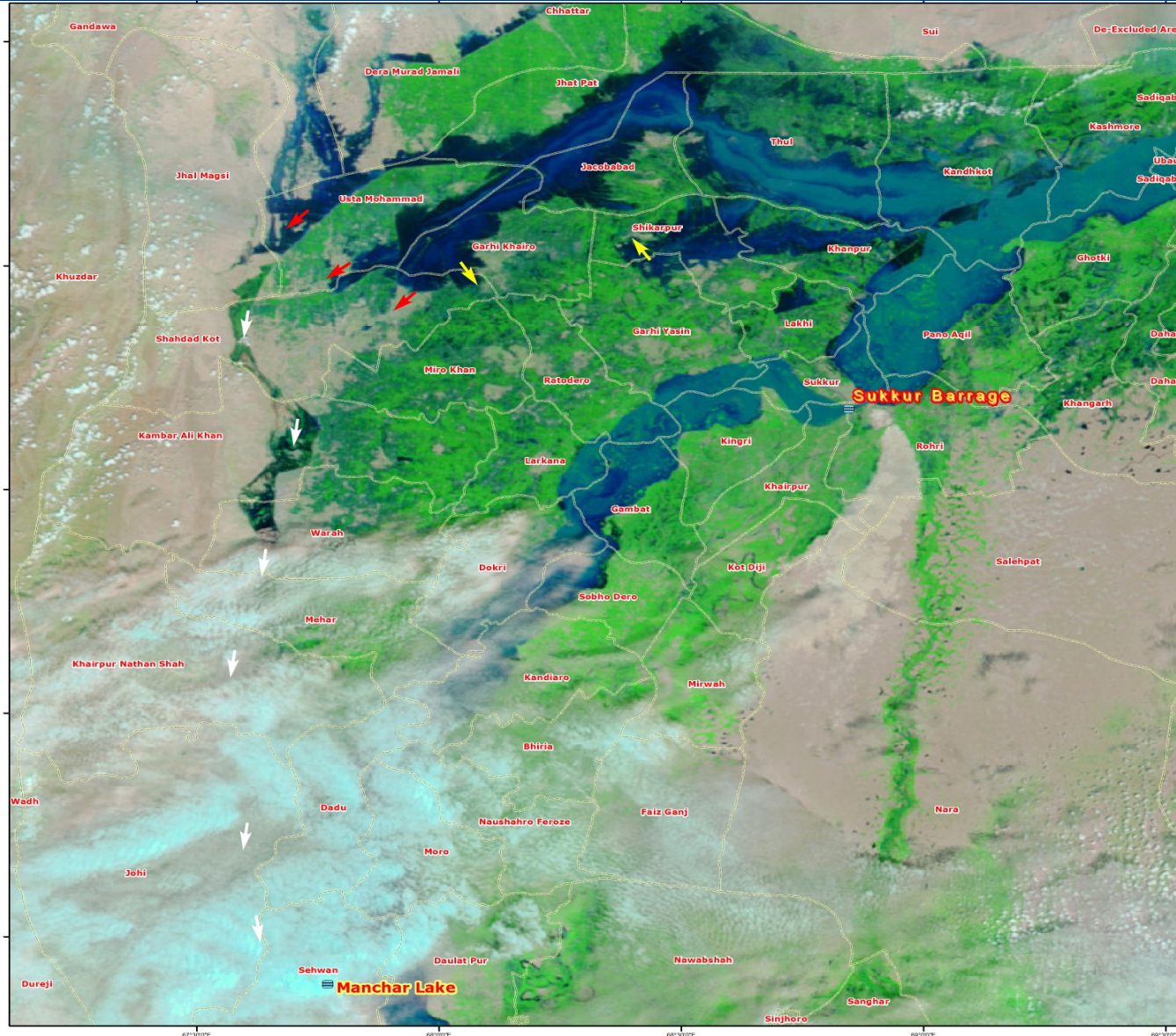
Pre Flood: 02 June 2010

Post Flood: 12 Aug 2010

Monitoring of Flood Flow

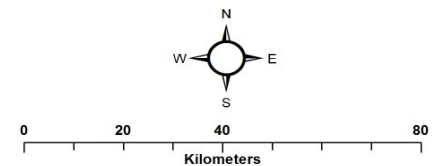**Legend**

- ⊞ Dam / Barrage
- ┄┄ Tehsil Boundary
- Fast Movement
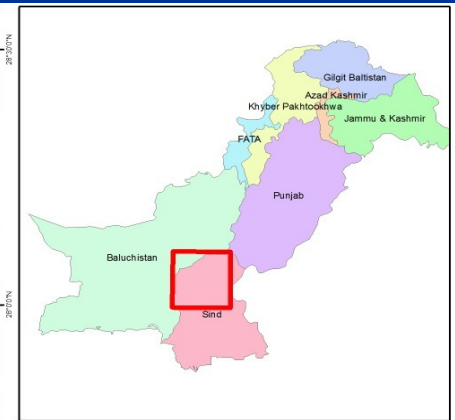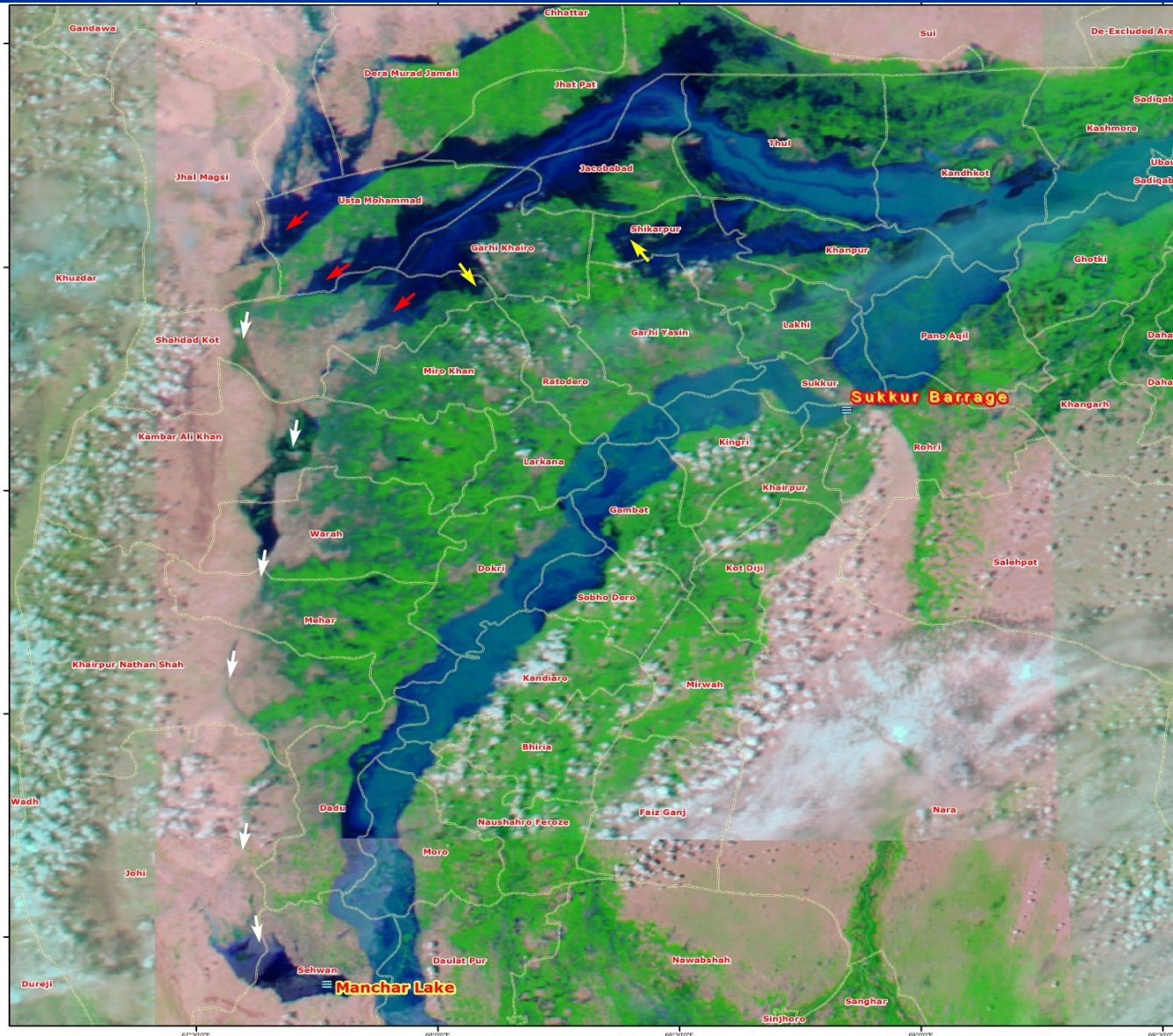- Slow Movement
- Potential Movement
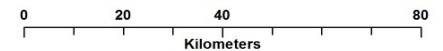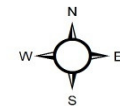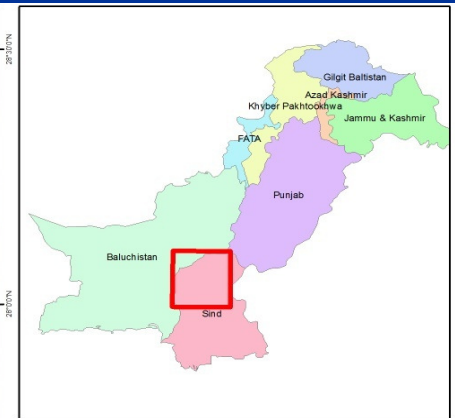
PRODUCED ON 20 AUGUST 2010
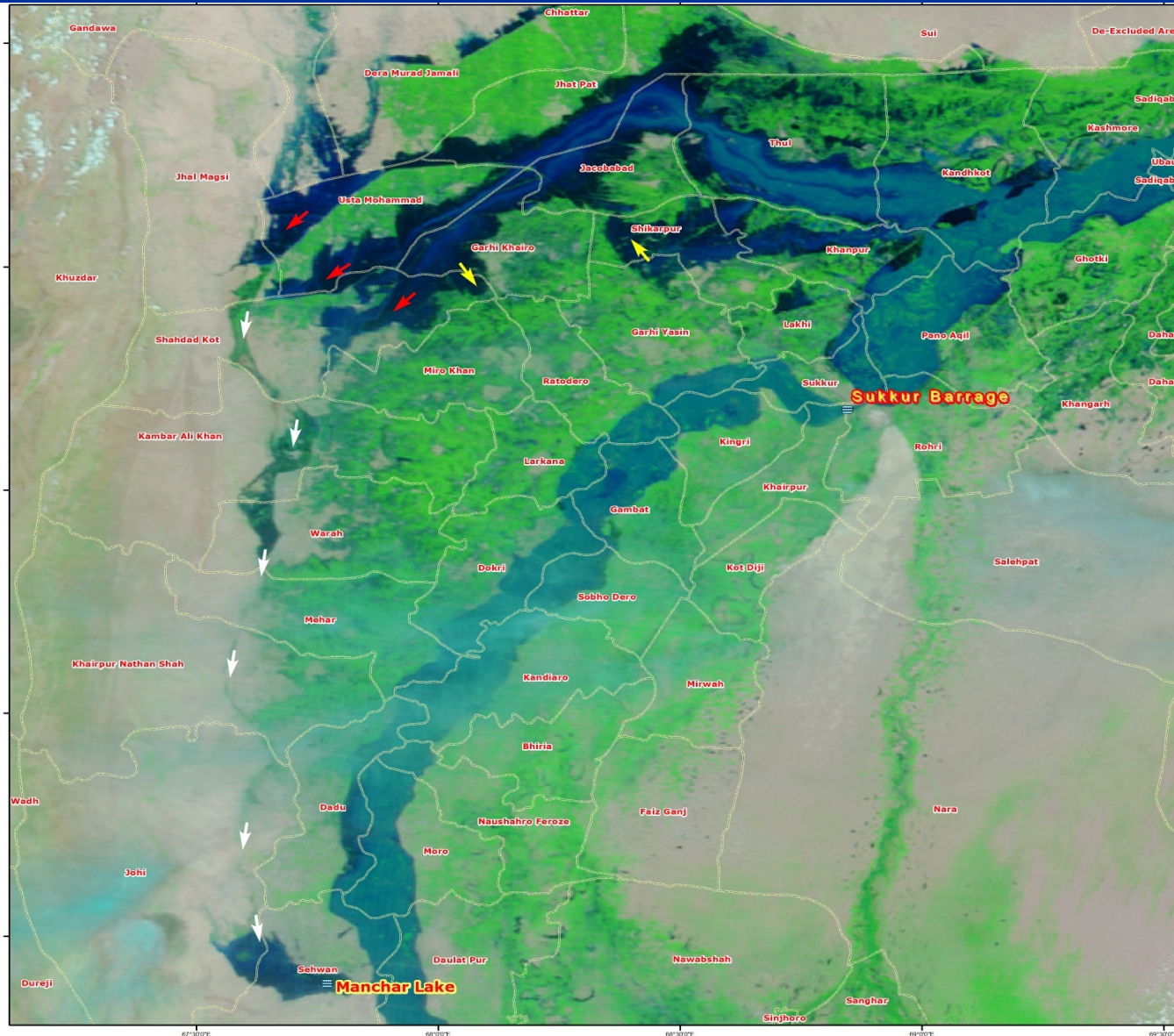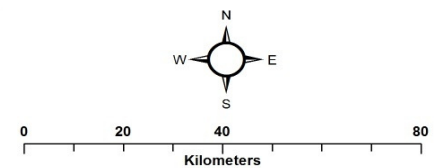
Monitoring of Flood Flow

Legend

- Dam / Barrage
- Tehsil Boundary
- Fast Movement
- Slow Movement
- Potential Movement

PRODUCED ON 21 AUGUST 2010

0   20   40   80
Kilometers

SUPARCO

Monitoring of Flood Flow

SUPARCO

Pakistan

Legend

Dam / Barrage
Tehsil Boundary
Fast Movement
Slow Movement
Potential Movement

PRODUCED ON 22 AUGUST 2010

Damage and Need Assessment

- In the wake of floods, the World Bank and Asian Development Bank led the Damage and Need Assessment (DNA) exercise

- World Bank was provided maps of affected areas and analysis of flood related damage

- Sectors covered were housing, roads, bridges, rail and airports, agriculture and irrigation

FAO, in collaboration with SUPARCO, undertook rapid crop damage assessment in the flood affected districts. This included:

- Flooded area breakdown by crop and district

- Date of inundation of affected districts and recession

- Displaced population in the affected districts and food needs

- Flooded area cumulative and latest by affected districts vs total area of these districts

Acknowledgment

UN-SPIDER

THANK YOU

UN-SPIDER