Irrigation System, Arid Piedmont Plains of Southern Khyber-Paktunkhwa (NWFP), Pakistan; Issues & Solutions

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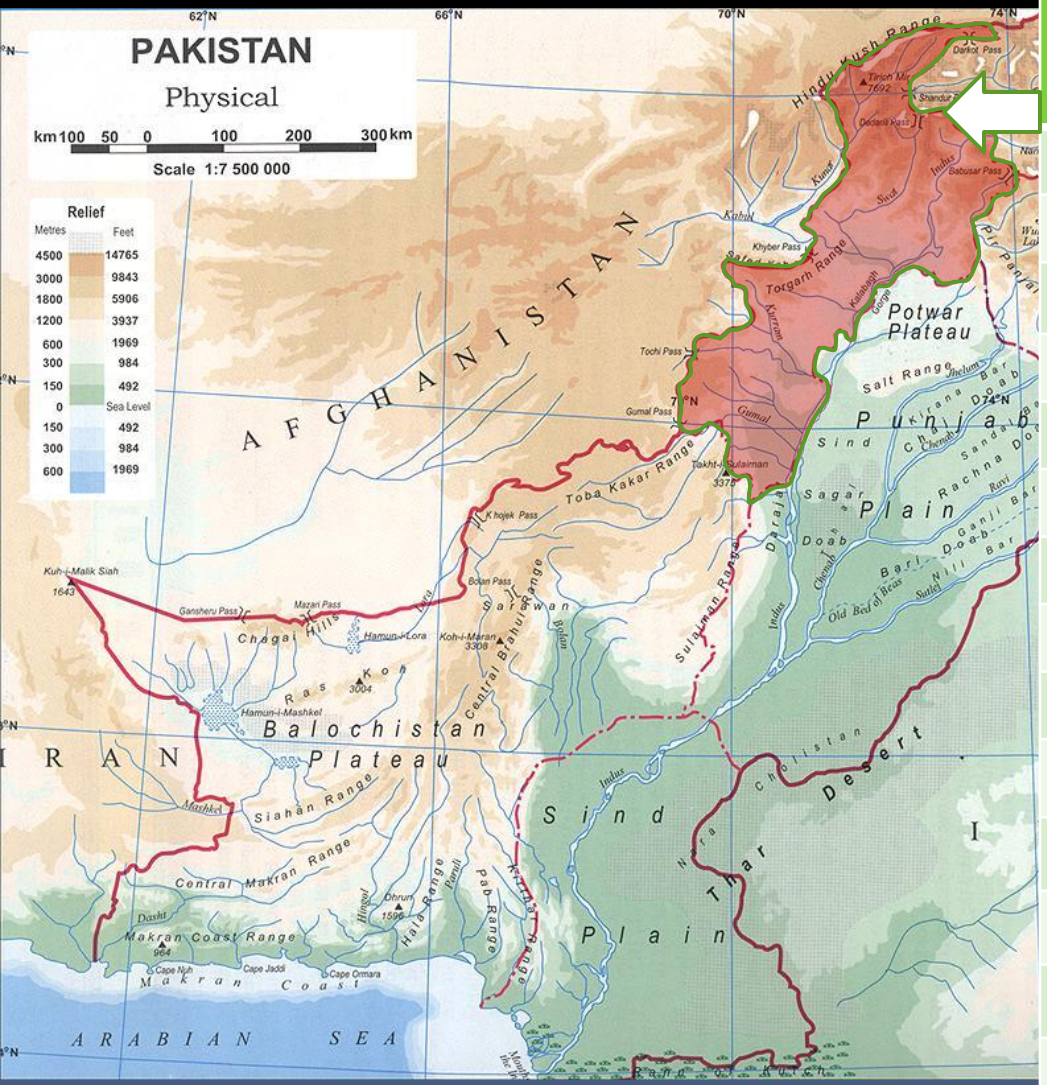
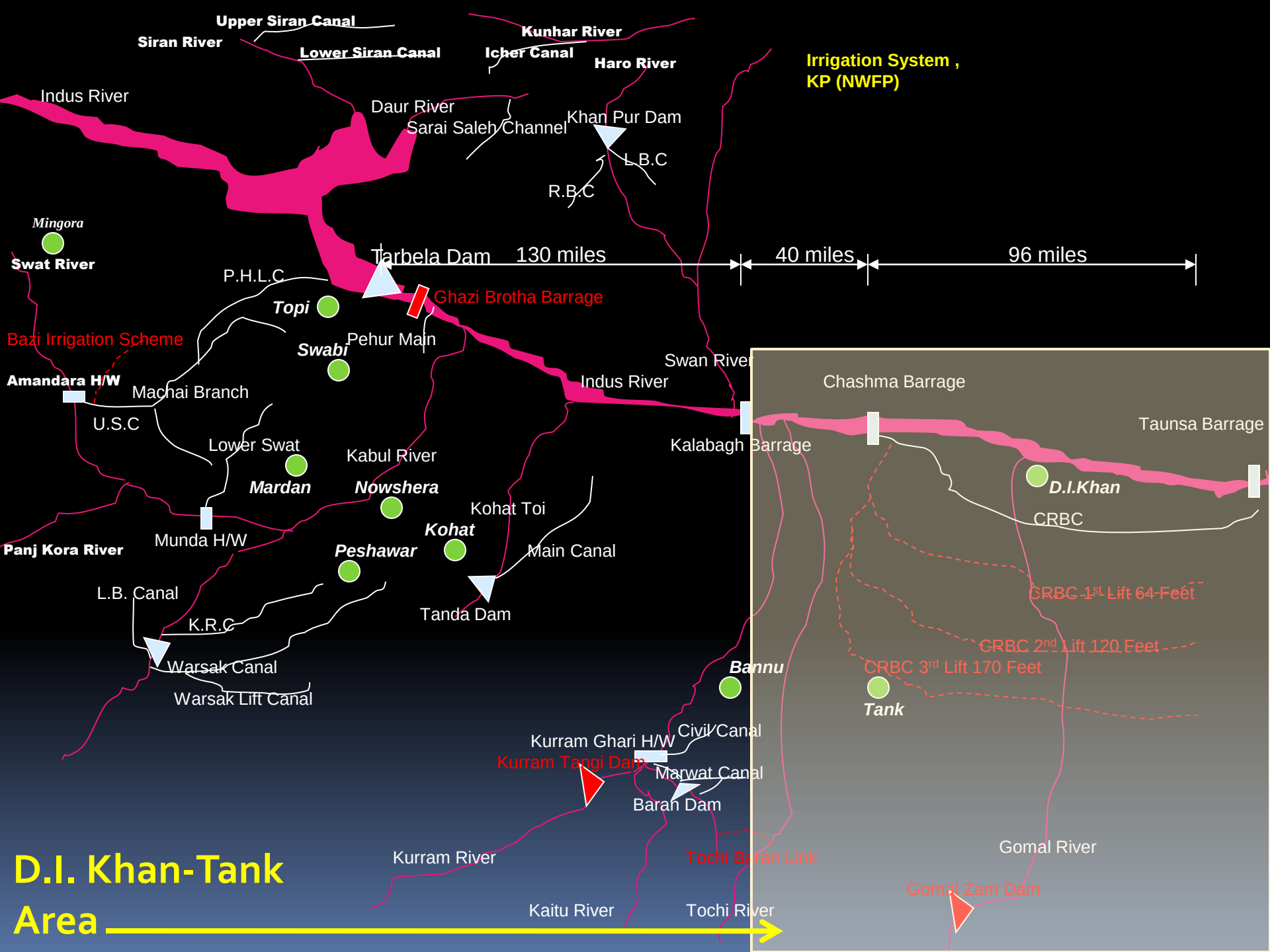
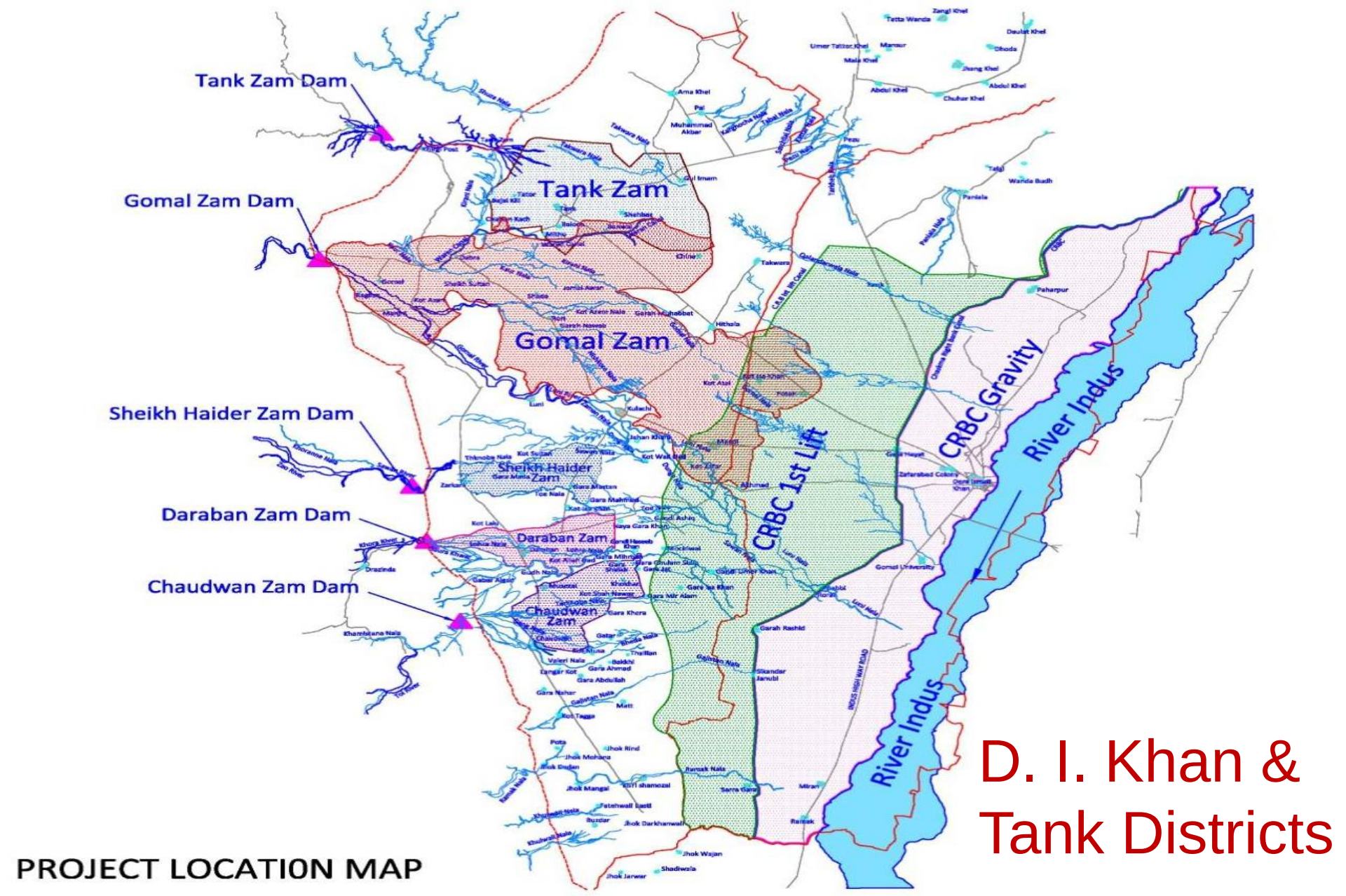
IRRIGATION POTENTIAL



Khyber-Paktunkhwa (NWFP)	(Million Acres)
Total Area (NWFP+FATA)	**25.4**
Cultivable Area	**6.72**
Irrigated Area	
Govt. Canals	1.2467
Civil Canals	0.82
Lift Irrigation Schemes	0.1095
Tube Wells/Dug Wells	0.1008
Total	**2.277**
Potential Area for Irrigation	**4.443**
Lakki Marwat	0.588
D.I. Khan	1.472
Tank	0.436
Total	**2.496**
Rest of Province	**1.947**


Irrigation System ,
KP (NWFP)
Upper Siran Canal
Siran River
Lower Siran Canal
Kunhar River
Icher Canal
Haro River
Indus River
Daur River
Sarai Saleh Channel
Khan Pur Dam
L.B.C
R.B.C
Mingora
Swat River
Tarbela Dam
130 miles
40 miles
96 miles
P.H.L.C
Ghazi Brotha Barrage
Topi
Bazi Irrigation Scheme
Swabi
Pehur Main
Swan River
Amandara H/W
Machai Branch
Indus River
U.S.C
Chashma Barrage
Taunsa Barrage
Lower Swat
Kabul River
Kalabagh Barrage
Mardan
Nowshera
D.I.Khan
CRBC
Kohat Toi
Kohat
Munda H/W
Panj Kora River
Peshawar
Main Canal
L.B. Canal
CRBC 1st Lift 64 Feet
K.R.C
Tanda Dam
CRBC 2nd Lift 120 Feet
Warsak Canal
Bannu
CRBC 3rd Lift 170 Feet
Tank
Warsak Lift Canal
Civil Canal
Kurram Ghari H/W
Kurram Tangi Dam
Marwat Canal
Barah Dam
Gomal River
Kurram River
Tochi Barah Link
Gomal Zam Dam
Kaitu River
Tochi River
D.I. Khan-Tank
Area

Flood Irrigation Vs Canal Irrigation Command



BACKGROUND OF AREA

These areas have approximate a GCA of 1.908 Million Acers and a CCA of over 1.0 Million Acers.

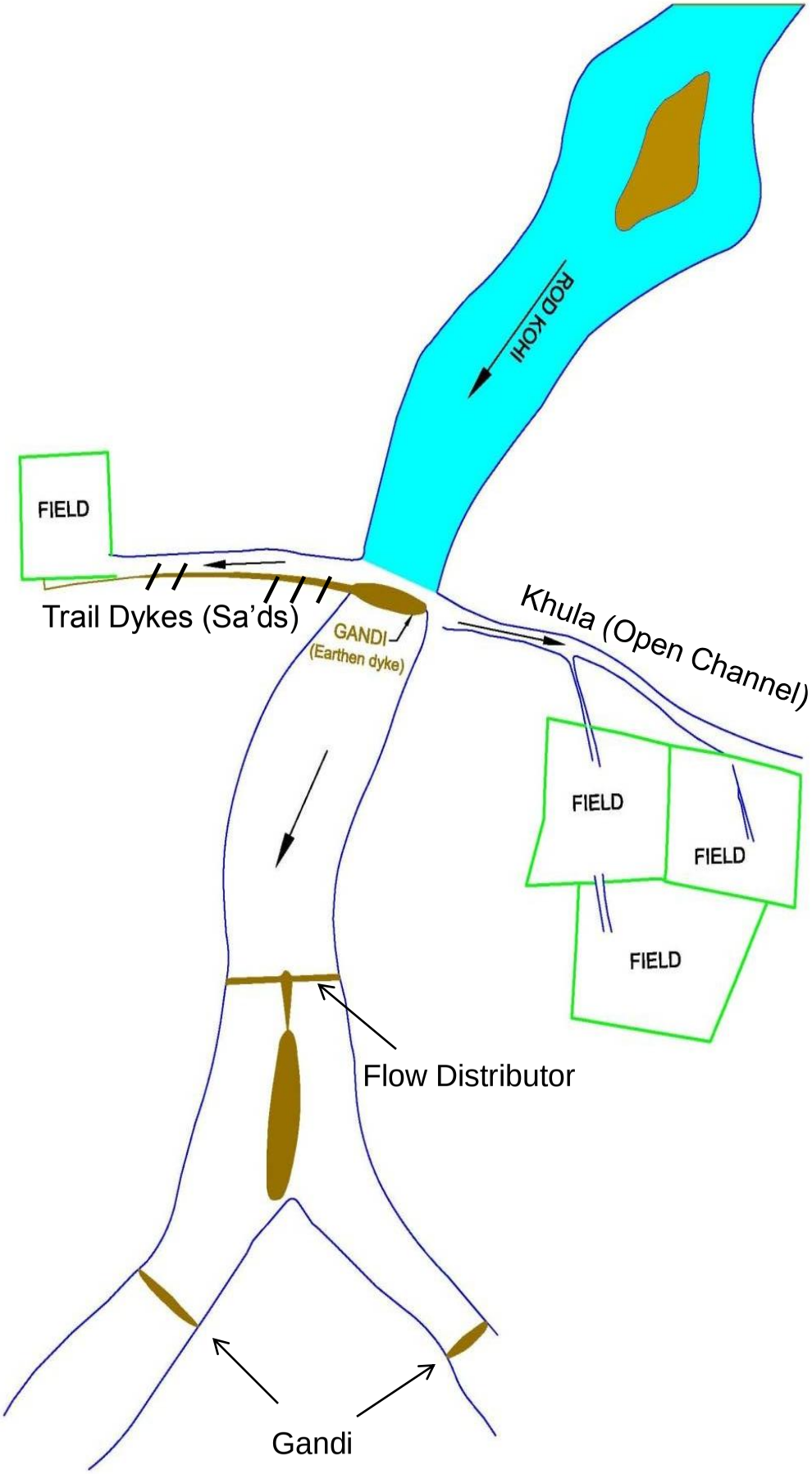
DERA ISMAIL KHAN

- Population 1.4 Million
- No damages from River Indus passing a discharge of 1.3 Million Cusecs
- All damages from the Hill Torrents to the Human life, livestock and infrastructure
- Reaction time for floods < 6 Hours.
- **No sub-soil water availability in the whole Daman area**

HILL TORRENTS

S.#	Name of Zams	Catch Areas Sq M	Discharge Cusecs Maximum	Length Miles
1.	Tank Zam	910	1200	191
2.	Gomal Zam	13900	160000	165
3.	Sheikh Haider Zam	175	40000	83
4.	Darban Zam	423	70000	28
5.	Chowdwan Zam	352	55000	143
6.	Sohaili Nullah	9.51	785	18.2
7.	Kaur Nullah	20	1030	22.6
8.	Zahan Nullah	7.5	1030	12
9.	Doung Nullah	15.07	642	25.8
10.	Gajistan Nullah	21.78	1355	22
11.	Ramak Nullah	24.39	1595	32

COMPONENTS OF ROD KOHI IRRIGATION SYSTEM



What is ROD KOHI?

- Conventional Irrigation in these hill torrents is called Kulyat and Riwajat-i-Abpashi that complies to comprehensive irrigation practices.
- Basic rights are established on basis of upper and lower riparian.

Contd..

- Purpose of these structures is to

a. Control water intensity
b. Distribute water into further small tracts known as “WAHS”

ADMINISTRATION

- Rod Kohi wing was re-established under revenue department in 1994.
- Functions of wing.
  - Maps Preparation.
  - Rules documentation.
  - Indigenous Knowledge and expertise.
  - All stakeholders involved.
  - Well Staffed.

ADMINISTRATION AFTER 2001 DEVOLUTION

- Kamara at village level.
- Watch and ward of structures.
- WUA of Revenue department co-ordinate.
- Funding through special Programs at Federal/Provincial level.
- Supply of Bulldozers hours, diesel etc.

SHORTFALL

- System fails in high floods that cause catastrophe to Human lives and Infrastructure.

PROBLEMS IN ROD KOHI.

- No regular flow.
- Flooding for one crop only (Rabi).
- Misuse of Rights by the upper riparian.
- Mistrust.
- Lack of coordination with the Lower riparian.
- Lack of decision power.

Contd..

- No control over temporary structures
- Lack of Technical Knowledge.
- Lack of earth moving machinery, manpower, finances, maintenance.
- High flood damages.
- High availability of flood water wasted
- Highly erosive soil of Daman area

ISSUES

A – TECHNICAL

- Due to vast variation of normal flows and floods, it is difficult to predict the land to be irrigated
- Probability of command for irrigation is low, medium and high so there is high risk in Rod Kohi System within the command of a Nullah
- Erosion and siltation are un expected and highly variable and have not been understood properly
- Insufficient and improper management to convey flows within the system
- Maintenance.

Contd..

B – SOCIAL

- Low priority to system and funding
- Lack of Coordination amongst all stake holders i.e. organizers, owners having rights, water user/village associations, farmers, notables and politicians
- Water distribution allocations/rights
- Out migration and depopulation
- Shortage of labor and tenancy
- Lack of conflict management and resolution
- Lack of institutional, technical and logistic support

Contd..

C – ECONOMIC

- Low value cash crop due to unsure irrigation
- No alternate source of income
- Failure rate of schemes is high due to design parameters, sediment transport and single structure consideration
- Funding constraints

RECOMMENDATIONS

A - MICRO LEVEL

- Off-Channel flood diversions of floods to new areas
- Catchment interventions like, small and medium storages, Ponds, Delay Action Dams, check dams, plantation etc.
- Alternate irrigation techniques and methods like drip, sprinkler, trickle irrigation
- Water conveyance, diversions, control and application
- Establishing a Flood Early Warning System

Contd..

B - MACRO LEVEL

- Establishing an **Independent Integrated Authority**
- Institutional, financial and logistic support
- Specific water sector projects needed
- An Indus Water Treaty like agreement with Afghanistan
- Comprehensive flood management studies of these Hill Torrents and utilization of floods drained to Arabian sea
- FEWS

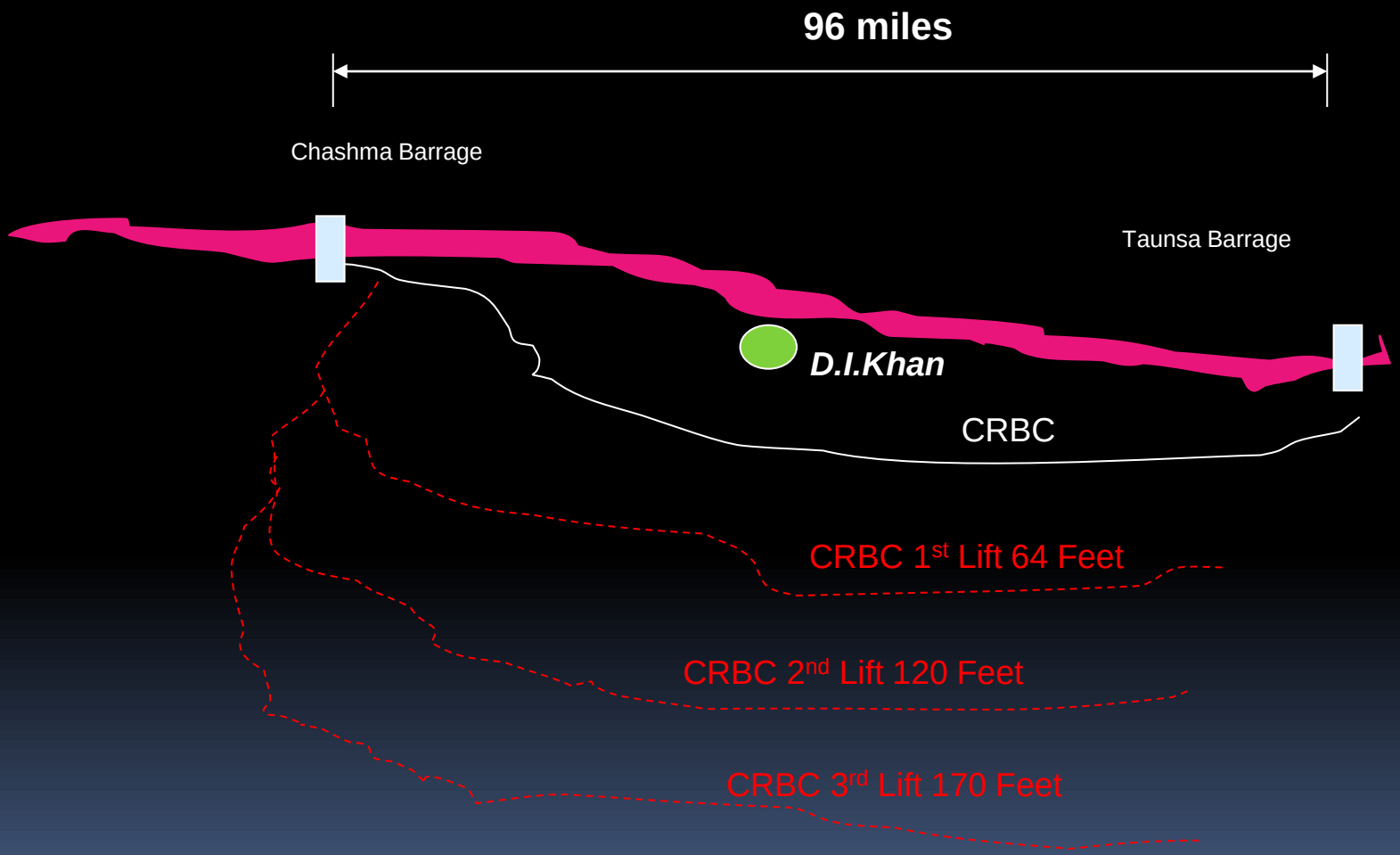
PROPOSED PROJECTS

IN THE AREA

SALIENT FEATURES OF PROPOSED DAMS

Name of Dams	Estimated Cost Rs. Billion	Gross Storage MAF	Dam Height Feet	Axis Length Feet	Power MW	Status
Gomal Zam	21.77	1.140	437	758	17.4	Under Construction
Tank Zam	19.90	0.216	275	1285	25.5	Detailed design in progress
Daraban Zam	2. 875	0.068	147	850	-	Detailed design in progress
Chaudwan Zam	4.49	0.051	200	1936	-	Detailed design in progress
Sheikh Haider Zam	3.863	0.907	190	1535	-	Detailed design in progress

CRBC LIFT CANAL PROPOSALS



CRBC LIFT CANAL PROPOSALS

Canal	CCA (Acres)	Length (Miles)	Discharge (Cusecs)	Lift (Feet)	Estd Cost
1st Lift	272960	78	2337	60	
2nd Lift	248080	89	2124	120	
3rd Lift	178960	101	1531	170	
Total	**700000**				
Status Feasibility studies completed for 1st Lift Canal only.					

JULY-AUGUST 2010 FLOOD

Updated Flood Waters in Charsadda and Nowshera Districts, Pakistan

Flood Analysis with RADARSAT-2 Satellite Data Recorded on 5 August 2010

This map presents an analysis of standing flood waters over the affected Charsadda and Nowshera Districts, Khyber-Pakhtunkhwa Province, Pakistan, based on post-disaster RADARSAT-2 data from 5 August and MODIS on 31 July 2010. Pre-flood water data was obtained from RADARSAT-1 satellite data (1 Dec. 1999). Please note that there are several associated levels of uncertainty with this analysis due to the limitations of comparing radar and optical satellite data with different spatial resolutions. It is likely that the extent of the flood waters detected on 5 August has been underestimated along some sections of the Kabul River within the map extent. The exact limit of the MODIS flood water detection on 31 July 2010 is also uncertain because of the relatively low spatial resolution of the sensors used. This analysis has not yet been validated in the field. Please send ground feedback to UNITAR / UNOSAT.

Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter, which is about assisting the disaster relief organizations with multi-satellite data and information, visit www.disasterscharter.org

Monsoon Rains & Flooding

9 August 2010

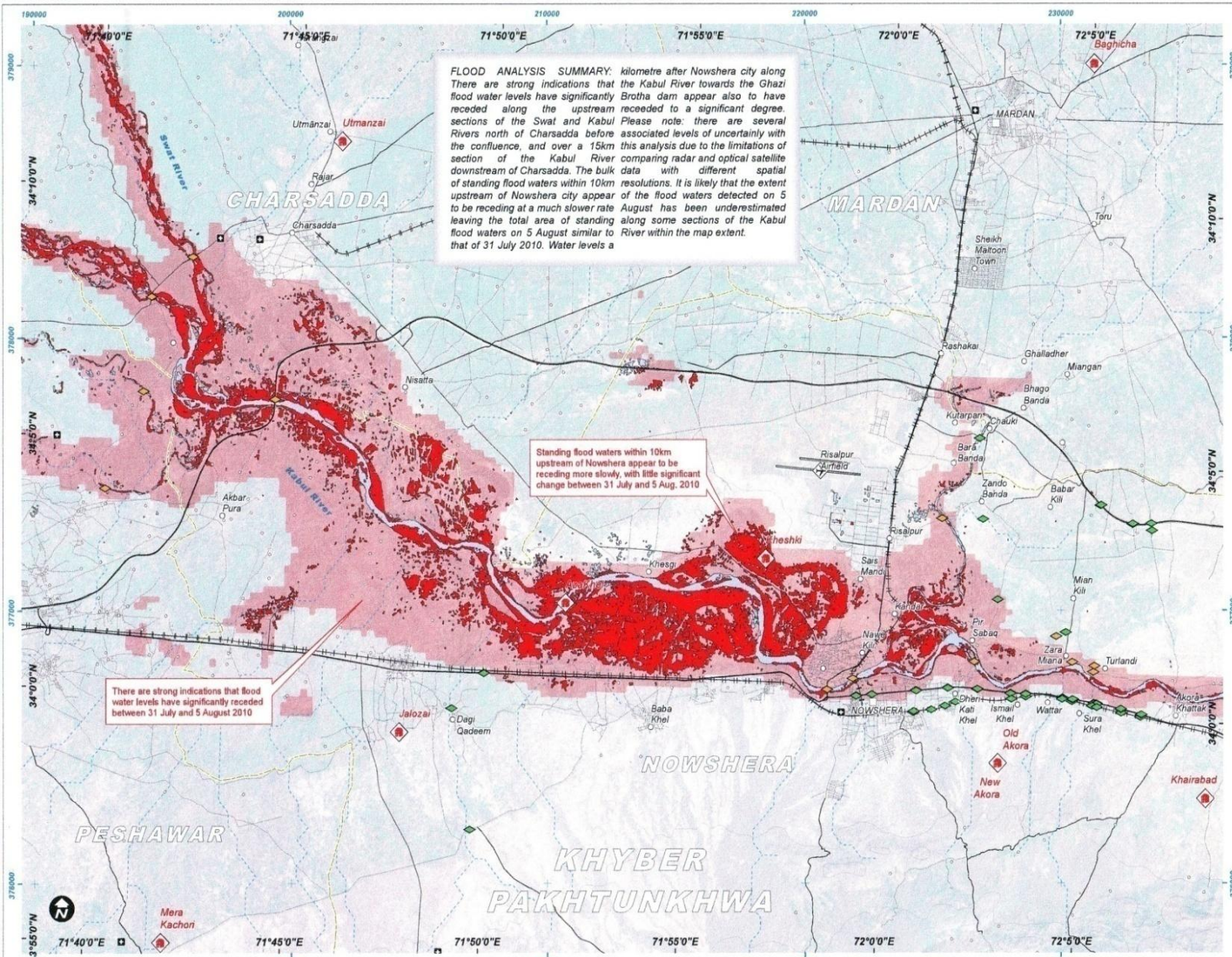
Version 1.0

Glide No: FL-2010-000141-PAK

FLOOD ANALYSIS SUMMARY: There are strong indications that flood water levels have significantly receded along the upstream sections of the Swat and Kabul Rivers north of Charsadda before the confluence, and over a 15km section of the Kabul River downstream of Charsadda. The bulk of standing flood waters within 10km upstream of Nowshera city appear to be receding at a much slower rate leaving the total area of standing flood waters on 5 August similar to that of 31 July 2010. Water levels a kilometre after Nowshera city along the Kabul River towards the Ghazi Brotha dam appear also to have receeded to a significant degree. Please note: there are several associated levels of uncertainly with this analysis due to the limitations of comparing radar and optical satellite data with different spatial resolutions. It is likely that the extent of the flood waters detected on 5 August has been underestimated along some sections of the Kabul River within the map extent.

Standing flood waters within 10km upstream of Nowshera appear to be receding more slowly, with little significant change between 31 July and 5 Aug. 2010

There are strong indications that flood water levels have significantly receded between 31 July and 5 August 2010



Legend

- Primary Road
- Secondary / Local Road
- River / Drainage Line
- Province Border
- District Boundary
- Railroad
- Elevation Contour (100m)
- Main City
- Town / City
- Village / Settlement
- Health Facility
- Refugee Settlement (open)
- Airport / Airfield

SATELLITE ASSESSMENT CLASSIFICATION:

- Bridge (likely functional)
- Bridge (Potentially Flood-Affected / damaged)
- Probable Flood Waters as on 5 August 2010 (Radarsat-2)
- Probable Flood Water Extent on 31 July 2010 (MODIS) - Likely represents the approximate extent of flood water reduction between 31 July & 5 August 2010
- Pre-Crisis Water Extent as on 1 December 1999 (Radarsat-2)

Map Scale for A3: 1:140,000

0 1 2 4 6 Kilometers

Crisis Satellite Data (1)	RADARSAT-2
Resolution	25 meters
Image Date	5 August 2010
Copyright	Radarsat 2 © MDA 2010
Source	Canadian Space Agency
Crisis Satellite Data (2)	MODIS Aqua & Terra
Resolution	250 meters
Image Date	31 July - 1 August 2010
Source	NASA Rapid Response
PreCrisis Satellite Data	RADARSAT 1
Resolution	25 meters
Image Date	1 December 2010
Copyright	Radarsat 1 © MDA 2010
Source	Canadian Space Agency
Elevation Data	Aster GDEM
Source	METI & NASA 2009
GIS Data	NGA, OCHA, Google Maps
Hydrology Data	USGS HydroSheds
Road Data	Google Map Maker
Road Data Copyright	© 2009 Google - Improve with Google Map Maker
Background Imagery	ESRI (Landsat7 WMS)
Refugee Data	UNHCR
Hospital Data	WHO
Flood Analysis	UNITAR / UNOSAT
Map Production	UNITAR / UNOSAT
Projection	UTM Zone 43N (WGS-84)

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UNOSAT
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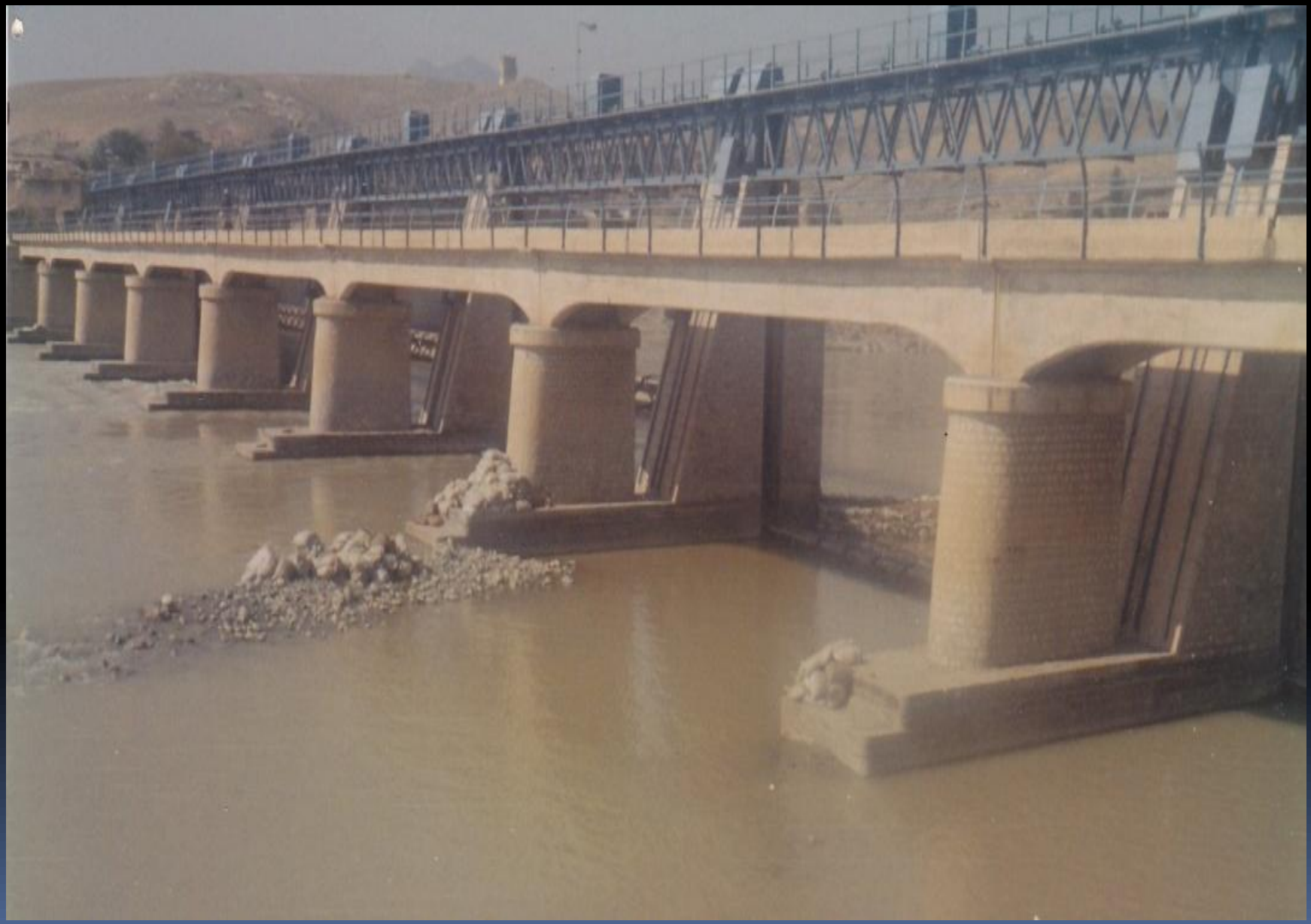
MAIN SHOBRA CHOWK, NOWSHERA

ANOTHER VIEW OF NOWSHERA

MUNDA HEADWOKS PRE-FLOODS



MUNDA PEAK FLOODS

MUNDA HEADWORK S AFTER 29-7-2010

TAKWARA PEAK FLOODS, D. I. KHAN

TAKWARA PEAK FLOODS

TAKWARA DAMAGED

DI KHAN FLOODS

DI KHAN INUNDATION

DI KHAN DURING FLOODS

DI KHAN FLOOD DAMAGES

CRBC DAMAGES

CRBC DAMAGES


Thank You!