

Background Paper
(Draft)

Inter-Provincial Water Issues in Pakistan

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in Pakistan**

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Abbreviations and Acronyms

CRBC	Chashma Right Bank Canal
C-J	Chashma- Jehlum
CCI	Council on Common Interests
DGKC	Dera Ghazi Khan Canal
GDP	Gross Domestic Product
GOB	Government of Balochistan
IRSA	Indus River System Authority
KP	Khyber Pakhtunkhwa
KM	Kilometre
MAF	Million Acre Feet
NWC	North West Canal
NWFP	North West Frontier Province (now named Khyber Pakhtunkhwa)
SCARP	Salinity Control And Reclamation Project
T-P	Taunsa-Punjad
WAA	Water Apportionment Accord
WAPDA	Water and Power Development Authority
WCAP	Water Sector Capacity Building & Advisory Services Project

PREFACE

Recent floods during the summer of 2010 and the ensuing deaths and destruction has once again highlighted the question of water resources management and inter-provincial differences on the subject in Pakistan. Pakistan seems to be facing the cycles of extra-ordinary dry and wet spells. Drought like conditions prevail for a few years and then floods hit the land leading to severe losses in both cases. The question is being asked that can there be a way to manage the cyclic surpluses and shortages to the advantage of the end users?

As the energy costs are shooting through the roof and Pakistan has started facing the worst electricity shortages of its history, the need to generate economical and clean electric power through hydro-electric projects is being emphasized. But the proposed solutions are not without controversy. There has been divergence of views among the provinces about the desirability of instituting water development projects. Since river Indus and its tributaries are the life line of almost all provinces of the country, the dwindling flows in the rivers have given rise to provincial tensions on the question of sharing this resource which was once considered infinite. Although Pakistan is lucky that its provinces had agreed to sign a unanimous Water Apportionment Accord in 1991, there have been varied interpretations of the accord leading to serious disputes between the provinces. Perceived or real failure to implement the accord in letter and spirit has weakened the mutual trust of the provinces. Punjab and Sindh differ on the interpretation of Water Apportionment Accord 1991; Sindh strongly opposes the construction of water reservoirs especially the Kalabagh Dam on river Indus because it apprehends that it would lead to the pilferage of its share of water from the river Indus. Khyber Pakhtunkhwa is unable to make use of its allotted share of water from river Indus and it objects to the construction of Kalabagh Dam on the grounds of its perceived or real adverse effect on the agriculture and infrastructure of Khyber Pakhtunkhwa. Balochistan, being a lower riparian to Sindh, accuses Sindh of holding back its due share of Indus River water. As the time will pass, it is anticipated that water availability in a normal year will further go down leading to further strain on agriculture-based economies of the four provinces and on inter-provincial harmony. Experiences from similar disputes in other countries indicate that merely administrative, technical, judicial or political solutions do not work unless a broader understanding and agreement emerges among the water users and their representatives. An informed dialogue based on facts and figures and knowledge of each other's position and grievances has been found to be one of the most effective ways to address inter-state and inter-provincial water disputes.

It is in this context that PILDAT has initiated the process of dialogue among various segments of all the four provinces notably Water Experts, Parliamentarians, Members of the Provincial Assemblies and media persons.

PILDAT Background Paper on **Inter-Provincial Water Issues in Pakistan** has been prepared to assist and support an informed dialogue. The aim of the background paper is to present the issues in their available detail so as to provide concise and objective information to all stakeholders on inter-provincial water issues in Pakistan and to enable them to understand the issues more meaningfully and recommend agreeable solutions for better policy initiatives and options. This background paper has also been commissioned to explain the inter-provincial water issues in a simple and concise manner so that the politicians, legislators and media persons who may not be technical experts could use this paper as a reference material to update their knowledge of the issues and the positions of various provinces on these issues. The ultimate objective is to hopefully resolve such issues through a sustained and informed dialogue. The paper is intentionally non-prescriptive and tends to faithfully present various viewpoints with their background.

Acknowledgments

PILDAT would like to acknowledge with gratitude the services of **Mr. Muhammad Idrees Rajput**, the former Secretary of Irrigation and Power Department, Government of Sindh, who authored this paper. PILDAT also wishes to place on record its deep appreciation for a number of eminent water experts from all the four provinces and the federation (listed separately in the paper) who participated in a series of roundtables to discuss inter-provincial water issues and in the process reviewed this paper and enriched it further with their contributions. Mr. Rajput was gracious to have incorporated numerous comments from these

experts in the paper. It is not necessary that all experts who participated in the roundtables agree with everything contained in the background paper but an effort has been made to include all major inter-provincial water issues and associated view points regarding these issues in the paper. PILDAT edited the paper to make it as concise and representative of all key view points.

We also wish to thank the British High Commission, Islamabad for its support to the project aimed at promoting understanding of inter-provincial water issues as a first step towards their resolution through dialogue. This paper is just one output of the project. We hope that this paper will be helpful in promoting an informed dialogue among all the stake holders, promoting better understanding of these issues and eventually resolving these issues.

Disclaimer

The author, the water experts who participated in the Roundtable and PILDAT have made every effort to ensure the accuracy of the contents of this paper. PILDAT, however, does not accept any responsibility of any omission or error as it is not deliberate. The content of this background paper does not reflect the views of PILDAT or British High Commission, Islamabad.

Islamabad
January 2011

ABOUT THE AUTHOR



Mr. Muhammad Idris Rajput

Former Secretary Irrigation and Power Department, Government of Sindh

Mr. Muhammad Idris Rajput was born on November 20, 1941. By profession a Civil Engineer, Mr. Rajput has received his B.E. (Civil) from University of Karachi in 1965 and then studied at the University of Minnesota, USA under Fulbright Hays Scholarship during 1969 to 1970. He has over 40 years extensive experience in Water Resources Engineering, Design and Construction Management of Water Projects.

He was appointed as Additional Secretary, Irrigation and Power Department, Government of Sindh, Karachi in 1987 and later in 1991 promoted as Secretary, Irrigation and Power Department, Government of Sindh. During 1994 to 1996, he served as the Chief Planning Engineer in Irrigation and Power Department of Sindh government. He resumed the responsibilities of the Secretary Irrigation and Power Department, Government of Sindh in 1998 and remained on the position till November 2001. Since, January 2004, Mr. Rajput is serving with National Development Consultants (NDC) Lahore, Pakistan as a Project Manager, Revamping/ Rehabilitation of Irrigation and Drainage Systems in Sindh Project. He has also attended many national and international Seminars, and Conferences on Water Issues. He is a member of the Governing Body of Pakistan Engineering Council since 2008.

List of Participants of the Roundtables on Inter-Provincial Water Issues in Pakistan

List of Water Experts who participated in at least one of the three Experts' Roundtables and contributed to the Background Paper includes the following listed alphabetically by first-name:

1. **Mr. Abdul Razik Khan Kansi**, Former Chairman, Indus River System Authority-IRSA, Balochistan
2. **Mr. Abdus Salam Khan**, Former Secretary Irrigation and Power Department, Balochistan /Member, Balochistan Public Service Commission, Balochistan
3. **Mr. Abrar Kazi**, Former Secretary of Sindh Water Committee, Sindh
4. **Mr. Amjad Agha**, President, Associated Consulting Engineers (ACE) Ltd. Lahore, Punjab
5. **Mr. Asif H. Kazi**, Former Chief Engineering Advisor/ Chairman Flood Commission and ex-Member (Water) WAPDA / Former Chairman of the Committee on Water Distribution, Punjab
6. **Mr. Ibrahim Rind**, Chief Engineer, Irrigation and Power Department, Balochistan
7. **Mr. Iqbal Saigol**, Industrialist and Entrepreneur, Punjab
8. **Mr. Khalid Mohtadullah**, Former Member (Water), WAPDA, Senior Advisor / Director International Water Management Institute-IWMI, Pakistan, Khyber Pakhtunkhwa
9. **Ch. Mazhar Ali**, Former Adviser Irrigation and Power Department, Punjab
10. **Mr. Muhammad Amin**, Member Indus River System Authority-IRSA, Government of Pakistan, Balochistan
11. **Mr. Muhammad Idrees Rajput**, Former Secretary Irrigation and Power Department, Sindh
12. **Mr. Naseer Ahmed Gillani**, Chief Water Resources, Planning Commission, Government of Pakistan, Islamabad
13. **Mr. Naseer Memon**, Chief Executive, Strengthening Participatory Organization-SP, Sindh
14. **Ms. Rabia Sultan**, Spokesperson, Punjab Water Council, Punjab
15. **Mr. Raqib Khan**, Member, Indus River System Authority-IRSA, Government of Pakistan, Khyber Pakhtunkhwa
16. **Rao Irshad Ali Khan**, Chairman Indus River System Authority-IRSA, Government of Pakistan, Punjab
17. **Sardar Muhammad Tariq**, Former Member (Water), WAPDA, Regional Chair Global Water Partnership - South Asia (GWP-SAS), Khyber Pakhtunkhwa
18. **Mr. Shams-ul-Mulk**, Former Chief Minister, Khyber Pakhtunkhwa Province / Former Chairman, Water and Power Development Authority-WAPDA, Khyber Pakhtunkhwa
19. **Dr. Ziaghham Habib**, Senior Advisor Livelihood, National Disaster Management Authority- NDMA, Government of Pakistan, Islamabad

An Overview of the Water Resources of Pakistan

Pakistan's economy mainly depends on agriculture. It accounts for 24 percent of GDP and employs 48.4 percent of total work force. About 70 percent of Pakistan's population lives in rural areas and is dependent on agriculture directly or indirectly. Over 70 percent of Pakistan's export depends on agriculture-based products. Irrigated agriculture provides 90% of the food and fibre requirements of the country. Irrigated agriculture is done in about 42.5 million acres while cultivation in Barany (Rainfed) is 10 million acres.

Water is the main input for agriculture and is available from three sources i.e. rivers, rainfall and underground. The main source of river water is Indus river with its contributing tributaries viz. Kabul, Jehlum, Chenab, Ravi, Sutlej and Beas. Unfortunately sources of generation of all above rivers are outside Pakistan. The average water availability from above from year 1922-23 to 2001-02 is 144 Million Acre Feet (MAF), 139 MAF from western rivers (Indus, Jehlum and Chenab) and 5 MAF from eastern rivers (Sutluj, Ravi and Beas). There is great variation in flows of western rivers, the maximum being 186 MAF and the minimum 97 MAF.

Rainfall is the second source of water in Pakistan. The annual rainfall on average basis for years 1960 to 2000 has been 290.7 mm. Some of it finds its way in farmlands and rivers, however, there is a potential of 17 MAF to be harnessed through dams on hill torrents.

Underground water is the third source of water for irrigation. There is a potential of 56 MAF for exploitation. About 45 MAF is being exploited through public sector and private tube wells. But in some areas there is overexploitation and leading to deterioration in the quality of water.

While expansion in irrigated area, urbanization and industrialization is increasing pressure on water use, the availability is changing because of silting of reservoirs, over exploitation of ground water and climate change, change in rainfall pattern, melting of glaciers etc. and Indian uses on western rivers. Thus there is need of augmenting water resources and conserving what we have.

Current and Projected Water Availability and Demand in Pakistan

A study conducted by Ministry of Water and Power in 2002 under caption "Pakistan's National Water Resource Strategy" has worked out availability at farm gate as 109.3 MAF with 62.3 MAF from surface, 42 MAF from underground and 5 MAF from rainfall. They have calculated development potential for 2025 as 139 MAF with 75.3 MAF from surface, 55.7 MAF from underground and 8 MAF from rainfall. However, they have calculated requirement as 145 MAF at farm gate. The available remaining potential is 13 MAF from rivers, 13.7 from underground and 3 MAF from rainfall. Same report works out average availability for storage as under:

- (i) Average annual flow below Kotri (1977 to 2001): **35 to 38 MAF**
- (ii) Requirement below Kotri: **10 MAF**
- (iii) Uses on eastern and western rivers: **3 to 5 MAF**
Balance: **20 to 25 MAF** (At Canal heads)
Equivalent available at farm gate: **13 to 15 MAF**

Thus surplus availability for storages is shown as 20 - 25 MAF.

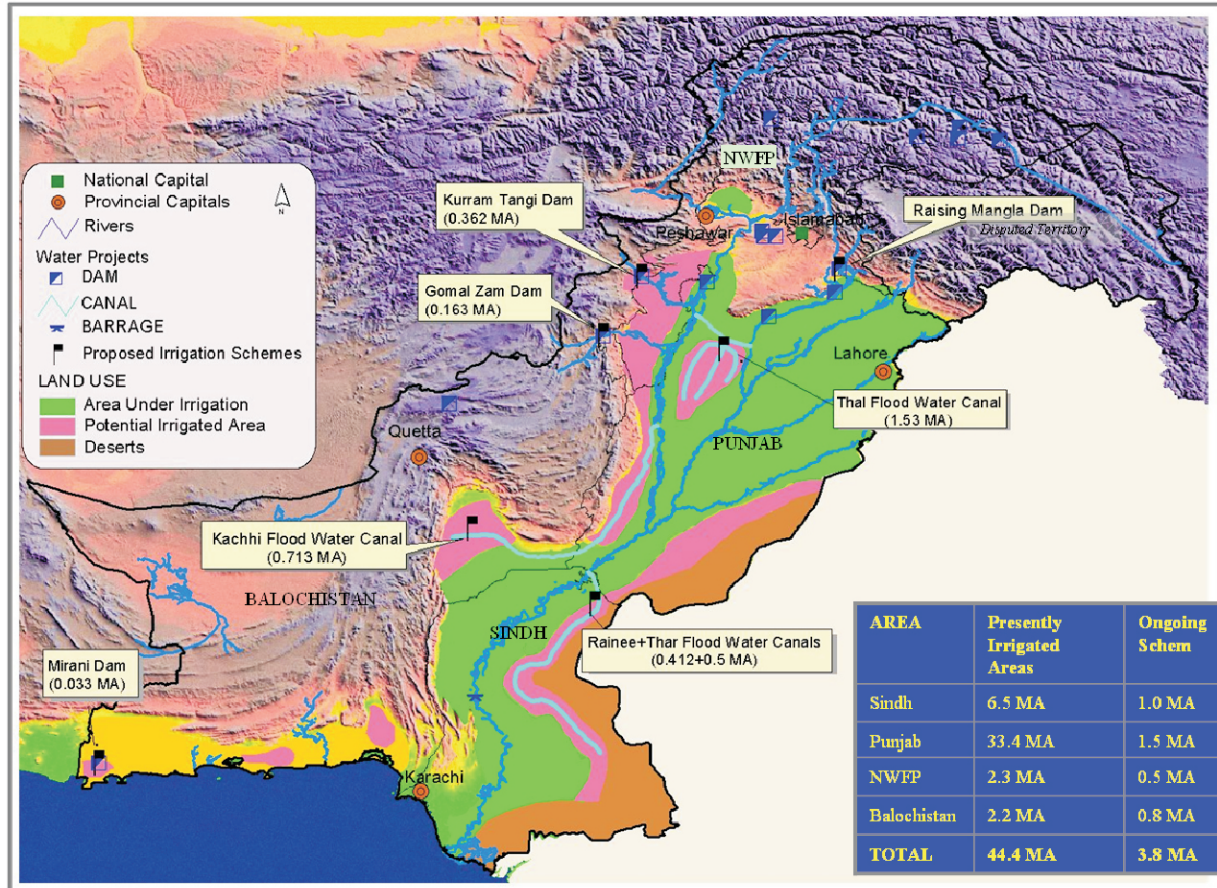
This issue was discussed by the Technical Committee on Water Resources appointed by the President of Pakistan in 2003 and headed by Mr. A. N. G. Abbasi. The Committee consisted of 8 members, two from each province, and a Chairman. There was no consensus on the availability of surplus water. WAPDA gave a figure of 3.95 MAF, 7 members gave a figure of 32.72 MAF, one member gave a figure of (-) 11.60 MAF and Chairman gave a figure of (-) 0.25 MAF.¹ This indicates that the views even among technical experts on the volume of river water available for storage vary considerably.

Significance of Resolving Inter-Provincial Water Issues

Unity and cohesion among federating units is important for national security. Any discord and disunity is harmful for Pakistan's survival. However, inter-provincial water issues crop up frequently. During 2010, Sindh and Punjab provinces came on a collision course on two occasions, and matter was referred to the Prime Minister.

1. Report of Technical Committee water resources with comment of Chairman Part II, Page 31

Figure 1: The Indus Map



The cause was distribution of water between the two provinces during the period of water shortage. Although the matter was settled for the time being, it may crop up again. This will harm national security. Thus there is dire need that inter-provincial water issues should be resolved.

This provincial disharmony is also delaying the development of river water resources and implementation of hydropower project.

Historical Distribution of Water Resources

The water in the Indus Rivers System has been put to irrigational use since the last several centuries. Initially there was a system of canals which drew supplies directly from the river without any control structure across the river. Thus, their withdrawals were governed by the level of water in the river. These canals were known as Inundation Canals or flood canals and since the water level in the river kept on fluctuating, the withdrawals in such canals remained un-

assured and erratic.

In the middle of the 19th Century steps were taken to control the variable water supply in those inundation canals. This objective was achieved by constructing head works across the rivers, which helped in providing assured water supply on an almost regular basis. Such diversion works of engineering were first attempted on the tributary rivers because of ease of construction. The first head-works was constructed on the Ravi River in the Punjab and was commissioned in 1859. As a result of the same water supply on the Upper Bari Doab Canal became assured. This was followed by several other head works across the tributary rivers in the Punjab during the period 1882 to 1901.

By 1935 the two major irrigation projects viz: the Sukkur Barrage on the Indus and the Sutlej Valley Project had been completed and put into operation. However, certain difficulties arose in sharing the water supplies between the

former states of Bikaner, Bahawalpur and the Punjab. The Khairpur State also, at this time demanded certain additional supplies in rabi season. The Punjab moreover wanted certain additional supplies for the Haveli Project. In order to resolve these issues the Government of India appointed what came to be known as the Anderson Committee.

The Anderson Committee gave its unanimous report in 1937. Subsequently another Commission was appointed as a result of which a Sindh-Punjab agreement was signed in 1945 by Chief Engineers of the two provinces, but it was not ratified by Government of Punjab for lack of settlement of financial issues. In 1947 Pakistan came into being and in 1948 India cut off supplies to Pakistan canals from headworks at Madhopur and Ferozpur located in India. After protracted discussions and help of the World Bank, Indus Waters Treaty was signed by Pakistan, India and the World Bank in 1960 which gave three eastern rivers viz. Sutlej, Beas and Ravi to India for its exclusive use. In May 1968, Water Allocation and Rates Committee (Known as Akhtar Hussain Committee) was constituted by Government of the West Pakistan. After the dismemberment of the One-Unit in the West Pakistan in 1970, the issue of water distribution among the provinces which earlier constituted the West Pakistan again came up and Government of Pakistan appointed Justice Fazale Akbar Committee in October 1970. It could not give a unanimous report. In 1977 a Judicial Commission was constituted which was subsequently called as Halim Commission, after Justice Halim Chief Justice of Pakistan. This Commission also could not give a unanimous report. In the meantime, adhoc sharing arrangement was followed upto 1990.

Impact of Partition of Indian Sub Continent on Water Resources of West Pakistan

The Indus Basin at the time of partition was divided into a number of provinces and princely states.

The basin included parts of Balochistan, the pre-partition Indian Provinces of Sindh, Punjab, North West Frontier Province (NWFP and presently known as Khyber Pakhtunkhwa - KP Province) and the states of Bahawalpur, Jammu and Kashmir, Khairpur and the hilly areas on north and east of the former Punjab Province. Parts of Afghanistan and China also lie in the Basin.

Like the irrigation system, seaways, railway, roads and other systems across India and the new state Pakistan

were so contiguous and connected that the colonial Government of India deemed it necessary to appoint a Partition Committee and an Arbitral Tribunal to resolve all disputes arising out of the territorial division. The life of the Committee and the Tribunal was fixed upto March 31, 1948 by which time it was expected that all disputes would have been resolved.

When the British withdrew from the Sub-Continent, the partition line was drawn across the Punjab through the highly developed irrigation system. Sir (Later Lord) Cyril Radcliff, Chairman of the Boundary Commission, stated in his award:

"I think I am entitled to assume with confidence that any agreements as to the sharing of water from these canals or otherwise will be respected by whatever government hereafter assumes jurisdiction over the headwork concerned."

On April 1, 1948, the day after the Tribunal ceased to exist, the newly born independent Government of India (Bharat) cut off water supplies in every canal crossing into Pakistan. It eventually restored the flow of most, but not all of the water after the signing of the joint statement on May 4, 1948.

Protracted meetings and discussions were held between representatives of the two countries but matter could not be resolved. Ultimately, with the efforts of World Bank, the dispute was settled by signing of Indus Waters Treaty at Karachi on September 19, 1960. Under this treaty three eastern rivers with average inflows of 33 MAF were given to India and some rights were given to India on three western rivers assigned to Pakistan.

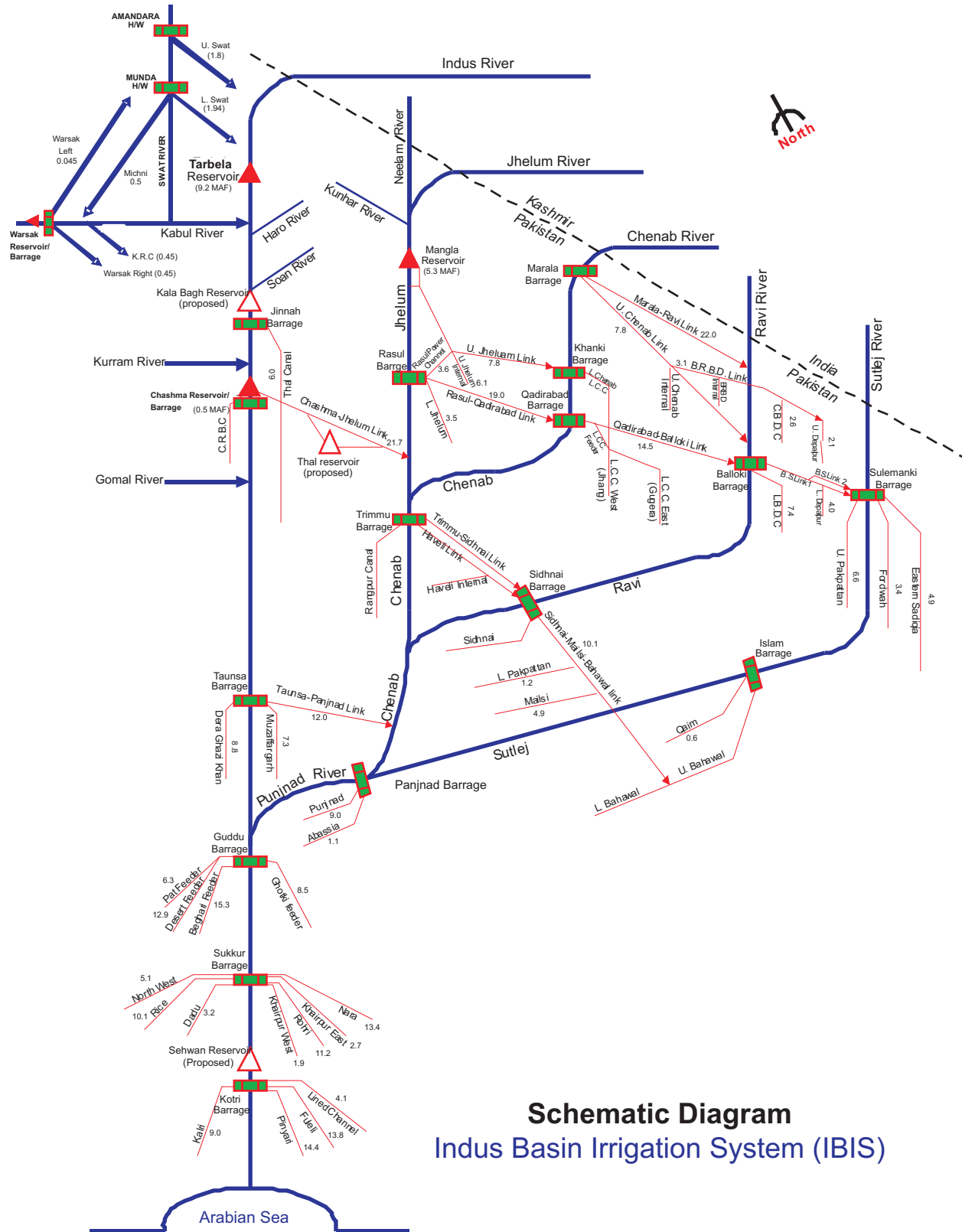
Indus Waters Water Treaty 1960 between Pakistan and India and its Ramifications

The treaty has following main provisions:

1. The supplies of three eastern rivers viz the Sutlej, the Ravi and the Beas would be available for un-restricted use of India.
2. The three western rivers viz. the Chenab, the Jehlum and the Indus would be available for un-restricted use of Pakistan except for certain specified uses in the territories held by India along the three Western

Figure 2: The Indus Basin Irrigation System

Figures in 000 Cusecs



**Schematic Diagram
Indus Basin Irrigation System (IBIS)**

3. rivers.
3. A transition period of 10 years was fixed ending March 31, 1970, during which Pakistan shall receive for unrestricted use specified quantity of waters of the Eastern Rivers which would be released by India. After the transition period ends Pakistan shall have no claim or right to releases by India of any of the waters of the Eastern Rivers. The Transition period could be extended upto a maximum period of three years on payment of a penalty.
 4. Pakistan shall construct Replacement works from the Western Rivers and other sources of water supplies for the canals in Pakistan, which on 15th August, 1947, were taking their supplies from the Eastern Rivers.
 5. India would pay to Pakistan for replacement works a fixed sum of pounds sterling 62 million.
 6. Exchange of data between India and Pakistan with respect to flow and utilization etc. of the waters of the Indus Basin Rivers.
 7. India and Pakistan each shall create a permanent post of Commissioner for Indus Waters and shall appoint to this post a person who should ordinarily be a high ranking engineer competent in the field of hydrology and water use. Each Commissioner will be representing his Government for matters arising out of the Treaty and relating to its implementation. The two Commissioners shall form the "Permanent Indus Commission."
 8. The settlement of differences and disputes etc. by the Commission/ by agreement/ by a neutral expert/ or any other way agreed by the Indus Commissioners.

Alongwith signing of Treaty, Indus Basin Fund Agreement was also signed which provided a network of two storages, eight inter river link canals and six barrages.

Many experts felt that it was not a just treaty. Normally water supplies are distributed. In this treaty entire rivers were distributed. While full control of 3 eastern rivers was given to India, some rights were given to India on three western rivers given to Pakistan. These uses included drinking water, non-consumptive use, cultivation and hydropower development rights. While flow supplies were given to India, Pakistan was made to depend on reservoirs, which have a limited life and it is a financial burden on Pakistan to replace them.

Water Apportionment Accord (WAA)1991

In 1991, with the efforts of Mr. Nawaz Sharif, the then Prime Minister of Pakistan, a unanimous Water Apportionment Accord (WAA) was signed by the four provinces on March 16, 1991. This was ratified by the Council on Common Interests (CCI) on March 21, 1991. Subsequently 'ten daily allocations' were made part of the Accord by the CCI on September 16, 1991. The WAA 1991 is an 11 page document of which three pages contain clauses of the accord and eight pages contain tables showing '10-daily allocations', two pages for each province.

The main clauses of WAA are 2, 4, 6, 7, 13, 14 (a) and 14(b). These are reproduced below:

Clause-2

In the light of the accepted water distributional principles' the apportionment agreed to is carried in Table 1.

Clause-4

Balance river supplies (including flood supplies and future storages) shall be distributed as carried in Table 2.

Clause-6

The need for storages/wherever feasible on the Indus and other rivers was admitted and recognized by the participants for planned future agricultural development.

Clause-7

The need for certain minimum escapage to sea, below Kotri to check sea intrusion was recognized. Sindh held the view that the optimum level was 10 MAF, which was discussed at length while other studies indicated lower/higher figures. It was therefore, decided that further studies would be undertaken to establish the minimal escapage needs downstream Kotri.

Clause-13

For the implementation of this accord, the need to establish an Indus River System Authority was recognized and accepted. It would have headquarters at Lahore and would have representation from all the four provinces.

Clause-14

(a) The system wise allocations will be worked out separately, on ten daily basis and will be attached with this agreement as part and parcel of it.

(b) The record of actual average system uses for the

Table 1: Agreed Apportionment of Water according to WWA 1991 (Figures in MAF)

Province	Kharif	Rabi	Total
Punjab	37.07	18.87	55.94
Sindh*	33.94	14.82	48.76
Khyber Pakhtunkhwa (a)	3.48	2.30	5.78
(b) Civil Canal**	1.80	1.20	3.00
Balochistan	2.85	1.02	3.87
	77.34	37.01	114.35
	1.80	1.20	3.00

*Including already sanctioned Urban and Industrial uses of Metropolitan Karachi

** Ungauged Civil Canals above the rim stations

period 1977-82 would from the guide line for developing a future regulation pattern. These ten daily uses would be adjusted pro-rata to correspond to the indicated seasonal allocations of the different canal systems and would from the basis for sharing shortages and surpluses on all Pakistan basis.

- (d) The provinces will have the freedom within their allocations to modify system-wise and period-wise uses.
- (e) All efforts would be made to avoid wastages. Any surpluses may be used by another province, but this would not establish any rights to such uses.

Authority (IRSA) was established through an act of parliament on December 10, 1992 for regulating and monitoring the distribution of water sources of Indus River in accordance with water accord amongst the provinces.

The Authority comprises of 5 members, one each to be nominated by each province and the federal Government from amongst high ranking engineers in irrigation or related engineering fields. The chairman has to be from amongst 5 members in alphabetical order for period of one year in rotation. The term of the office of members is 3 years. The chairman WAPDA and Chief Engineering Advisor to the Government of Pakistan or their nominees shall be ex-official members of the Authority without any voting right. Any question in respect of implementation of Water Accord is to be settled by the Authority by the votes of the majority of members and in case of equality of votes the chairmen shall have casting vote.

Indus River System Authority - IRSA

As Per clause 13 of the WAA 1991, Indus River System

Table 2: Balance River Supplies (including flood supplies and future storages)

Punjab	Sindh	Balochistan	NWFP (Now KP)	Total
37 %	37 %	12 %	14 %	100%

A provincial Government or the WAPDA may, if aggrieved by any decision of the Authority, can make a reference to the CCI.

Development of New Water Reservoirs and Provincial Concerns

Three water reservoirs were constructed in Pakistan viz. Tarbela, Mangla and Chashma with a total live storage of 15.73 MAF. Due to silting their capacity has reduced to 11.47 MAF in 2010 and is estimated to further reduce to 10.70 MAF in year 2020.²

There is a need of constructing more reservoirs for growing needs of its population and replacement of the capacity lost due to silting. Work on Diamer-Basha Dam, announced on January 17, 2006 is in early stages of implementation but the construction has not commenced as yet.

Punjab is of the view that Construction of Kalabagh Dam should be undertaken while the other three provinces object to its construction. Sindh objects to its two off-taking canals. Khyber Pakhtunkhwa objects due to its perceived ill effect on Nowshera Town and on its drainage system.

Varied Interpretation of Water Accord

As stated earlier, Water Apportionment Accord is a three page document with 8 pages of tables showing 10 day wise distribution of water between the provinces. According to Sindh, distribution should be as per 10 day wise water share given to provinces. In case of shortage, each provinces should get that much less.

However, Punjab province objects to it on the ground that all clauses of the accord need to be read and implemented in conjunction with each other and one or some clauses can not be read or implemented in isolation. Punjab also holds that while signing Water Apportionment Accord it was verbally agreed that this Accord will be implemented if Kalabagh Dam is constructed. Since Kalabagh Dam has not been constructed, sharing water as per the shares given in the Accord is not possible.

They say that the water they used to draw prior to Accord reduces during the periods of low river water availability, so

till reservoirs are constructed, sharing on the basis of the Accord is not possible. A decision was made in May 1994 in a ministerial meeting chaired by Mr. Ghulam Mustufa Khar the then Minister of Water and Power that sharing of Indus Water should be on historic basis, i.e., average water used in Post Tarbela period 1976-81. This matter was referred to the Law Division, Government of Pakistan who have declared this decision of the ministerial meeting as a violation of the Accord. Law Division's opinion recorded on October 16, 2000 in its paragraph 2 is as under:

“As per plain interpretation of clause 14 of the accord the ten daily uses, having become part and parcel of the accord, shall be adjusted pro-rata for sharing shortages. Any interpretation of sharing shortages on the basis of historic use shall be violation of the concurrent accord. Moreover under clause 13 of the accord, IRSA is responsible for implementation of accord. Similarly any dispute on the subject should have been referred to the CCI under the constitution. Hence the formation of any body or committee of taking any decision or interpretation on such report shall be a distortion of the accord as well as violative of the constitution. However, since the matter has not been referred to the appropriate body i.e. CCI by the aggrieved party, therefore the existing arrangements as decided by the IRSA, may be allowed to continue till the constitution and decision of the CCI.”

Law Division's opinion on April 25, 2002 is as under:

“The opinion of this division dated October 16, 2000 and the said directive of the Chief Executive Secretariat dated October 25, 2000 were placed before the then Law Minister, who approved the proposal that Para-2 of the advice dated October 16, 2000 be recalled and consequently this division issued a revised note on February 16, 2001 in these words: In view of the said directive, regarding apportionment of “water of Indus river system the Ministerial award of 1994 is annulled and accord of 1991 has to be implemented. The opinion already conveyed by this division on

2. Annexure-F, of Technical Committee on National Water Resources Development Programme, WAPDA, December, 1994

October 16, 2000 revised and Para-2 thereof is accordingly recalled.”

On persistent complaints from Sindh, it was decided in 2003 to share water on the basis of a three-stage formula, i.e., These three stages were as follows:

- i. Upto 105 MAF
- ii. From 105 MAF to 117 MAF
- iii. Beyond 117 MAF

IRSA decided to exempt Khyber Pakhtankhwa and Balochistan Provinces from sharing shortage

Sindh feels that there is no provision of above exemptions in the accord. With the above interpretation regarding its implementation, Sindh's share reduces and it objects.

Balochistan has a different point of view. It says that despite exemption actual losses borne by Balochistan are more than that of Punjab and Sindh. Losses as high as 10% for Rabi and 15% for Kharif are deducted from total availability at Rim stations before working out provincial shares (actual losses are even higher). These losses are mainly due to two reasons. Firstly irrigation in Kacha areas of Punjab and Sindh and secondly, lack of transparency in water discharges/ water accounts at canal heads provided by the provinces. These losses are utilized by Punjab and Sindh. Balochistan says that it is ready to bear the shortages if its share is worked out from the total availability at Rim stations before deducting the losses.

How Chashma-Jhelum Link Canal Figures as a Dispute between Punjab and Sindh?

In order to meet shortfall in supplies dependent on eastern rivers which were given to India under Indus Waters Treaty 1960, two link canals were constructed from Indus river viz. Chashma- Jhelum (C-J) Link Canal and Taunsa-Punjab (T-P) Link Canal. No operating rules of these two canals have so far been framed. Since Water Apportionment Accord has distributed water to provinces, each province has to get its share according to it. If water is short in tributary rivers (i.e Jhelum and Chenab) and surplus in Indus river, it can be transferred from Indus to Tributary zone through these links. However, if there is shortage in Indus zone, and surplus in tributaries zone the reverse should follow. But level of Indus is higher than tributary rivers so it can not be transferred back through link canals. Water can be given to Sindh and Balochistan

provinces below Punjab.

In order to meet the shortfall in supplies due to transfer of eastern rivers to India under Indus Waters Treaty 1960, three storages and eight canals were constructed. Out of eight canals, two (Chashma-Jhelum link canal and Taunsa-Punjab Link canal) were meant to transfer water from Indus to Southern Punjab. According to Water Apportionment Accord, the share of provinces is established and they have to get water accordingly. While Khyber Pakhtunkhwa, Sindh and Balochistan draw their shares from Indus, Punjab is divided in three zones for the purpose of regulation i.e. Jhelum-Chenab (J-C) Zone, Tributary Zone and Indus Zone. J-C Zone can draw water only from Jhelum and Chenab rivers, Indus Zone only from Indus while Tributary Zone from both Indus and C-J.

When share of Punjab from river Indus is worked out, it uses this water partly in Indus main canals that is Thal Canal, Chashma Right Bank Canal (CRBC), Dera Ghazi Khan Canal (DGKC), and Muzaffargarh Canal and partly in Tributary zone through Chashma-Jhelum (CJ) and Taunsa-Punjab (TP) link Canals. Punjab's contention is that when its share on Indus is established by IRSA, it can use it as it likes according to Paragraph 14e of the accord. While Sindh argues that Punjab cannot transfer water from Indus to Tributary zone, more than its share on Indus even if it has a share on Indus, as long as there is shortages in Sindh.

An Account of the Dwindling Availability of Water and Rising Demand

According to 'Pakistan National Water Resource Strategy (2002) prepared by Ministry of Water and Power in 2002, the surface water availability in Indus basin varies from 138 MAF to 145 MAF, while 3.8 MAF is available outside Indus basin. The rainfall harvesting potential through hill torrents is 17 MAF, whereas ground water potential is 56 MAF.

However, above is changing because of climate change effects, melting of glaciers, Indian uses on western rivers including the ones which is not entitled to according to the Indus Waters Treaty and development in Afghanistan on Kabul river.

The demand is increasing due to growth in population, urbanization and industrialization. Comparison of present and future demands is given in Table 3.

Table 3: Comparison of Present and Future Demands

	Year 2003	Year 2025	% Increase
(i) Agriculture at the Farm Gate	100 MAF	128 MAF	28%
(ii) Municipal and rural water supply, sanitation and Environment	5.5 MAF	12.2 MAF	110%
(iii) Industry	2.2 MAF	4.8 MAF	118%
	108 MAF	145 MAF	

Divergent Views on Kalabagh Dam in Khyber Pakhtunkhwa

Folowing is the summary of views generally expressed by some of the opponents and advocates of Kalabagh Dam in Khyber Pakhtunkhwa:

- 1) Flooding of Peshawar Valley including Nowshera Town: Opponents of Kalabagh apprehend that Historic flooding of Peshawar Valley including Nowshera town would be aggravated in the event of recurrence of 1929 record flood. The advocates of Kalabagh Dam say that the flood of 29th august 1929 flooded the Nowshera town and submerged G.T. Road from Khairabad to Nowshera and Nowshera to Pabbi. There was no Kalabagh dam then. The flood of July/August 2010 did the same thing, to a greater degree; and there was no Kalabagh dam even at that time. 'Would be aggravated' is a supposition but Nowshera was flooded twice in the past 81 years, without Kalabagh Dam being there, is a ground reality. The advocates of Kalabagh Dam also state that the Backwater effect of Kalabagh Lake would end about 10 miles downstream of Nowshera.
- 2) Effect on Drainage of area surrounding Mardan, Pabbi and Swabi plains: Opponents of Kalabagh Dam maintain that the Drainage of surrounding area of Mardan, Pabbi and Swabi plains would be adversely affected by the Kalabagh reservoir thus creating waterlogging and salinity. Supporters of Kalabagh Dam state that Mardan is distant from Kalabagh dam by more than 200 km, Pabbi by 230 Km and Swabi by about 160 Km. Lowest ground

levels at mardan, Pabbi and Swabi areas are 970, 960 and 1000 feet above Mean Sea Level (MSL) respectively, as compared to the maximum conservation level of 915 feet for Kalabagh. They point out that Kalabagh reservoir level would therefore be lower than these plains. On the other hand Tarbela Dam is at a stone's throw from Swabi and with a reservoir level that goes as high as 550 ft above these plains and on an average remains higher by about 400 ft for the year. An additional factor is the extensive irrigation network that keeps a source of recharge at the surface level available for the entire year. What could be a more threatening source of water logging for the mentioned plains a source of water 120 ft below the plains and 150 Km away or the source of water 400 ft above the plains and located in the vicinity?

- 3) Effect on Mardan SCARP: Opponents of Kalabagh Dam say that the Operation of Mardan Salinity Control And Reclamation Project (SCARP) would be adversely affected by the construction of Kalabagh Dam. The supporters of the dam point out that the Mardan SCARP outfall drain has no physical, hydrological or topographic relationship with Kalabagh Dam. Furthermore the invert levels of main drains of Mardan SCARP are higher than the Kalabagh reservoir elevation of 915 feet and the backwater level in Kabul river and Kalpani Khwar. These drains would, therefore, keep on functioning without any obstruction, the pro-dam experts argue.
- 4) Submergence of Fertile Cultivable Land: Opponents of Kalabagh Dam also say that the

Fertile cultivable land would be submerged due to Kalabagh Dam. The supporters of the dam state that the irrigated land submerged in Punjab and KP provinces would be only 3000 acres (2900 acres in Punjab and 100 acres in Khyber Pakhtinkwa). However, they point out, 1000 acres of irrigated land were acquired for Mardan SCARP alone.

- 5) **Population Dislocation:** Opponents of Kalabagh Dam maintain that a large number of people will have to be relocated due to the construction of the Dam. The advocates of the dam state that based on the 1998 estimate, total population to be relocated is 108,101 of which 65,929 shall be from Punjab and 42,172 from Khyber Pakhtunkhwa. Compared to this, 250,000 persons are estimated to be relocated due to Lyari Expressway in Karachi. The population to be relocated is, therefore, not an extra-ordinary one and by proper resettlement planning and implementation, this relocation can be made as less painful as possible.

Divergent Views on Kalabagh Dam and Other Reservoirs Planned on River Indus in Sindh Province

Kalabagh Dam

1. **Availability of water in Indus River:** The opponents of Kalabagh Dam believe that the flow in river Indus is variable and declining. Past record shows that surplus water is not available every year. If a large dam costing US \$ 5 to 17 billions is built, there will be an effort to fill it every year. In years of low flow, when surplus water is not available, the filling of the dam will not be curtailed with the result that essential irrigation water supplies to Sindh will be reduced.

Persons holding the opposite view say that the seasonal and annual variability of river flows of the Indus River System has been known for centuries. And yet an extensive irrigation system has been built in the basin. Barrage after barrage was conceived and built on a run-of-the-river resource availability, and this accentuated the inherent deficiency of the system. A curative process was needed, and it could only be through a storage reservoir that would transfer water from Surplus to

the Deficient period. They further state that Flows are regulated and distributed between the Provinces by IRSA and it is not at the whim of any one stakeholder. The regulatory regime needs to be strengthened so that any act in disregard of allocated provisions is identified and punished expeditiously. The supporters of the dam also argue that In a multipurpose dam project, if the downstream demands do not allow, occasionally, to fill the reservoir, the benefit of power generation and flood control would always be there. And looking in the future, these benefits, are of tremendous importance and value.

2. **Proposed Canals from Karabagh Reservoir:** Critics of the dam argue that Canals have been proposed to off-take from Kalabagh Dam, which will draw excessive water and as a result supplies to Sindh will be reduced.

Supporters of the dam think that IRSA should be sufficiently empowered to make sure that no province receives more than its due share. If a just system to safeguard each province's due rights is ensured under IRSA, the presence of canals off taking from the proposed Kalabagh Dam itself should not be a ground to suspect that upper riparian will usurp lower riparian's due share. They also point out that it is for IRSA to ensure compliance with the allocated regimes rather than denying a Province to have access to its share of water in a manner equal to other provinces in terms of economic cost of diversion.

3. **Cultivation in riverain or 'Sailaba' areas:** Opponents of the dam apprehend that Storing 6.1 million acre feet at Kalabagh will reduce flows coming down to Sindh which will have effects on its sailaba cultivation, mangrove forest in delta, fish and shrimp production, livestock in delta, bio-diversity, drinking water supply, riverian forests, increase in sea intrusion, deterioration of river channel, increase in poverty in delta, sweet water tube walls along river.

The supporters of the dam contend that comprehensive studies have been carried out by competent / reputed Consulting Houses, and the overall review undertaken by an International Panel of Experts on all the issues mentioned above. The conclusion of these technical/professional studies

Table 4: Flow Downstream Kotri in 6 Years

Year	Flow Downstream Kotri
2000-2001	0.745 MAF
2001-2002	1.924 MAF
2002-2003	2.152 MAF
2004-2005	0.286 MAF
2008-2009	5.824 MAF
2009-2010	4.006 MAF

is that in order to overcome all the environmental problems, the following flows should be ensured beyond Kotri:

- A flow of 5000 cusecs, on a continuing basis, round the year
- A total flood flow of 25 Million Acre-Feet (MAF) in a period of 5 years.

4. Sea Water intrusion in Indus estuary: Opponents of the dam argue that Sea Water intrusion in Indus estuary would accentuate after the construction of the Kalabagh dam. The advocates of the dam state that the fear is not substantiated by factual data

Other Reservoirs Planned on River Indus

- (i) **Non-availability of water for storage and Flow downstream Kotri:** Opponents of any new reservoir on river Indus feel that surplus water for filling the reservoir is not available every year. This, according to them, is confirmed by the fact that during last 10 year flow downstream Kotri was less than 6 MAF in 6 years as under. Table 4 carries detailed figures.

They, therefore, ask the question as to how a reservoir could be filled during above 6 years? If filled, Sindh being lowest riparian, will be affected, they apprehend.

The supporters of other reservoirs on Indus state that in

order to get a comprehensive picture of the flow downstream Kotri, the actual flows for the last 35 years (and not just 6 years) be studied. They maintain that average flow downstream Kotri has been 31.25 MAF over a period of 35 years from 1976 to 2010. The proponents of the dam also contend that the reservations of Sindh Province on other reservoirs on Indus River rely on the scarcity of water in a three year period of years 2000-2001 to 2002-2003, and the year 2004-05. These four years are a part of Post Tarbela period covering about 40 years. Do the benefits accruing in the balance 36 years mean nothing - in agriculture, in energy and in flood control?

Water Issues Between Sindh and Balochistan Provinces

Balochistan draws water from two barrages in Sindh viz. Gudu and Sukkur barrages. According to the Water Apportionment Accord 1991, allocation of water for Balochistan on Gudu barrage is 2.24 MAF in Kharif and 0.77 MAF in Rabi. The same on Sukkur barrage is 0.61 MAF in Kharif and 0.25 MAF in Rabi. There is relatively a minor problem of supplies from Gudu barrage to Balochistan. However, there is major problem of distribution on Sukkur barrage in end June and early July when rice transplantation is in full swing. Because of full allocation by IRSA without shortage to Balochistan they are entitled to 2,200 cusecs from second ten daily of June to end September. However according to Sindh they can not supply 2,200 cusecs in end June and early July because of pond level problem. Sindh also maintains that North West

Table 5: Allocation (MGD)

Province	Proposed by GoB	Existing
Sindh	51.03	101.78
Balochistan	124.93	59.00
Total	175.96	160.78

Canal (NWC) can not draw required discharge in above period unless river discharge is 135,000 cusec. Balochistan states that it gets supplies even below 1400 cusecs during peak Khareef season compared to its entitlement of 2200 cusecs. Balochistan indicated that it did not receive its due flow from Sindh through NWC even when the discharge at Sukkur Barrage reached 153, 000 Cusecs and the pond level was 199.5. Balochistan wants Sindh Government to check and determine the causes of inefficiency of North western Canal. Balochistan also feels that the construction of Ruk Complex was carried out by Sindh without proper mathematical and model study which led to abnormal 5 to 6.5 feet thick silt deposits in the canal bed. Balochistan feels that the Sindh Government should check the causes besides conducting the model study of Ruk Complex and take appropriate remedial measures to enable NWC to draw its discharge.

Balochistan also states that Hub Dam was designed to receive rainfall runoff from the catchment area out of which 72 % is located in Balochistan and 28 % in Sindh but the distribution of the stored water is inequitably made as 63 % for Sindh and 37 % for Balochistan. Balochistan feels that this inequitable distribution should be rectified.

According to the above formula the proposed apportionment based on the actual withdrawal/ availability of 175.96 MGD at Hub Dam is carried in Table 5.

Balochistan also feels that Sindh has interrupted the work on Right Bank Outfall Drain III project which was being implemented by WAPDA and is at the final stage of completion. Balochistan feels that the Rs. 100 Billion project which is being implemented with the financial assistance of the Federal Government should not be restricted to only one province.

Other Issues Raised by any Province or Territory of Pakistan Regarding Water Resources

Issue Raised by Sindh

- (i.) Water is stored in Mangla dam when there is shortage of water for irrigation needs of Sindh province. Sindh demands that first irrigation needs of Sindh are to be met before water can be stored in any dam.

Punjab is of the view that Jehlum river is an early riser. If dam is not filled upto 80% by end June, it will not be filled to full capacity. Also according to project report of dam, its filling criteria is for its early filling.

Sindh objects to this and stresses for its delayed filling to help their short supplies in early Kharif. They cite the data of several years when early storage resulted in operation of spillway in July and August.

- (ii.) Sindh demands 10 million acre feet for downstream Kotri needs. Studies have been carried out through international consultants but so far no decision has been taken as to how much quantum is needed and as such water is not released downstream Kotri as per requirement.

Balochistan

- (i) Possible violation of Paragraph 9 of Water Apportionment Accord 1991 by Punjab and Sindh provinces: Balochistan feels that Punjab and Sindh provinces are constructing many dams and other irrigation schemes on rivers supplementing river Indus. As a result of detaining water even before reaching Indus causes reduction of supplies in Indus. Balochistan wants that the Government of Pakistan or IRSA should check such irrigation schemes or small dams for violation of paragraph 9 of WAA.
- (ii) Transition Losses due to installation of Tube wells by Punjab province: Balochistan feels that water losses in Indus during transition phase are

excessive and may be attributed to installation of some 5000 tube-wells in Punjab. Balochistan wants the Government of Pakistan to check the impact of tubewells in Punjab on River Indus and bring the water abstracted by means of tubewells into the distribution pool.

- (iii) Extension of Canal System and a dedicated Barrage for Balochistan; Balochistan says that it has fertile and plain land of about seven million acres in Kachi plain which can be irrigated like Pat Feeder Canal command area provided the canal system is developed upto the said land. Balochistan feels that a separate Barrage for Balochistan be constructed in Punjab at an appropriate location where levels may be sufficiently raised to ensure gravity flow to the existing and new canals of Balochistan Province.

Azad Kashmir, Islamabad Capital Territory and FATA

All these three territories demand water for drinking and other purposes. However, they are denied water by IRSA on the ground that they are not co-sharers as per the Water Apportionment Accord.

a. Need for Telemetry

Correct flow measurements is a prerequisite for proper regulation of water. Provincial water accounts prepared by IRSA are based on canal withdrawals data provided by the provinces. In order to ensure transparency in the discharges provided by the provinces at barrages and canal heads and at storages by WAPDA, a Telemetry system was installed in 2004 but unfortunately it did not serve the purpose and could not gain the confidence of the stake holders.

There are different problems with the system. Firstly there is the need to have the uniformity in the flow measurement formulae which was provided by the provinces and fed into the system. Second problem is with the 'water level' and there is a large difference between the value of the discharge received through telemetry and manually. So much so that the discharges received from WAPDA for Tarbela, Mangla, Chashma and Kabul river by Telemetry and manually often do not tally.

Presently the Telemetry System is under the charge of WAPDA and it is believed that the Government is planned to rehabilitate the system and remove the shortcomings in stages in coordination with IRSA and the relevant provinces under Water Sector Capacity Building and Advisory Services Project (WCAP) financed by the World Bank.

One aspect which is very important and challenging, is that most of the barrages and canal heads are under the control of the provinces and unless there is willingness and strong commitment by stake holders that proper running of telemetry system is in the best national interest it will not fulfill the desired objective. The system could easily be vandalized by any party with vested interest.

b. Constitutional Provisions to Resolve Water Disputes among the Provinces

Distribution of water among four provinces is done by IRSA established under IRSA Act 1992. Any province or Federal Government aggrieved by any decision of IRSA, can approach CCI, which can decide water issues by a majority vote. If further resolution of grievance is needed, the aggrieved party can approach parliament where matter will be decided by joint session of parliament (These provisions are covered in Articles 153,154 and 155 of the Constitution of the Islamic Republic of Pakistan).

Some Thoughts on the Possible Ways Forward

One viewpoint is that the main cause of inter-provincial water disputes seems to be the lack of trust and the perception of injustice to one province by the other. When supplies are abundant and every co-sharer gets water as per its requirement there is no dispute. When supplies are short of requirement and every co-sharer gets proportionately reduced share as per some agreement, again there will be no dispute. However, if any co-sharer does not get proportionate supplies as per agreement, disputes crop up. Continuous violation either real or perceived - of signed agreements creates mistrust which become firm with time to an extent that reasonable things appear unreasonable to the party which considers itself the aggrieved one. In order to resolve a dispute, the mistrust should first be converted into trust. That will be possible when all parties are satisfied that each one of them is complying with the agreements in letter and spirit.

Fortunately, there is a unanimous agreement on distribution of water in the form of Water Apportionment Accord in Pakistan. Making any changes in the water share of each province outside the Water Accord must not be allowed. Reference to any verbal understanding should not be taken as an agreement. Thus Sharing of water must be done as per shares given in the Accord. Complaints of Sindh province regarding exempting Khyber Pakhtunkhwa and Balochistan provinces from sharing shortages should be studied in the light of Paragraph 14(b) of the Water Apportionment Accord which stipulates that shortages and surplus should be shared on all Pakistan basis. Having done this, operating rules of link canals should be made with discussion and consensus. Similarly filling and operating rules of Mangla dam should be made with discussion and consensus.

Above actions will slowly and gradually remove mistrust and Pave way for further reconciliation. When this is achieved, construction of reservoirs can also be agreed and requests of Azad Kashmir and FATA can also be met.

Some experts feel that this route to creation of trust and confidence is totally subjective and, therefore, not wholly assured of success. There is another route that is worth description. This whole controversy of choosing the "Historical" flows or the "Accord" flows starts from a regime of sharing shortages. Can we not replace such a regime with one of sharing surpluses? It is undoubtedly possible through a number of large reservoirs. After all hasn't all the stakeholders, without exception, benefited from Mangla and Terbela reservoirs even after losing flows of Sutluj, Beas and Ravi rivers?

However, such a strategy must include the system of Water Audit, carried out every month, with deterrent punishment for offenders and adequate relief for the victims.

This strategy would not only make the current dispute between Punjab and Sindh Provinces a thing of the past, but also give confidence to all the lower riparians (meaning Sindh and Balochistan). The suspicions on the Right and Left Bank High Level Canal from Kalabagh Dam would also be mitigated through this strategy.

Following points need consideration to achieve the above objective:

- 1) IRSA's technical capabilities need to be enhanced. IRSA should be directly placed under the

administrative control of the Cabinet Division with directly responsible to CCI for its decisions.

- 2) IRSA's Budget needs to be enhanced with enhanced financial and administrative powers.
- 3) IRSA should have powers to impose and recover penalties on Province(s) guilty of water theft.
- 4) Telemetry system should be made accurate and functional on priority basis and IRSA's staff should be trained to handle it independently.
- 5) Both KP and Balochistan provinces should be provided with essential infra-structure to enable them to draw their full share of water under 1991 Accord with capacity to draw their future share of water also from new storage reservoirs. It was pointed out by some experts that the KP can not draw its future share economically without Kalabagh Dam as irrigation in the Southern parts of KP would otherwise require pumping from river Indus making it an almost unfeasible proposition.
- 6) Provinces which cannot utilize their share of water should be able to sell and trade in water at mutually agreed water price with any Province willing to buy or trade in.
- 7) 1991 Accord should be respected and followed in letter and spirit.
- 8) Annual water audit should be carried out to point out any irregularities or water thief etc.
- 9) Heavy penalties for water thefts should be imposed by IRSA and money given to the aggrieved province.
- 10) The Indus basin mathematical model should be upgraded and used by IRSA in water management. The impact of climate change on water availability should be carefully worked out to mitigate future challenges.
- 11) Weather forecasting system should be further improved for more reliable forecasting.
- 12) In view of the recent floods, a comprehensive study needs to be undertaken to determine operational procedures of existing reservoirs for minimizing flood damages in future. Similar study to indicate

mitigatory role of additional reservoirs such as at Basha, Munda, Akhori and Kalabagh together with Mangla, Tarbela and Chashma should also be initiated.

- 13) In view of the history of the inter provincial disputes, it would be prudent to follow a two pronged approach. Where IRSA's enhanced capacities as suggested above would help remove misgivings at bureaucratic and political level, the mobilization of civil societies and stakeholders could play a major role in removing public mis-perceptions. Many success stories are available where stakeholders' involvement had really helped in resolving outstanding inter-state and transboundary water issues. Where it has not been able to resolve the issues completely, it, at least, helped in softening the position-based stand of the parties. A multi stake holders' dialogue from all the provinces and territories supported by research and accurate information is strongly recommended. These stake holders include Farmers, water experts, elected representatives and government.

- 14) It is obvious that the Indus River system is short of water; demands far exceed the availability, therefore most of the time IRSA is compelled to make provinces share shortages, and this is very difficult to do when larger provinces depend so heavily on water for their economic sustenance, and therefore feel strongly about their positions. Despite the advantage of having a water apportionment accord in place, the provinces' remaining at loggers head speaks eminently of something that is seriously missing in the way we have so far approached this problem. This should lead us to look at how others in similar circumstances have reached a more satisfactory outcome because the problem of sharing of waters between upper and lower riparian's is not specific to Pakistan alone.

There are some good examples where a better resolution of water issues in trans-boundary situations is achieved when the focus is moved from sharing shortages to sharing benefits. While this involves a major paradigm shift, yet it opens up new possibilities for reaching a win-win situation for all sides.

It is not suggested that what has worked elsewhere will work here equally well, but it needs to be seriously explored as to how such a change in focus would lead to a similar win-win situation in our case. This line of thinking has not so far been sufficiently pursued to develop a framework within which the provinces can be persuaded to come on board. It is a challenge, but in some ways it offers greater possibility of getting the parties to come to an agreed understanding provided transparency, equity and sincerity remain the drivers of developing and using the water resources of the Indus Basin together.

Regarding Sindh and Balochistan dispute, it is partly a technical problem. In early Kharif water taking capacity of North West (NW) Canal off-taking from Sukkur barrage proves deficient and therefore needs to be increased. This will be possible by either increasing water way of NW Canal or increasing pond level at available discharge. Balochistan feels that the problem is due to changing head of Warah Branch to Rice Canal which causes silting. This matter needs to be referred for model experiment for necessary correction.

Regarding distribution of water stored in Hub dam, the matter needs to be examined in detail by WAPDA who have implemented this project.

They say, "Where there is a will, there is a way". If there is will to resolve water dispute, it can be achieved.



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