



**13<sup>TH</sup> GENERAL ASSEMBLY OF  
ASIA-PACIFIC PARLIAMENTARIANS'  
CONFERENCE ON ENVIRONMENT  
AND DEVELOPMENT  
*Islamabad, February 26-March 3, 2007***

**PAKISTAN COUNTRY PAPER**

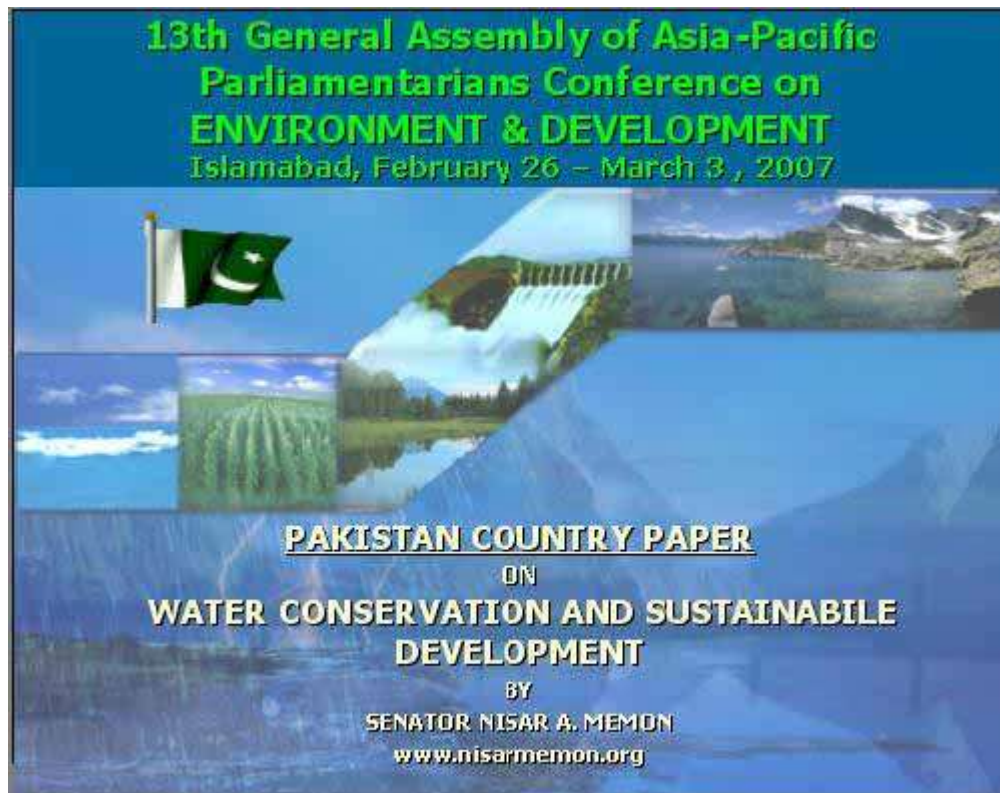
ON

**WATER CONSERVATION AND  
SUSTAINABLE DEVELOPMENT**

**Presented by  
Senator Nisar A. Memon  
Chairman Parliamentary Committee  
On Water Resources (2003-04)**

**[www.nisarmemon.org](http://www.nisarmemon.org)**

→ S. 1



Mr. Chairman,

Distinguished Delegates,

Members of Parliament,

Distinguished Guests,

Excellencies,

Ladies and Gentlemen,

→ S. 2



Water is life, for all living beings. For human beings it is an important ingredient for survival, providing seafood, agricultural products and meets the body requirements for clean drinking water. Water is the most precious resource of any country. Being a vital constituent of life, with its diverse uses water will continue to play a major role in achieving the broader development objectives of food security, poverty alleviation and consequently the improved quality of life. Thus water is a key element for sustainable development of any country and considered as fundamental right for survival.

This country paper takes an overview of Pakistan's water potential and its development. It emphasizes that the benefits of water resource development projects are significant and these benefits extend to a large part of the population through irrigation networks. Irrigation dominates water use in

Pakistan and it is expected to continue as the major user of surface water into the future.

This morning Prime Minister of Pakistan made a comprehension presentation as such, I shall try to skip some of areas.

Water resources are exhaustible thus for realizing maximum benefits form water potential, its conservation and sustainable development are essential. Water conservation through lining of our irrigation systems and development of new storage projects are key elements for further development of irrigated agriculture in Pakistan.

Ladies and Gentlemen,

→ **S. 3**



The Islamic Republic of Pakistan is a South Asia n country, located at the

cross roads of Middle East, Central Asia and Far East civilizations, with religions such as: Islam, Buddhism, Hinduism and Christianity coexisting for centuries. Geographically it is bordering Arabian Sea and lies between India on the East, Iran on the West, Afghanistan on Northwest and China on the North. Azad Jammu & Kashmir & disputed territory of Jammu & Kashmir on its North and Northern Areas of Gilgit and Skardu form the important land link with China through Karakorum Highway. Pakistan is comprised of four provinces namely: Baluchistan, Frontier, Punjab and Sindh and has Federally Administered Areas of Frontier. Pakistan's area of 803,940 sq km is slightly less than twice the size of California with a coastline of 1046 kms.

Pakistan with a population of estimated 160 million is a land of diversities, with some of the highest mountain peaks in the world, large rivers, vast flood plains and extensive deserts. It also has some of the world's largest earth and rock filled dams and the world's most extensive canal irrigation system. About 40% of its area falls in seismic zone and the rivers occasionally overspill their banks. It has a huge and busy railway network used by thousands of passengers every day. It is located in a strategically sensitive region and has remained in the middle of the global and regional events for the last many decades.


Pakistan is blessed with a large coastline and exclusive economic and maritime zones. The length of the Pakistan coast is 1,046 km and has two operational ports namely Karachi Port Trust and Port Qasim, while new port of Gwadar will come in operation this year. These ports play vital role in economic development of Pakistan.

The Indus River, the sixth largest river in the world, travels more than 1000 miles from our North running across the country before reaching the Arabian

Sea forming a large delta. The Sindh coastal region that developed as a result of Indus river discharge is located in the southeastern part of the country between the Indian borders along Sir Creek on the East to Hub River along the Balochistan coast on the West.

→ **S. 4**

**Uses & Requirements** (2002/2025)



WATER SECTOR USES	USES 2002	REQUIREMENT FOR 2025	ADDITIONAL WATER REQUIREMENTS
	(MAF)		
Agriculture	100 *	120.0	20.0
Drinking, Sanitation, etc	5.8	12.2	6.4
Industrial	2.2	3.8	1.6
<b>Total:</b>	<b>108</b>	<b>136</b>	<b>28 <sup>MAF</sup></b>

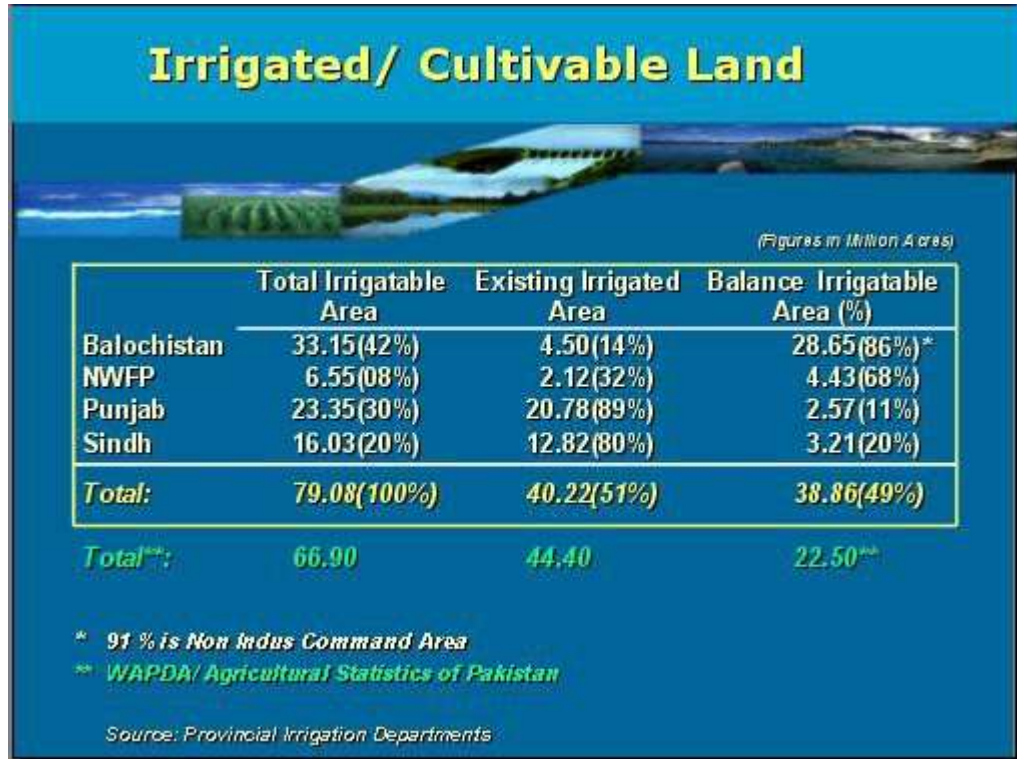
\* Present shortfall of about 12MAF  
<sup>MAF</sup> Corresponding figure at Canal Head is 37 MAF  
Source: National Water Policy

Indus Basin Irrigation Systems forms one of the world’s largest contiguous system with Indus River and its tributaries running through the heartland of Pakistan. However, some areas are not within Indus System and are dependent on rain.

Agriculture, according to all indicators, is one of the main sectors of Pakistan’s economy. It contributes about 21.6 per cent of the Gross Domestic Product, directly accounts for about 40 percent of the export earnings and employs more

than 44.8 percent of country's workforce. 65.9 percent of the country's population living in rural areas is directly or indirectly linked with agriculture.

→ S. 5



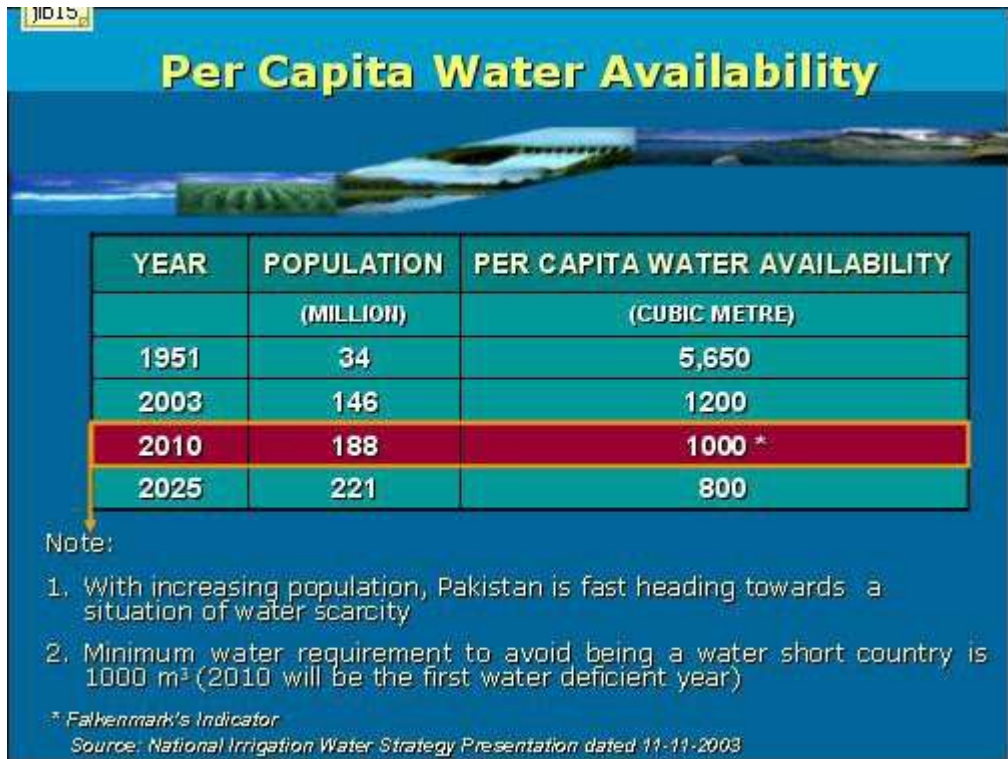
Pakistan's renewable water resources include precipitation, surface water, and groundwater. Part of the rainfall and surface water recharges the groundwater aquifer from where it is pumped out and used for supplementary irrigation and for partly meeting drinking water requirements in urban and rural areas.

The natural precipitation in Pakistan is low and irregular. The occurrence of rainfall varies widely. Most of the rainfall occurs in the monsoon season of July and August. Both the intensity and volume of water during the monsoon season are high and so cannot be fully utilized.

The groundwater resources of the country which have been extensively investigated, have established the existence of a vast aquifer underlying the Indus Plains which have been recharged in the geologic times from natural precipitation and the river flows and more recently by the seepage from the canal systems.

Conservation of water supplies is becoming increasingly important for Pakistan due to increased pressure on land and water resources by fast population growth. New sources of water supply are becoming scarce in Pakistan, presaging severe water shortages in future. Principle of conservation requires that full use be made of available water supplies.

→ **S. 6**



With Pakistan's fast growing population, estimated to touch 189.88 million by the year 2015, and depleting water resources, Pakistan is fast heading towards



a situation of water shortage. Per capita surface water availability for irrigation was 5650 cubic meters in 1951, which reduced to 1700 m in 1992. The minimum water requirement to avoid being a “water short country” is 1,000 cubic meters. As such in the year 2010, Pakistan will reach the stage of “acute water shortage”. Actions are being taken to make additional storage reservoirs.

Despite availability of two major storage reservoirs, (Mangla and Tarbela), agriculture in the Indus Basin suffers shortages at the time of **Rabi** maturing and **Kharif** sowing, which affect the yields of wheat and other crops. Though rivers start swelling up in April, the flows in April and May, augmented by some limited storage, are still not enough to meet compelling irrigation needs for sowing of our **Kharif** cash crops, like cotton, sugarcane and rice. Due to lesser carry over facilities from Tarbela early Kharif period is marked by major disputes over sharing of river water.

With the passage of time, the quantum of irrigation water presently available will go on declining further. This is because of the sedimentation of Tarbela, Mangla and Chashma reservoirs.

→ S. 7

## Dams & Water Shortages

- Rapidly increasing population
- Increasing intensity of cropping  
*(original 60-70%, now increased to 120-150% - Punjab)*
- Sedimentation of Existing Reservoirs:

Reservoir	Live Storage Capacity (MAF)				
	Original	Existing	Projection for Year 2010		
Tarbela (1976)	9.68	7.16	26 % *	6.40	34 %
Chashma (1971)	0.72	0.44	39 %	0.32	55 %
Mangla (1937)	5.34	4.56	14.6 %	3.92	26 %
<b>Total:</b>	<b>15.74</b>	<b>12.16</b>		<b>10.64</b>	
<b>Combined Storage Loss</b>		<b>3.58 (23%)</b>		<b>5.10 (32%)</b>	

\* % Loss in Storage  
Source: WAPDA/IRSA


Besides recurring irrigation water shortages, the country passes through periodic calamities caused by floods. Monsoon rains result in over flowing rivers, causing loss of life and destruction of crops, livestock and public infrastructural facilities on a colossal scale. Floods are detrimental not only in financial terms, but also severely undermine the productive system.

Waterlogging and salinity are posing a serious threat to the sustainability of the irrigation system in the long term and reducing agricultural productivity at present. Flat topography, lack of sufficient natural drainage and continuous seepage from canals are amongst the major contributing factors of surface and sub-surface drainage problems, which destroy fertile lands by exposing them to waterlogging and salinity hazards.

Ladies and Gentlemen,

→ S. 8

### I. Ongoing Storage Projects



Name of Project	Live Storage (MAF)	Irrigable Area (Acres)	Installed Capacity (MW)	Cost (Rs Million)	Completion Date
Mangla Raising	2.90	-	180	62,552	June 2007
Gomal Dam	0.89	163,086	17	12,829	June 2006
Mirani Dam	0.15	33,200	18	5,861	June 2006
Sabakzai Dam	0.02	6,680	0	1,102	June 2006
Satpara Dam	0.05	19,920	13	2,090	Nov. 2006
<b>Grand Total:</b>	<b>4.01</b>	<b>222,886</b>	<b>228</b>	<b>84,434</b>	

*Source: WAPDA*

→ S. 9

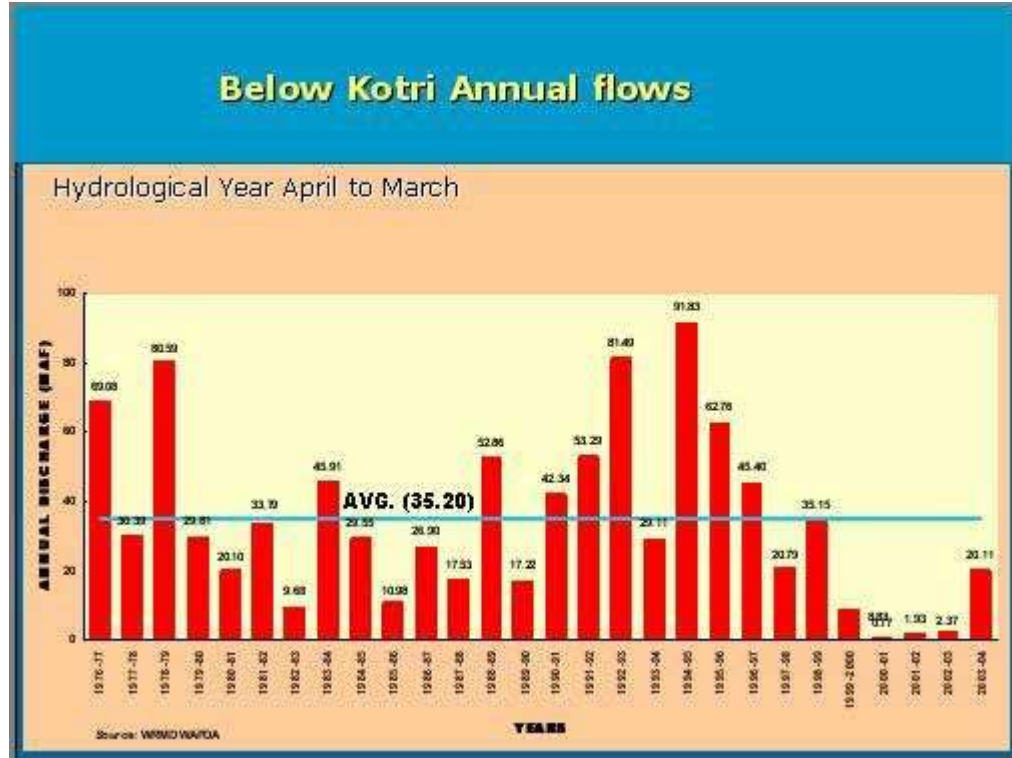
### V. Major Ongoing Canal Projects



Name of Project	Irrigable Area (Acres)	Cost (Rs Million)	Completion Date
Greater Thal Canal	1,535,000	30,467	June 2007
Kachi Canal	713,000	31,204	June 2007
Rainee Canal	412,400	18,862	Dec. 2007
Pat Feeder Canal Extension	159,000	2,243	June 2006
Khirthar Canal Remodeling	70,000	1,000	June 2006
<b>Total:</b>	<b>2,889,400</b>	<b>83,776</b>	



## S. 10 \*




In order to further develop Pakistan economically we must utilize the full potentials of that highest quality irrigation water which apart from current uses finds its way to sea. \*Thus utilizing all the surface water of the Indus river system and provision of comprehensive drainage facilities for practically all the irrigated zones is the safe and sustainable way of developing Pakistan.



→ S. 11

### Dam Sites - Ongoing Storage Projects




Name of Project	Live Storage (MAF)	Irrigable Area (Acres)	Installed Capacity (MW)	Cost (Rs Million)	Completion Date
Mangla Raising	2.90	-	180	62,552	June 2007
Gomal Dam *	0.89	163,086	17	12,829	June 2006
Mirani Dam *	0.15	33,200	18	5,861	June 2006
Sabakzai Dam *	0.02	6,680	0	1,102	June 2006
Satpara Dam *	0.05	19,920	13	2,090	Nov. 2006
<b>Grand Total:</b>	<b>4.01</b>	<b>222,886</b>	<b>228</b>	<b>84,434</b>	

\* Outside Indus System  
Source: WAPDA

→ S. 11-A

### Dam Sites - Prospective Storage Projects



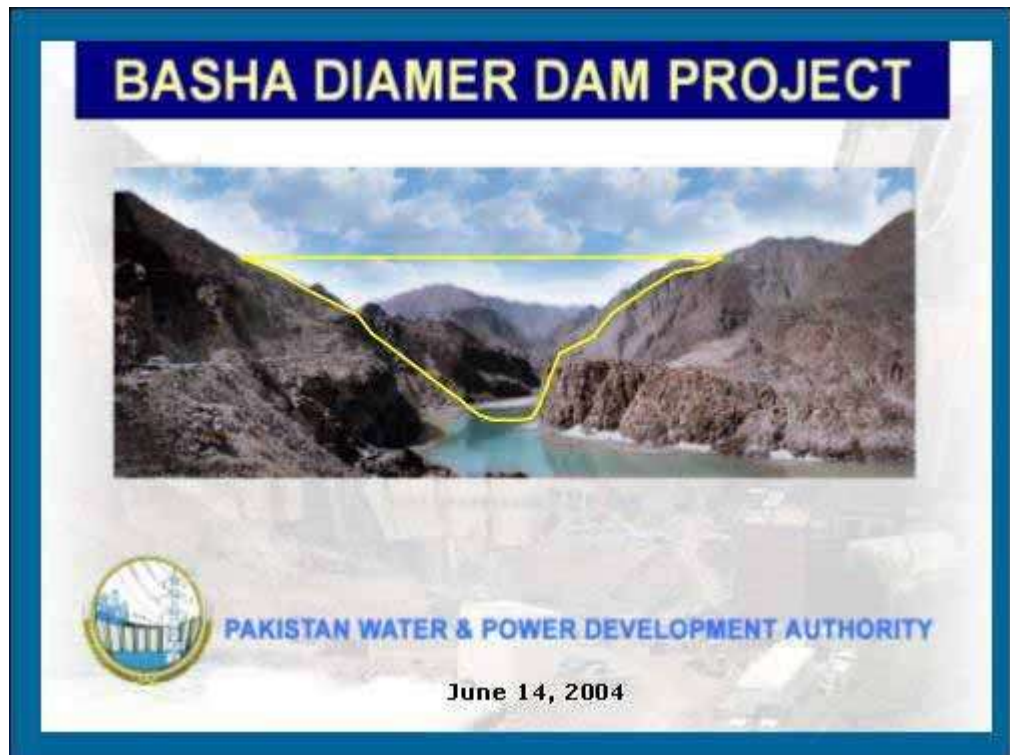
Name of Project	Live Storage (MAF)	Installed Capacity (MW)	Cost (US\$ Billion)	Status
Akhori Dam	6.00	600	1.6	Feasibility Study to be completed by August 2005
Basha Dam	7.34	4,500	6.7	Draft Feasibility Report submitted in June 2004
Kalabagh Dam	6.10	3,600	5.4	Feasibility Study Completed**
Katzarah Dam*	35	15,000	N.A	Desk Study. Pre-Feasibility to be completed by Sept. 2005
Skardu Dam	8-15.5	4,000	N.A	

Source: WAPDA \* Engr. Fatehullah Khan \*\* Update requires one year

→ S. 11-B



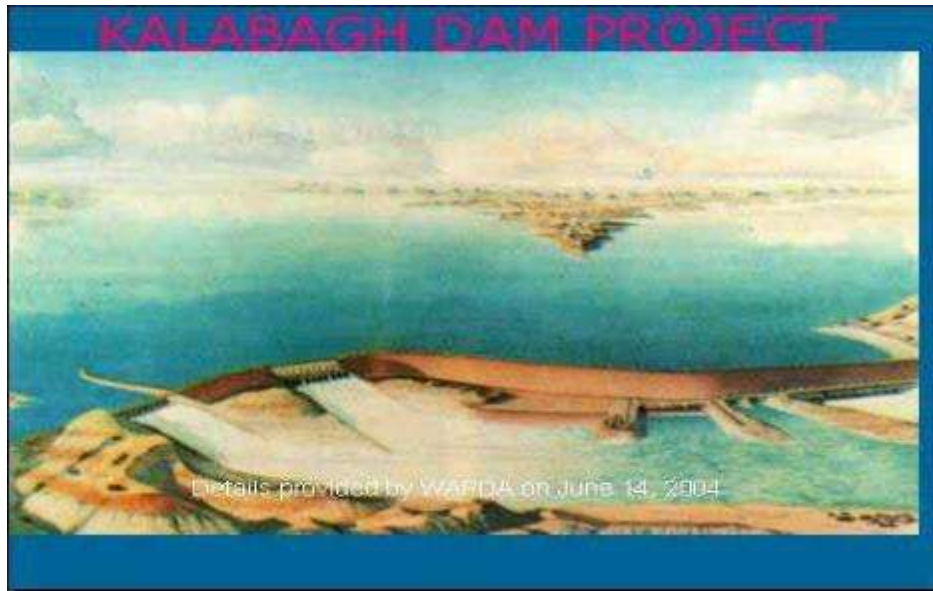
→ S. 11-C







## S. 11-D



Additional dams have to be built and new reservoirs provided so that practically all the run-off of the Indus Basin Rivers can be stored and used for irrigation with a minimum wastage being discharged into the Arabian Sea to meet the ecological needs. Such arrangement would eliminate the

→

floods and make the control of the water table easier.

→ **S. 12**

## V. Conservation Measures – Lining

Conveyance/ Seepages:

Seepage losses in irrigation system is as under:

- *Main Canals & Branches:* 10%
- *Distributaries & Minors:* 15%
- *Watercourses:* 20%

Total: 45% (47 MAF of 104 MAF)

Main Canals & Branches: 5 % Lined

Distributaries & Minors:

- Total length 48,852 Km, out of which 4,594 Km (9%) lined
- Lining of 17,166 Km (35%) in progress to be completed in next 4-5 years
- Future Plans envisaged for lining of 17,988 Km (37%)
- 81% of total length will be eventually lined

Watercourse Lining: Major initiative of Government..

The irrigation water supply system has to be lined so that optimum amounts of water can be supplied to the irrigated lands. This being undertaken by government extensively.

If nothing or not enough is done in the near future to increase the amount of surface irrigation water to increase the agricultural output, Pakistan will be faced by a stagnation period with a gradual decrease of agricultural production, and sustainable economic development of the country will be very difficult if not impossible.

→ S. 13

**IV. CONSENSUS FOR BUILDING LARGE DAMS**

**PAKISTAN NEED**

- About **38.86 Million Acres** of land available for cultivation, which constitutes **49% of total cultivable area**
- **Per capita water availability is on decline and will be 1000 m<sup>3</sup> by year 2010 and Pakistan will become water scarce country**
- Existing reservoirs silting up. By 2010, storage capacity of **5.1 MAF (32%) will be lost** from Tarbela, Mangla & Chashma
- **Additional water requirements by 2025 are estimated at 37 MAF**
- **An average of 35.2 MAF annually has gone down to sea**
- **World wide several large dams being constructed (over 200 ft height) China 59, Japan 35, Iran 28, Turkey 22, India 6.**

Pakistan like other countries is also suffering from environmental problems. Land degradation and desertification are the major problems faced by the country. Deforestation over the years is responsible for high rates of soil erosion in the catchments areas of the Indus River System and major

ephemeral rivers in Balochistan Plateau. This has been causing sedimentation of the reservoirs built at huge costs across rivers and streams.

Besides the loss of land productivity, soil fertility, and biodiversity in the watersheds, incidences of flash floods have increased, which have been responsible for huge financial and human losses.

Besides land degradation and desertification, other environmental problems faced by the country include loss of biodiversity in the degraded ecosystems, unchecked and widespread pollution of air, water and marine environment, water logging and salinity in irrigated areas, and groundwater depletion in Balochistan.

The continuing loss, fragmentation and degradation of natural habitats show the ecological trend of greatest concern. The net result is the negative impact on forests, rangelands, and freshwater and marine ecosystems. Of equal concern is decline in many native species of animals and plants. Some species are already extinct, many are internationally threatened, and more still are of national concern. The degradation of agro-ecosystems and the accelerating loss of domestic genetic diversity are areas that need to be looked into.

### **Ladies and Gentlemen,**

Globally, water has always played the most crucial and important role in ensuring environmental security. The same is true for Pakistan. While its misuse and mismanagement has adversely affected and accelerated environmental degradation, its proper and judicious use with integrated approach can help sustain the environment and even help restore degraded ecosystems.

Ensuring water security for all requires a careful consideration of the gender inequity, which is most serious in the case of drinking water, since women are invariably entrusted with the responsibility of fetching water for domestic use. This is witnessed in most rural areas of the country particularly in Balochistan and Sindh. Women in these areas have to travel long distances to fetch a pitcher of freshwater for their daily use. In addition, the destruction of forests in the catchment areas leads to the disruption of the hydrologic cycle, which affects adversely the nutrition and livelihood security of women in the water scarce areas.

In coastal areas, the situation of drinking water availability is extremely serious with women spending a major part of their time ensuring water availability. This results in loss of productive hours. Further the chance of water pollution at source and during transit becomes high and poses health hazards.

Efforts at involving communities in ensuring water security are important. People's participation in activities like rainwater harvesting, conservation, and efficient use will foster both sustainable food and drinking water security.

Meeting the challenge of water scarcity requires finding local solutions. Contingency plans and alternative strategies will have to be developed for different water availability situations, most of which will require active cooperation of all the families residing in a watershed. Management procedures relating to inter-sectoral availability of water should keep in view the needs of women. As already stated, it is the women who are mostly incharge of fetching and managing water at the household level. Hence, the

gender dimension should be internalized in all technological and policy issues relating to water.

→ S. 12

**V. Conservation Measures – Lining**

Conveyance/ Seepages:

Seepage losses in irrigation system is as under:

- **Main Canals & Branches:** 10%
- **Distributaries & Minors:** 15%
- **Watercourses:** 20%

Total: 45% (47 MAF of 104 MAF)

Main Canals & Branches: 5 % Lined

Distributaries & Minors:

- Total length 48,852 Km, out of which 4,594 Km (9%) lined
- Lining of 17,166 Km (35%) in progress to be completed in next 4-5 years
- Future Plans envisaged for lining of 17,988 Km (37%)
- 81% of total length will be eventually lined

Watercourse Lining: Major initiative of Government...

In conclusion, I would like to submit that like other countries, Pakistan has the challenges of environment and development and allow me to submit that Pakistan's government, parliament and people are committed to convert these challenges to opportunities towards improving the living conditions of the people.

Thank You.

