

PRESENTATION
ON
WATER SECURITY

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IMPOTANCE OF WATER RESOURCES FOR NATIONAL ECONOMY AND POVERTY ALLEVIATION

- Critical input for agriculture to meet food and fiber requirements, drinking water, sanitation, industry, environment, etc.
- Contribution to GDP equivalent to **23% (\$ 25 billion annually)**
- **64%** of population depends on agriculture
- **80%** of rural work force engaged in agriculture
- Responsible for **60 to 70%** exports

MAJOR ISSUES

- **Water Shortages**
 - Inadequate storages
 - Deficient harnessing of Hill Torrents
 - Over-extraction of ground water
- **Infrastructure**
 - State of infrastructure, sustainability
 - Expansion
- **Water Losses and Conservation**
- **Drainage and Land Reclamation**
- **Management Issues**
 - Water productivity
 - Equitable Distribution
 - Coordination
- **Inadequate availability of funds for Development of Infrastructure and Maintenance**

AUGMENTATION OF WATER RESOURCES

- **Construction of five major storages (Di Amer-Basha, Munda, Kurram Tangi, Kalabagh and Akhori) to be completed by 2016 increasing water availability by 20.7 MAF at a cost of US \$ 18.45 billion**
- **Enhancement of capacity of existing reservoirs (e.g. ongoing Mangla Raising Project to provide 2.9 MAF additional water by 2007)**
- **Construction of Medium Dams e.g. ongoing Mirani, Sabakzai, Gomal Zam, Satpara dams**
- **Small dams to be constructed in all provinces wherever feasible. Work on 35 small dams in progress e.g. Hingol, Naulong, Winder, Supleji, Bolan (Balochistan), Gaj Nai (Sindh), Sanam, Baran (NWFP) & Jalwal, Jabba, Sawal, Thatti Syedan (Punjab)**
- **Full potential of hill torrents (approx 10 MAF) shall be fully exploited to supplement surface water irrigation (Murri-Bugti, Kirther, Mithawan, Kaha, Vidore etc.)**

SALIENT FEATURES OF MAJOR DAMS

Sr. No	Items	Akhori	Diamer-Basha	Kalabagh	Kurram Tangi	Munda
1	Live Capacity (MAF)	7.0	6.3	6.1	0.614	0.69
2	Hydropower Potential (MW)	600	4500	3600	83	740
3	Power Generation (Gwh)	2100	16770	11750*	331	NA
4	Construction Starts	2015	2009	2006	2006	2009
5	Completion Year	2020	2016	2012	2011	2013
6	Cost (US\$ in Billion)	4.4	6.5	6.1**	0.3	1.15
7	Transmission Cost (US\$ Billion)	NA	1.0	0.15	NA	NA
8	EIRR (@ 10%)	20.9%	23.4%	23.6%	NA	NA
*Including 336 GWH for conjunctive use at Tarbela; **Excluding Outlets						5

INFRASTRUCTURE IMPROVEMENT

- **Raising of Mangla Dam**
- **Modernization & Rehabilitation of Barrages** (*Taunsa, Khanki, Balloki, Islam, Sulemanki, Jinnah, Guddu, Sukkur etc.*)
- **Remodeling & Rehabilitation of Canals** (*Thal, Lower Chenab, Lower Jhelum, Upper Chenab, Nara, Rohri, North West, Dadu, Warsak, Upper Swat, Lower Swat, Pat Feeder canals etc.*)

WATER LOSSES AND CONSERVATION

- **Lining of channels (*priority to saline zones*) and water-courses**
- **Promote use of hi-tech and modern irrigation techniques e.g. sprinkler, drip irrigation system, etc.**
- **Promote better irrigation practices at farm level such as furrow & border irrigation, laser land leveling etc.**
- **Rain Water Harvesting and other conservation measures**

NEED FOR CONSERVATION AND STORAGE

Conservation/Loss Reduction:

- Two types of losses i.e. seepage and evaporation
- Seepage losses (40-45%) can be curtailed through:
 - *Lining of Canals*
 - *Lining of Water Courses (Conservation potential 4-5 MAF)*
- Localized impact
- Life is 5 to 10 years

Storage:

- Available potential for development is 20 - 25 MAF
- Facilitates inter-seasonal and inter-regional water transfer
- Life is 50 -100 years

DRAINAGE AND LAND RECLAMATION

- **Minimize drainable surplus at source through efficient irrigation**
- **Improve on-farm and off-farm drainage of irrigation lands** (*OFWM projects, NDP, surface drains, sub-surface drains, SCARP tubewells etc.*)
- **Safe disposal of drainage effluents** (*RBOD-I,II & III*)
- **Use of chemicals (gypsum, etc.) and bio-chemical techniques to tackle sodicity problems**
- **Drainage Master Plan**

FLOOD CONTROL

- **Improve Flood Forecasting and warning system**
- **Promote flood retardation through construction of multiple storages and other structures**
- **Construction of dykes and spurs wherever required**
- **Adequate maintenance of existing infrastructure**

MANAGEMENT ISSUES

- **Low water productivity**
- **Equitable distribution**
- **Governance** (*transparency, coordination, monitoring, participation*)
- **Inadequate finances for development and O&M**
- **Sustainability**

SUMMARY OF INVESTMENT REQUIREMENTS (OVER NEXT 10 YEARS)

S.No	Item	Estimated Cost (Billion Rs)
1	Dams	1150
2	New Canals	90
3	System improvement <i>(Modernization of Barrages, remodeling irrigation system, lining and Institutional strengthening)</i>	216
4	Drainage	30
5	Floods	15
	Total	1501 Say US \$ 25.0 Billion

WATER SECTOR FINANCING

SR NO	ISSUES	MEASURES
1	Inadequate budgetary allocations for development and O&M	Enhance allocations under PSDP/Revenue budget and other fiscal measures
2	Lack of private investment and return on investment (direct and indirect)	<p>1) Induct private sector on pilot scale in development of water infrastructure on the pattern of highways, telecommunications etc.</p> <p>2) Promote partnerships between public and private sectors in development, improvement and management of infrastructure and water related services</p>

CONCLUSION

- **Storages, improved and augmented infrastructures required**
- **Efficiency, conservation and modern technology for irrigation are essential**
- **Efforts to control waterlogging and salinity need to be stepped up**
- **Prudence in ground water management required**
- **Donors assistance is required for financing of dam projects**
- **Institutional reforms need to be continued**
- **Water sector institutions need to be strengthened**

THANK YOU

ILLUSTRATIVE ANNUAL BENEFITS

Rs in Billion

Sr. No.	Sector	Diamer-Basha Dam of 6.3 MAF
1	Agriculture	47
2	Saving of fuel cost for Power Generation	67
3	Municipal and Industrial use	19
4	Flood Control	06
5	Environment	51
	Total (Aggregate)	190
	Total Per MAF	30

PROSPECTIVE CONSERVATION PROJECTS

Sr. No.	Name of Project	Location	Cost (Billion Rs.)
1	Modernization of Barrages	All over Pakistan	100
2	Rehabilitation of Canals	Punjab	21
3	Lining of Canals (<i>saline zones</i>)	Punjab	31
4	Rehabilitation of Canals	Sindh	13
5	Lining of Canals (<i>saline zones</i>)	Sindh	25
6	Rehabilitation of Canals	N.W.F.P	8
7	Lining of Canals (<i>saline zones</i>)	N.W.F.P	7
8	Rehabilitation of Canals	Balochistan	6
9	Lining of Canals	Balochistan	5
	Total		216 17

Outlay for above stated projects = US \$ 3.6 Billion