Hisaar Foundation
a foundation for water, food and livelihood security

Think Tank on the Rational Use of Water

First Report

October 2016

Recommendations for Pakistan's Water Policy Framework

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Foreword

It is our pleasure to share the first publication by Hisaar Foundation's Think Tank on Rational Use of Water. The Think Tank aims to provide meaningful and innovative solutions to Pakistan's key water issues as well as advancing these solutions into a mainstream national agenda.

This body came into existence in 2014 and, through strenuous efforts of the members of its Think Tank and the staff of the Hisaar Foundation, it has accomplished a great deal since its inception. From identifying the major challenges facing Pakistan in the water sector to setting priorities for the work to be undertaken in the initial phase, the Think Tank has strived to fulfill its obligations in a timely manner.

While the Think Tank began its work by identifying five key priority areas: efficient management of the Indus basin; Balochistan groundwater management; drought management and arid zones; urban water management; and the Indus Water Treaty/Transboundary water, fast emerging realities resulted in expansion of our focus.

It was at the Hisaar Foundation's second international conference on water held in November 2015, entitled "Securing Sustainable Water for All 2015– Innovation, Integration and Inclusion," experts and participants reached the consensus that the government of Pakistan must formulate a national water policy. Therefore, the Think Tank was charged with developing a set of recommendations as well as a call to action for the formulation of a national water policy.

A core value of the Foundation is that water is everyone's business and diversity of views will only enrich the solutions to the many challenges we face. Hisaar Foundation invited a unique mix of professionals to form the Think Tank. The composition of the Think Tank members offer a blend of water experts and prominent leaders with diverse backgrounds. Each individual truly believes in the cause of water and the spirit of volunteerism thereby generously offering their time and valuable experiences.

Three leading national experts on water were invited to join this group including Khalid Mohtadullah, a leading authority on water who is also an engineer by profession, Dr. Daanish Mustafa, a geographer and an academician and Simi Kamal, founding chair of Hisaar Foundation and a geographer by profession. Dr. Salman Shah, economist and a former finance minister of Pakistan, Aliuddin Ansari, a well-known name in the corporate sector and a former chief executive officer of Engro Corporation, Dr. Sarosh Lodi, Dean of Civil Engineering Faculty of the Karachi-based NED University of Engineering and Technology and also the chair of the Universities for Water Network of Hisaar Foundation, Seema Taher Khan, a media and communication specialist, and myself in my capacity as the chairman of Hisaar Foundation and specialist in strategy and institutional development. We also appreciate the valuable contributions made by Mirza Qamar Beg, a former member of this group.

We aim to advance the conversation on Pakistan's water challenges not only by disseminating this publication widely but also by interacting with the various stakeholders on the issue. I am grateful and obliged to our Think Tank members who worked tirelessly in bringing out this document. I would also like to especially acknowledge the contribution of Zofeen Ebrahim towards editing of this publication. Finally, I must mention that without the zeal and determined effort of the Hisaar Foundation's staff who demonstrated commitment to the cause by putting in long hours, this milestone would not have been achieved.

I thank you.

Zohair Ashir
Chairman

The Think Tank was established with the mission to provide national leadership in Pakistan on the crucial issue of promoting the rational use of water, its improved management, and providing policy directions. Specific goals included establishing a national forum for discourse on rational use of water, developing and presenting policy alternatives, and carrying out advocacy at the highest levels of the government, civil society, and corporate sectors.

After two years of hard work, I am happy to present the first set of outputs:

1. Recommendations for Pakistan's Water Policy Framework
2. A paper on Drought Management and Arid Zones: Understanding drought, early warning signs and drought resilience
3. An article on "The Great Betrayal: The unfulfilled promise of Pakistan's water economy"

The Think Tank supports and encourages academic explorations, research, and individual viewpoints, as well as builds consensus on policy through discursive engagements.

The policy recommendations included here are the result of intensive discussions and consensus building among the Think Tank members and incorporation of viewpoints from two international conferences and several consultations across Pakistan. In the endeavor to formulate a comprehensive water policy framework the Think Tank held discussions with representatives of international non-governmental organizations, local civil society organizations, representatives from the business and corporate sectors, members of the Lahore and Karachi chambers of commerce and industry, representatives from donor agencies, farmers, women's groups, media, academia, university students, teachers, professors, as well as elected representatives.

In "Drought Management and Arid Zones: Understanding drought, early warning signs and drought resilience" Dr. Daanish Mustafa and Sanaa Baxamoosa study the regional specific experiences of drought in Pakistan.

In the article "The Great Betrayal: The unfulfilled promise of Pakistan's water economy", Dr. Salman Shah shares his views on the immense potential of the water economy of Pakistan.

Having developed a "universe of priorities" encompassing the water challenges faced by Pakistan, members of the Think Tank aim to develop policy, position papers and/or research outputs for each of the twenty five priority action areas identified.

It is our hope that together we can lobby with the government in instituting an appropriate water policy, as outlined in this publication.

Simi Kamal

Convener Think Tank & Chair of the Academic Committee

Recommendations for Pakistan's Water Policy Framework

Proposed by Members of the
Hisaar Foundation Think Tank on the Rational Use of Water

Preamble

This framework has been developed over three years of hard work covering two international conferences organized by Hisaar Foundation on 'Water Cooperation in Action - From the Global to The Grassroots' (December 2013) and 'Securing Sustainable Water for All: Inclusion, Integration and Innovation' (November 2015) and numerous sessions of the Hisaar Foundation Think Tank on Rational Use of Water[1] and the Universities for Water Network[2], as well as several stakeholder sessions and meetings with water experts, government functionaries, the corporate sector, the business community, international agencies, academia, women's groups, youth groups, civil society and the media. This also includes discussion in various documents[3].

This policy framework covers the following **five focus areas:**

- Improving access to water for the poor and landless, and maximizing water use efficiency
- Financing the urban and rural water economies and the water value chain
- Safeguarding the Indus Basin, its aquifers and its infrastructure
- Improving governance and management of water institutions
- Building a base for science, technology and the social aspects of water

This is a call to action to federal and provincial governments and will continue until Pakistan has a feasible and actionable national water policy in place.

Land and water belong to the people of Pakistan and form their endowment and entitlement. They are Pakistan's main natural and economic resources for which there is substantial physical infrastructure available and where a very large segment of the population is provided livelihood opportunities. This water policy framework postulates that Pakistan's water must be a source of development, dignity and prosperity for all citizens. Pakistan has recently committed to Agenda 2030 and has become signatory to Sustainable Development Goals (SDGs) where Goal 6 calls, among others, for ensuring availability and sustainable management of water and sanitation for all, water use efficiency and integrated water resources management. The UN World Water Development Report 2016 highlights that most of the global work force is directly or indirectly dependent on water resources[4]. The Organization for Economic Co-operation and Development 2016 report links water, growth and finance and calls for financing investments in water security and sustainable growth[5].

Pakistan's economy is a 'water economy' with 60 percent of the population directly engaged in agriculture and livestock and 80 percent of Pakistan's exports based on these sectors. Approximately 95 percent of surface water[6] and almost all fresh groundwater in Pakistan is currently used in agriculture.

Therefore, Pakistan needs a long term plan for its water requirements and the federal government should take the lead in defining the long term roadmap up to 2050 in a climate-challenged world. Pakistan's Vision 2025 aims to increase water storage capacity, improve efficiency in agriculture by 20 percent and ensure

1 Think Tank Members: Mr. Aliuddin Ansari, Dr. Daanish Mustafa, Mr. Khalid Mohtadullah, Dr. Salman Shah, Professor Dr. Sarosh Hashmat Lodi , Ms. Seema Taher Khan, Ms. Simi Kamal and Mr. Zohair Ashir

2 UWN members: NED University of Engineering and Technology, Mehran University of Engineering and Technology, University of Karachi, Habib University, Lasbela University of Agriculture, Water and Marine Sciences, University of Agriculture, Faisalabad, Lahore University of Management Sciences (LUMS), University of Peshawar, MNS University of Agriculture Multan, Karakoram International University

3 Kamal S, Amir P, Mohtadullah K, 'Development of Integrated River Basin Management (IRBM) for Indus Basin - Challenges and Opportunities', WWF Pakistan, 2011
Shah S, presentation on 'Rejuvenating Pakistan's Water Economy: Policies, Institutions and Infrastructure', presented in 'Securing Sustainable Water for All – Inclusion, Integration, Innovation', Hisaar Foundation's international water conference (November 2015)
Briscoe J and Qamar U, Pakistan's Water Economy: Running Dry,The World Bank report, November 2005

4 Water and Jobs, United Nations World Water Development Report, 2016

5 OECD Economic Outlook, Volume 2016, Issue 1, OECD Publishing, Paris.

6 Pakistan 2025, One Nation-One Vision, approved by National Economic Council, May 2014, Planning Commission, Ministry of Planning, Development & Reform, GoP, pp 64

clean drinking water to all Pakistanis[7]. It speaks of water security goals that include technologies to minimize wastage, more effective allocations, establishment of institutional mechanisms and a minimum baseline for suitable water to every person in Pakistan.[8] With a growing population, Pakistan is a water-scarce country now, and with water security goals in its vision statements, Pakistan needs to work in smarter, less water-intensive ways.

These recommendations for a policy framework have been developed to cover the next 10 years, with a vision, goals and strategies to achieve the goals. It is offered to the government of Pakistan for consideration and the Pakistani public to lobby with the government for requisite actions.

1. Situational Analysis of Water and Unused Potential

Given the present level of development in the country, a runway population and increasing climate change impacts, the best option for sustainable economic and social development is to make the needed investments in Pakistan's water sector to ensure equitable access to the fruits of development to all, while at the same time conserving this vital resource. Therefore, it is necessary to first have in place a sound water policy that provides the framework for optimal and balanced development, management and conservation of Pakistan's water resources and assets.

Pakistan's total surface water from all rivers is 154 million acre feet (MAF) on average but the flow fluctuates widely in different years. The average flow to the sea is approximately 40 MAF but is very variable[9]. For example, the flow was 92 MAF in 1994 -95 per year and 0.77 MAF in 2000-01[10]. Approximately 10 MAF is systems losses each year[11]. On average 104 MAF of water is diverted into the irrigation system, against the 114.35 MAF mentioned in the Indus Water Accord[12]. Pakistan also has about 50 MAF[13] of fresh groundwater of which 79 percent is in Punjab and 28 percent in Sindh. [14]The canal irrigation water efficiency is around 33 percent i.e. only one-third of the water mobilized in the irrigation system reaches the farm gate. In comparison, other countries have achieved efficiency levels exceeding 90 percent. Waterlogging and salinity have not yet been effectively tackled. Pakistan has lost 3.2 million hectares[15] (canal command area) to water logging and salinity. Thirty-three million tonnes of salt is coming into the system annually and we are only capable of discharging 9 million tonnes per year[16], leading to net accumulation of salt in the system. However there is a potential to achieve a favourable salt balance in the Indus basin through effective drainage management.

The potential hydro generation capacity embedded in the Indus river system is about 59,000 MW[17] of which Pakistan has exploited only 6,595 MW[18]. Pakistan's total land area is around 196 million acres out of which 77 million acres are suitable for agriculture. Currently 55 million acres have access to irrigation[19]. Therefore, there is a potential of bringing 22 million acres of additional land under irrigation by extending the Indus basin irrigation network to the arid areas of Pakistan.

Annual agriculture GDP for 55 million acres of irrigated land is under US$500 million for every

7 Pakistan 2025, One Nation-One Vision, Planning Commission, Ministry of Planning, Development & Reform, GoP, pp 102
8 Ibid, pp 62
9 The Pakistan Water Situational Analysis, the World Commission on Dams – Consultative Process in Pakistan (WCD CPP) Project, IUCN, 2002, pp 1
10 Khan, RIA, Water Resource Development in Pakistan, presented at Roundtable Discussion on Agriculture and Water in Pakistan, World Bank, IRSA 2011
11 Pakistan Water Sector Strategy, National Water Sector Profile, Ministry of water and Power, Volume 5, October 2002, pp 2
12 Pakistan Water Accord, 1991
13 The Tenth Five Year Perspective Plan-Investing in People, 2010-15, Planning Commission GoP, Islamabad, pp 291
14 The Pakistan Water Situational Analysis, the World Commission on Dams – Consultative Process in Pakistan (WCD CPP) Project, IUCN, pp 3
15 MINFA 2008 quoted in The Tenth Five Year Perspective Plan-Investing in People, 2010-15, Planning Commission GoP, Islamabad, pp 59
16 The Tenth Five Year Perspective Plan-Investing in People, 2010-15, Planning Commission GoP, Islamabad, pp 293
17 WAPDA report November 2011 quoted in Report on An Overview of Electricity Sector in Pakistan, ICCI, pp 11
18 Hydel Potential in Pakistan, Ministry of Water and Power, GoP, 2013, pp 15
19 Issues of Water Resources in Pakistan, Briefing Paper No. 7 for Pakistani Parliamentarians. PILDAT. 2003. pp 11

MAF of water. This makes total agriculture GDP of around US$50 billion per year[20]. There is a potential to raise this substantially and build upon and expand the water 'value chain'.

The cost of replacing the Indus basin system is approximately US$ 300 billion[21]. The Indus basin system is our asset and we must leverage it to generate local investment from within Pakistan for repair and maintenance of this infrastructure. We should also build new infrastructure where needed, through cooperative, institutional and innovative financing models.

In this endeavour we should learn from global experiences including the Murray Darling basin of Australia which is an extremely relevant comparative study for Pakistan in achieving salt balance, regulating and managing both groundwater and surface water through use of economic, environmental and social instruments, and the principles of integrated water resources management (IWRM).

2. National Water Vision

Pakistan Vision 2025 states that "Pakistan's ultimate aspiration is to see Pakistan among the 10 largest economies of the world by 2047, the centennial year of our independence". We believe that this cannot be done unless we develop Pakistan's water economy and provide clean, safe and accessible water for all citizens as a right, balanced with affordable and efficient water supply for economic and social development with benefits for all areas of Pakistan, and for both women and men.

This vision is built upon depoliticized consideration of water movement, water storage, water use, water recycling and water conservation in the interest of Pakistan, and for promoting and achieving equitable distribution of costs and benefits of the water economy across Pakistan, especially benefiting the poor.

To circumvent the long debates that have strangled rational use of water in Pakistan, we propose concrete goals over a ten-year period to kick-start the process of widening the benefits of the water economy to embrace deprived areas and groups, and encourage water efficiency in agriculture and other uses.

2.1 National Water Goals over Next 10 Years

These goals reflect the vision and the five focus areas which are feasible and manageable in a ten-year time frame.

1. Extend the irrigation system to the arid districts of eastern Sindh, southern KPK, eastern Balochistan and southern Punjab, bringing at least five million new acres under cultivation for distribution to poor and landless farmers.
2. Mobilize five MAF of additional surface water each year to reach the farm gate by third year of this policy (40 MAF instead of current 35 MAF), and 10 MAF each year by the seventh year of the policy (45 MAF instead of current 35 MAF) including savings in current system (lining canals in downstream areas, changes in cropping patterns and water saving measures) and new/enhanced storages of different sizes at different levels, as appropriate in different areas.
3. Improve water efficiency from the current level of 33 percent to approximately 43 percent (i.e. 45 MAF instead of 35 MAF of irrigation water available at the farm gate).
4. Achieve one billion dollar output for every MAF of water used in agriculture.
5. Preserve, maintain, repair and add to the existing water infrastructure assets.
6. Revise abiyana to reflect the real value of water, make it pro rata and geographically specific.
7. Control withdrawals in fresh groundwater areas and line watercourses in saline groundwater areas.
8. Generate additional 10,000 megawatts (MW) [22]indigenous hydropower and reduce reliance on thermal power.

20 This is based on calculating 20% of Pakistan's GDP from Pakistan Economic Survey 2016

21 Briscoe J and Qamar U (eds), Pakistan's Water Economy: Running Dry, The World Bank, November 2005

22 State of Industry Report 2015, National Electric Power Regulation Authority, Govt. of Pakistan. pp. 5

9. Institute coordination among water, agriculture and industry for maximum benefits.
10. Make investment in water infrastructure and hydropower a core part of the China Pakistan Economic Corridor (CPEC).

3. Strategies for Achieving Goals

For achieving the 10 goals, comprehensive strategies are proposed under each of the five focus areas:

3.1 Focus Area 1 - Improving Access to Water for the Poor and Landless and Maximizing Water Use Efficiency

Several of the 10 goals refer to increasing access and benefits of water to all. While many barani areas of Pakistan may not benefit from the possible reach of the Indus system, those that can should be brought under irrigation. Other methods are suggested for difficult and dry areas, where irrigation system cannot be extended. Some of these initiatives can be taken up under the CPEC arrangements.

3.1.1 Thinking Differently about Water Use Efficiency

Water use efficiency in the Indus irrigation system is low on many counts, not least in terms of water lost through seepage, estimated at two-thirds of total diverted water (69 MAF out of 104 MAF).

We must recognize the different geology, hydrology and geography of various areas in the Indus basin and allow water seepage where the 'lost' water contributes to sweet groundwater. But we must save current water losses downstream where seepage water is lost by mixing in saline groundwater. This will be done by lining the canals in saline areas and investing in this intervention on priority basis. Improving water efficiency from 33 percent to 45 percent will mean beginning with additional five MAF of saved water which can be channeled into the proposed Rainee/Thar canals, Katchi canal and others, to bring new areas into cultivation.

Work will commence on working out entitlements of provinces, areas and districts based on all available sources of water (groundwater, surface water and precipitation), rather than only surface water. So if one district has large supplies of groundwater, its share from surface water will be reduced. This will require hard negotiations, but will lead to efficiency and equity.

3.1.2 Bringing Deprived Cultivable Areas under Irrigation

This policy framework calls for extending the irrigation system to the arid districts of eastern Sindh, southern KP, eastern Balochistan and southern Punjab, bringing at least five million new acres under cultivation for distribution to poor and landless farmers.

This would include the eastern districts of Sindh like Kashmore, Ghotki, Sukkur, Khairpur, Sanghar, Umerkot, Mirpurkhas, Tharparkar, Thatta and Badin; the southern Punjab with Pakpattan, Bahawalnagar, Bahawalpur, Muzzafargarh, Lodhran, Rajanpur, DG Khan, Layyah and Bhakkar; the eastern Balochistan with Barkhan, Kohlu, Dera Bugti, Naseerabad, Jafarabad, Jhal Magsi, and Khuzdar districts and the southern KP districts of DI Khan, Tank, Lakki Marwat and Karak.

3.1.3 Zoning for Improving Water and Crop Productivity

Pakistan's crop productivity per unit of water is very low at0.13 kg/m3[23]. Time is needed to bring about a more positive change to this. In certain instances, existing cropping patterns will have to be readjusted in line with changing water availability and emerging opportunities. Such changes have to take place in a programmed manner that takes cognizance of ground realities, population trends, market trends and trade opportunities. Irrigation water efficiency will have to be enhanced by improving the delivery systems, establishing benchmarks for minimum crop water requirements, rehabilitating

23 Tariq S, Water Productivity, presented in National Seminar on Integrated Water Resources Management, Islamabad, Dec 2005

traditional systems and adopting new conservation technologies (for example atmospheric moisture harvesting, rainwater harvesting, drip irrigation etc.) that help save water.

Zoning land according to water productivity and water/irrigation efficiency potential will be undertaken at both macro and micro levels. This framework will identify the yield gaps to be bridged in each zone, to ensure that optimal annual productivity of the systems bring marked improvements in the farming sector, while also conserving the basis of these improved yields.

We need to grow only those crops that need less water, discontinue or vastly reduce crops that require huge amounts of water (such as some variety of rice and sugar cane) and get growers to pay for water at higher rates for such crops. Once water is treated as a cost of production in the water economy, the market will adjust and cropping pattern will change.

Farmers are an integral part of participatory processes in management, planning and implementation of water distribution, collection of water rates and the management of tertiary irrigation systems.

A paradigm shift is required to recognize the role of the farmer (not absentee land owners) as fundamental in the irrigation and agricultural production process, and the cornerstone of the water economy.

Emphasis is required on protecting the livelihoods of small and tenant farmers, inland and coastal fishermen.

3.1.4 Allocating Water for the Expanding Urban Economy

With over 50 percent of Pakistan's population living in urban areas, and the proportion likely to grow, entitlement of urban areas for domestic, municipal and industrial uses cannot be pushed under the carpet in the current political rhetoric and must be tackled head-on. In principle every person moving to an urban area must bring his or her domestic water 'entitlement' with them as a right, and the water supply to the city adjusted accordingly[24]. Industries, trade and business, all require water over and above individual requirements, and these uses must be reasonably factored into the water quantum supplied to cities.

The water entitlement of each urban area will be determined and supplied by provincial governments from their share of water and municipal governments will manage this water under equitable systems and control of wastage, charging as per entitlement and use.

Water recycling, wastewater management, water treatment, water conservation, greening, water harvesting from rain and atmosphere and innovation will become realities in the cities and towns.

3.1.5 Allocating Water for Barani, Hard Rock and Desert Areas of Pakistan

Policy makers often forget the most difficult desert, hard rock, and barani areas, which receive sporadic rain and sometimes none in years. A large proportion of such areas lie in the Balochistan, Salt Range and the Potohar plateau.

These areas will have priority for groundwater development and use, but with licensing and control to prevent mining of aquifers. Innovative methods for obtaining water, based on the differences in day-time and night-time temperatures, harnessing flash floods and novel ways of harvesting water from the atmosphere will be developed for these areas.

3.2 Focus Area 2 - Financing the Water Economy and the Water Value Chain

Pakistan's water economy and its value chain needs to be protected so that the gains of proposed expansion of this economy, its water use efficiency and equitable sharing of benefits can be institutionalized. This also means consciously building better links among agriculture, pastoral outputs and industry, in ways that allows young farmers to stay on the land and

24 The WHO standard is between 50 and 100 litres of water per person per day.

keep producing, while maintaining an amenable lifestyle in rural areas.

3.2.1 Financing Maintenance, Repairs and New Infrastructure

The average cost of irrigation development in public schemes is an estimated US$ 1300/hectare, while the cost of drainage development is around US$ 2650/ha. The average cost of operation and maintenance (O&M) is US$ 65/ha per year. The average cost of sprinklers and micro-irrigation for on-farm installation is US$ 1500/ha and US$ 1750/ha respectively[25]. This requires stupendous amounts of money to keep our water infrastructure in working order and add to it as envisaged in the vision of this policy.

While this policy proposes that some of the cost of maintenance, repairs and new infrastructure is recovered through improved revenue streams and revised abiyana to reflect the real value of water, Pakistani banks will be persuaded to develop products to meet the gap in financing.

3.2.2 Financing Value Chain for Increasing Water Productivity to Maximize Returns to Farmers and Businesses Based on Agricultural and Pastoral Outputs

One of the goals of this policy is to achieve one billion dollar output for every MAF of water used in agriculture, fish-farming, livestock and related areas. This requires investment for on-farm improvements and better productivity as well as value-added businesses and industries from micro, through small and medium enterprises, to small and large industries, to release the potential of prosperity in all these sectors, targeting men and women, as well as young people.

Potential value chains based on the productivity of zones, as described in the section above, will form the bases of financing packages that commercial banks can be encouraged to develop. Not only will this boost economic opportunities for farmers and support rural-based businesses, it makes good financial sense for lending by banks.

Pakistani public and private sector banks and investment companies will be encouraged to lend for water value chains and help connect agricultural, fisheries and pastoral livelihoods with small, medium and large businesses.

3.2.3 Financing Hydropower Generation

In 2015, the total installed electricity generation capacity of Pakistan was 24,823 MW out of which the share of thermal plants was 16,814 MW followed by hydel power plants 7,116 MW, nuclear power plants 787 MW and wind power plants 106 MW[26]. It is one of the drawbacks of Pakistan that its power production is dominated by thermal power plants that run on oil and gas. Pakistan is heavily dependent on imports of oil and spent US $6572.68 million on import of 8.04 million tonnes of crude oil during the year 2013-14[27]. In addition, the total coal imported into the country during 2013-14 was 3.12 million tonnes that cost approximately US $310.72 million[28].

It is clear that at least for the next 10 years hydropower is the smartest and cheapest option for Pakistan, and hydropower schemes can be small and medium, as well as big, and the power generated can be put into the national grid immediately. This policy framework proposes 10,000 megawatts of hydroelectric power over the next 10 years, financed by the private sector.

Pakistani public and private sector banks will come forward to take up this winning proposition, and Pakistani businesses will get into this sector, where there is already an established market in place.

3.2.4 Building a National Investment Base for the Water Economy

This policy calls for reducing reliance on international donors and building a national investment

25 Accessed online http://www.fao.org/nr/water/aquastat/countries_regions/Profile_segments/PAK-IrrDr_eng.stm

26 State of Industry Report 2015, National Electric Power Regulation Authority, pp. 123

27 Ibid. pp. 77

28 Ibid. pp. 77

base where Pakistani banks, financial institutions and investors become the 'owners' and backers of water infrastructure, hydropower, agricultural development and the water value chain.

Pakistan will raise 'water bonds' and other financial instruments to fund the proposed rehabilitation, maintenance and repair of existing systems and new development on a fast track basis. Pakistani public and private sector banks, as well as investment houses, will become integral part of funding water infrastructure and water value chain.

3.3 Focus Area 3 - Safeguarding the Indus Basin and its Infrastructure

Pakistan has many wastage, drainage, pollution and distribution problems in the Indus basin. Since the 1970's Pakistan is experiencing an increase in floods, droughts and extreme weather events and now climate change is having a direct impact on its water resources and water availability. Pakistan must act now to safeguard the Indus basin and its infrastructure – the largest contiguous irrigation system in the world.

3.3.1 Ensuring Physical Sustainability and Integrity of Rivers, Water Bodies, Catchment Areas and Groundwater

The water sources, basins, catchments, groundwater and coastlines of Pakistan have to be secured and safeguarded from degradation, over-exploitation and destruction so they continue to be available for multiple and sustained uses and remain the backbone of Pakistan's economy and social well-being. This has to be the job of the federal government.

Unregulated groundwater development (tubewell installation) has led to mining of aquifers and adverse penetration of salt water into fresh water aquifers. It is essential to revisit the hydrology of both surface and groundwater systems of the Indus Basin to correct this imbalance.

In the barani areas, ground water regimes need to be restored through planned recharge and harvesting rain and flood waters by building small dams and other systems. The first right on groundwater should be for drinking, domestic and livelihood uses, and not for intensive commercial agriculture which is the case presently.

Practical steps will be designed for regulation of groundwater across Pakistan that are environmentally sound, socially acceptable, economically viable and legally enforceable.

Introduction of appropriate conservation methods (which may be different for different areas) will achieve salt balance in the Indus basin through a phased programme covering improved drainage and other measures.

Under integrated flood control and drought management, flood water will be added to Pakistan's water supply and will be stored in over ground and underground storage systems throughout the country like the aquifers, old river courses, lakes, storm water courses and terai areas.

All water initiatives will be carefully screened for their resilience to climate change and appropriate measures included to enable both mitigation and adaptation perspectives, as seen appropriate.

3.3.2 Protecting Indus Delta and Pakistan's Coastlines

One of the most devastating results of system inefficiency of the Indus waters has been the destruction of the Indus delta and Pakistan's coastlines. Although the Water Accord recognizes a fixed quantum of environmental flows, these are not released in a consistent way each year. The inconsistency is justified on the grounds that there is an 'average' over time, when flood flows 'even out' the dry years. Calculations of average will have to be changed from mean to mode (most frequently occurring) to determine water flows released to the sea.

This policy will ensure a regular, controlled minimum flow each year to the sea, to safeguard

delta areas and the coastline, to be guaranteed through strict regulation and implementation and a GIS based monitoring system.

3.3.3 Water Conservation

Water savings are a must for a more efficient use of water and its conservation and for realizing the national vision. Techniques that facilitate water harvesting at all levels will be encouraged to help preserve water during periods of high rainfall flow for use during lean periods.

Traditional water harvesting systems such as tonka system, Rod Kohi agriculture and Karez systems will be preserved as they help conserve water in dry lands and harsh ecologies.

Steps will be taken at all levels through widespread media campaigns and public private partnerships to raise awareness and implement water conservation through appropriate incentives and penalties. The greatest water savings will be targeted where there is greatest use – in agriculture.

3.3.4 Improving Surface Storage, Groundwater Storage and Inter-Seasonal Transfer Facility

The nature of surface water flows in the Indus system is highly variable with 75 to 80 percent of water being available in three months of the year and only a trickle in the remaining nine months of the year. Carryover capacity is almost nonexistent. Adequate facilities are, therefore, needed to store water to move it from one season to the other, and also to store water in water surplus years. Also, interface of groundwater and surface water needs to be seen as a basis for proposing new infrastructure in some parts of the Indus system. If surface water is seeping into the soil and maintaining vast quantities of groundwater, the need for surface storages has to be seen in that context.

Pakistan will enhance/create water storage facilities at different levels to capture the additional five MAF of water each year from its Indus River Basin system (starting in the seventh year of this policy) to meet irrigation and power needs and also to mitigate the negative impacts of floods and droughts. However, these will be undertaken after extensive environmental assessment to mitigate the impact on biodiversity and the environment, cost-benefit assessment of investment and after fixing the downstream distribution system to minimize losses. Pakistan will make necessary investment in downstream areas to prevent water losses in regions underlain with saline water, and tackle inefficiencies in the drainage system.

At the same time Pakistan will develop a serious and extensive plan to use local ponds, wetlands, lakes as aquifers as natural expanded storages under water stewardship concepts.

3.3.5 Strengthening National Security through Trans-boundary Cooperation on Shared Water Resources

Pakistan's national security is inextricably linked to its management of shared water resources with its neighboring countries. The Indus basin is shared between India, Afghanistan and China, with the bulk of the basin lying in Pakistan. Trans-boundary water bodies have the potential to be sources of conflict over competing scarce resources, but also of cooperation. The Indus Waters Treaty of 1960 is a testament to the potential of cooperation of trans-boundary waters.

This policy calls for a concerted effort to shift the paradigm of thinking about trans-boundary water resources management from competing for scarce resources to one of cooperation and benefit sharing. Pakistan needs to explore the potential of developing a treaty with Afghanistan to share the Kabul river. Pakistan should also explore cooperation with China on the Indus waters.

3.4 Focus Area 4 - Improving Water laws, institutions, Governance and Management

Pakistan has to demonstrate the political will to let Pakistan's water economy take its course

in building prosperity for all Pakistanis. In an environment where power is demonstrated by flouting rules, making people in power to act within the ambit of the law and take action for the benefit of the many (rather than the few) is a big challenge.

3.4.1 Improving Trust and Transparency in Interprovincial Water Sharing

In order to improve sharing of water resources and sharing the benefits of water resources, all the water sources available to a province must be taken into account. This will improve trust and transparency, and will also be fairer than before.

The existing surface water sharing formula will be applied in a spirit of goodwill each season, and monitored by an independent body, until such time that the provinces can sit down together to work out all water available (surface water, groundwater and precipitation) for all uses in each province and territory and determine the shares accordingly. This will be further broken down for establishing water allocations and rights at the district level.

3.4.2 Establishing Per-capita Water Entitlement, Water Rates and Water law

Drinking water, domestic water and sanitation are social entitlements of each Pakistani and each one must receive a fixed amount in this context. Beyond this entitlement, water rates need to reflect the value of the resource to users, provide incentives and bring about efficiency within the economy, and help protect the environment. Currently the common perception does not include awareness that irrigation water and water for other uses is being provided far below its economic value.

Per capita water entitlement will be fixed and used for calculating and supplying water for domestic use to rural areas, cities and towns. This means that everyone will get free water up to established entitlement[29]. For that over and above, people would have to pay.

Water rates will be evaluated in line with economic and social realities to bring them close to the "true" value of water. All explicit and implicit subsidies on water will be rationalized. Everyone who uses water will pay for it, just as they pay for electricity and gas. Once users pay for it, they will not waste it and also there will be money available for maintenance, repairs, improvements and conservation. Access and right to water for agricultural or other activities will be separated from ownership of land.

Pakistan will put into place a comprehensive set of water laws that define water rights, uses, value, conservation and principles of pricing, subsidies, licenses and polluter penalties.

3.4.3 Creating a Coalition of Stakeholders to Promote Citizens Social Responsibility on Water Issues

In today's world, water has become everyone's business. The sustenance and growth of Pakistan's political, economic and social agenda depends largely on whether water resources are managed equitably and fairly.

This policy calls for all key stakeholders – government, civil society, farmers, businesses and corporations, women's groups, youth groups, the marginalized, academia and media to be included in its management and inducted in the process of key policy decisions on water. Water related information and data must be shared with the public at large to build consensus, reduce polarization and increase awareness of citizens' responsibility in protecting the water resources.

3.5 Focus Area 5 - Building a Base for Science, Technology and the Social Aspects of Water

Linkages are essential between science, research and practice, and between the sociology and psychology of water use and water behavior to bring water studies into the modern era and prepare the water professionals of the future. The actions required under this policy framework mean capacity building and new skills across the board.

29 The WHO lower limit 50 litres of water per person per day

Pakistani universities will become the strongest link in developing the person-power and skill-base for propelling the vision of this policy framework, developing new courses and degrees to prepare thousands of men and women to serve in the water sectors, including planning with a very long-term perspective.

This policy will support universities and research institutions to develop interdisciplinary and multidisciplinary water studies in consonance with Pakistan's requirements and make strong linkages among the academia, the industries, agriculture and technologies across the water value chain.

This policy will also provide incentive for greater use of technology to bring efficiency and innovation to overcome water challenges.

4. Demonstrating Leadership

Decades of stalling over a national water policy, low levels of debate and discussion, politicization of whatever water discourse did take place and the low priority afforded to water issues within the government and in the country as a whole, has meant that difficult and uneasy decisions over water have not been taken judiciously and in a timely manner. Science, technology and policy need to work in tandem. This requires a strong political will, trained personnel with authority to take decision independently and adequate financial resources.

This policy calls for on the government to get serious, provide clear leadership and put up a well-resourced permanent water commission (that could be an empowered existing water institution or a new one) led by people of integrity and knowledge and which can deliver the intent of rational use of water in Pakistan.

4.1 Responsibilities for Action at Government Level

Implementation of this policy requires the following clearly defined actions at four levels:

- **Federal level:** Protecting the integrity of the Indus basin, all other basins and other water resources, building infrastructure, regulation, investment, financing mechanisms and conservation.
- **Provincial level:** Managing and maintaining infrastructure, running irrigation and drainage systems in a sustainable and equitable manner. This requires making the provincial Irrigation and Drainage Departments financially autonomous, and responsible for getting water to each district as per allocation.
- **City level:** Managing municipal and industrial water in sustainable and equitable manner.
- **Local level:** Managing local water, for all its uses, in sustainable and equitable manner. It is essential that a well-resourced, autonomous, empowered and functioning local government is in place to deliver the intent of this policy.

(Set up under Section 42 of the Companies Ordinance 1984)

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