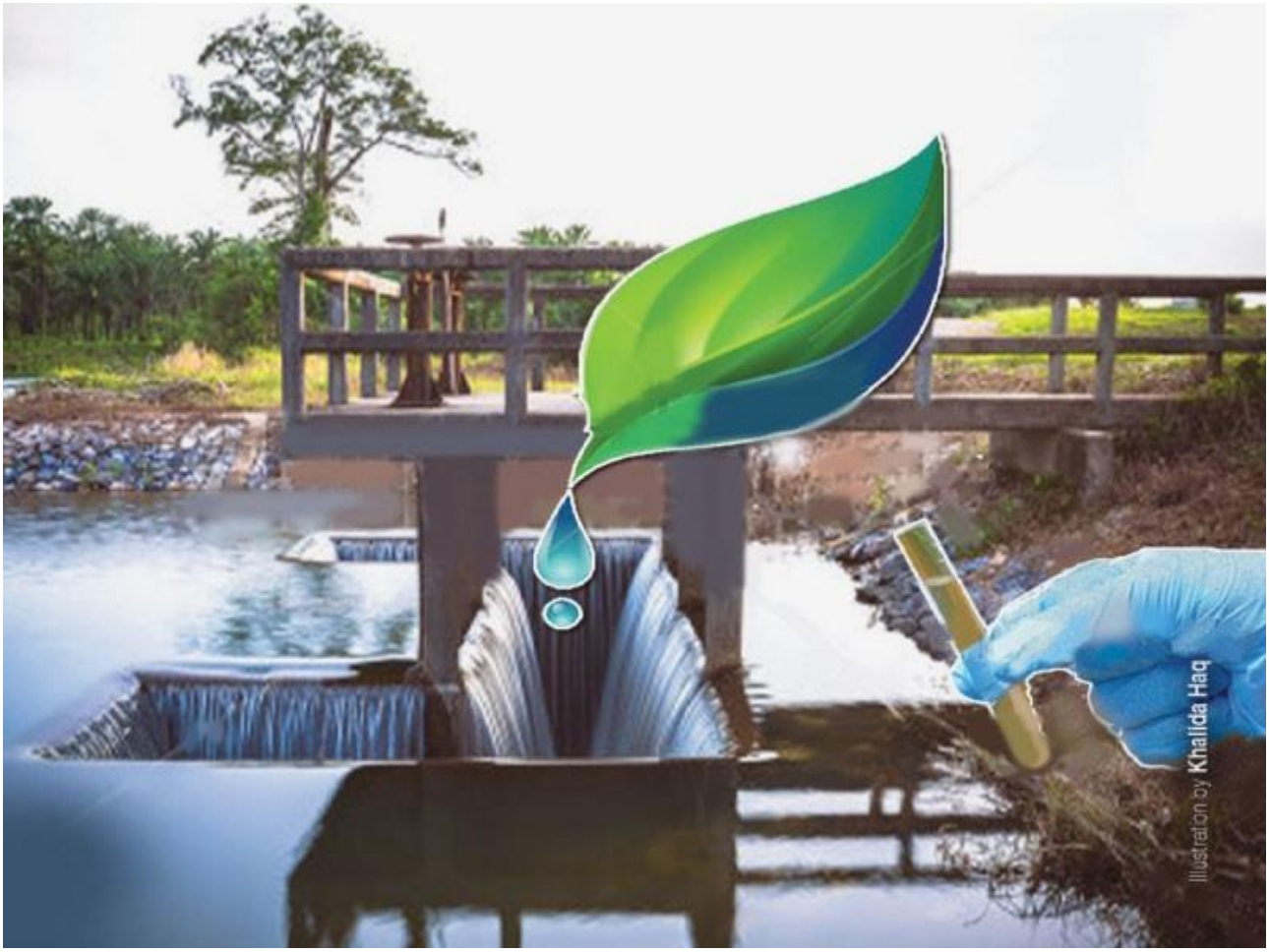
FRAMEWORK FOR IMPLEMETATION OF NATIONAL WATER POLICY

(2018-2030)



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FEDERAL FLOOD COMMISSION, ISLAMABAD

(FORMER/ FIRST NWC-SECRETARIAT)

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The completion of the Framework was not at all possible without the dedicated guidance by the Secretary Ministry of Water Resources. He has remained kind enough to participate in all the important meetings held on issues related to NWP. Under his supervision this important task has been accomplished by the office of CEA & CFFC, the former NWC-Secretariat.

I would like to thank Hisar Foundation for developing the initial draft Framework document. The keen interest and valuable input from all relevant Federal Ministries, Provincial Departments and other stakeholders are also deeply acknowledged. We appreciate the valuable comments received from Ministry of National Food Security & Research, Ministry of Health Services, Governments of Sindh, Khyber Pakhtunkhwa, WAPDA, PCRWR, NDMA, PARC, PMD, IRSA, Survey of Pakistan, Gilgit-Baltistan and AJ&K etc. which indicated their short, medium and long term priorities framed in line with objectives of NWP. All these interventions have been analyzed through in-house capacity of O/o CEA & CFFC and made as important part of this Framework.

I also appreciate especially the sincere efforts of Hashoo Foundation regarding organization of series of meetings with key stakeholders of private sector so as to identify the role of Private sector towards implementation of National Water Policy. The similar profound attention was also given to this task of national importance by Pakistan Council of Research in Water Resources. It was because of their immense support that a number of workshops were arranged on the issue of localization of NWP wherein need for adopting Water-Energy-Food Nexus (WEF Nexus) was ascertained for sustainable management of the water resources. The brief recommendations from both of these organizations have been made part of this Framework.

The Implementation Framework contains 163 No. of interventions required to be adopted by the concerned departments/ organizations for implementation in four different timeframes (18 No. immediate, 71 short term, 58 medium term measures and 16 long term) so as to achieve the national targets within the stipulated timeframe i.e. by 2030. Finally, it is worth to mention here that this Framework document should be treated as a living document; it shall be requiring review and refinement based on the updated progress, professional inputs and continual support from the Provinces and all other concerned organizations.

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1. INTRODUCTION

Pakistan is an agrarian economy which is heavily dependent on the waters of Indus River System, mainly used for irrigation and hydropower generation. The Indus River and its western tributaries on average bring out about 138 Million Acre Feet (MAF) of water annually with an average canal withdrawal of around 100 MAF. The System has the largest contiguous irrigation system in the world which commands an area of 42 Million Acres. It has 3 major reservoirs with an estimated storage capacity of 13.681 MAF. The remarkable progress made by Pakistan in the first four decades from 1950 to 1990 increased the availability of water withdrawn from the Indus River System making Pakistan self-sufficient in food. But the progress we have made is now under threat.

The present looming shortage of water has now become a grave threat to Pakistan's food, energy and water security. Today, Pakistan's water economy is in acute danger of running dry. Our per capita availability of water, which was above 5,200 cubic meters at the time of independence, has now dropped below the minimum threshold of 1,000 cubic meters per head, making us a water scarce country. It would not be wrong to say that the prevalent water scarcity is inching towards a full-blown water crisis and is likely to become an existential threat, unless we act decisively as a nation.

This extraordinary situation requires extraordinary measures, as business-as-usual is simply no longer an option. We need to focus all our energy and acumen, not only to avert an anthropogenic water crisis but to mitigate the impacts of climate change, as Pakistan is considered by experts to be one of the most climate vulnerable countries on the planet. If the glacial melt which accounts for 40 percent of our river flows accelerates, we will face heavy flooding in some years and as the snow cap shrinks, the annual river flows will begin to decline. This, combined with erratic behavior of rainfall in monsoon, can play havoc with the country's agriculture sector and threaten its food security system as has been witnessed during the 2010 floods. The other issues being faced by Pakistan in the water sector are: inadequate storage capacity and sedimentation of reservoirs; extensive seepage losses in the irrigation system; absence of measures for utilization of flood water/ hill torrents; inadequate operation & maintenance of irrigations system and poor cost recovery; excessive groundwater extraction without groundwater recharge; disposal of drainage effluent; lack of private sector participation; and sub-optimal use and low productivity of water.

Taking cognizance of the above-indicated issues, Federal Government approved the first-ever National Water Policy of Pakistan on 24th April 2018 which provides comprehensive guidelines for water resources management and development as per international practices and will herald a new era for sustainable water resources management and development in Pakistan. This implementation framework has been prepared keeping in view the objectives and strategic priorities given in the National Water Policy. Implementation of each action proposed has been designed into following four time frames:

- Immediate Actions: Mainly the ongoing projects likely to be completed within 1-2 years (preferable by end 2020)
- Short term Actions: within next 2 years (completion preferable by 2022)
- Medium term Actions: within next 3-5 years (completion preferable by 2025)
- Long Term Actions: within 10-years (completion preferable by 2030)

2. BACKGROUND & CONTEXT

2.1. Approval of National Water Policy

The study to formulate first draft of Pakistan's National Water Policy (NWP) was carried out by O/o CEA/CFFC under National Drainage Programme. Based on the study recommendation, first draft of NWP was prepared in 2005 for providing guidelines and a clear cut road map for development and management of water resources. However, draft policy could not be approved the then. During 2010, draft policy was updated through extensive consultations and deliberations with all major stakeholders in order to include the issues related to impact of climate change on water resources. The updated policy was sent to Ministry of Law and Justice for vetting. Law Division advised for consultation with Provinces through Ministry of Inter Provincial Coordination.

Based on series of meetings with major stakeholders and a consultative seminar organized on November 28, 2016 at Islamabad, refined draft of NWP was submitted to Ministry of Inter Provincial Coordination on January 13, 2017 for approval of CCI. CCI in its meeting held on August 25, 2017 considered the summary submitted by M/o Water & Power and decided that newly created Ministry of Water Resources to review and re-submit before CCI. Accordingly draft NWP document was reviewed and submitted again to CCI in its 34th meeting held on November 24, 2017.

CCI also decided to constitute a Committee headed by Deputy Chairman planning Commission to further review the NWP draft. The Committee had two meetings on February 15 & March 12, 2018 and prepared an updated NWP draft. Federal cabinet in its meeting held on March 13, 2018 approved the draft NWP for placing before CCI for final approval. Subsequently the policy was presented in 36th meeting of CCI held on March 27, 2018 and was approved in principle subject to incorporation of certain amendments proposed by the stakeholders and it was decided to present a Water Charter for final approval in the next CCI meeting. Finally the NWP along with Water Charter was presented and approved in 37th meeting of CCI held on April 24, 2018.

2.2. Institutional Set up for Coordinating NWP Implementation

In order to effectively translate NWP strategies into actions, Provincial governments were requested on February 15, 2019 to take immediate, practical and well-coordinated steps for devising ways and means for making the services of water delivery to all water consuming sectors (agriculture, urban service and industry) while ensuring economy and financial sustainability. In pursuance of para 29.5.1 of the approved NWP, National Water Council (NWC) headed by the Honorable Prime Minister was notified by Ministry of Water Resources on June 14, 2018 for implementation of NWP. A Steering Committee was also notified on same day (June 14, 2018) to assist NWC through inter-provincial coordination, reviewing policy papers and monitoring reports before submission to NWC. Secretary Ministry of Water Resources designated O/o CEA/CFFC as Secretariat of the National Water Council on October 10, 2018. The 1st NWC meeting was held on October 25, 2018. The Honorable Prime Minister directed that Steering Committee (SC) of NWP headed by the Federal Minister for Water

Resources may analyze various proposals for implementation of NWP and submit its recommendations.

2.3. Meetings of NWC, Steering Committee & NWC Secretariat

In line with the directions of Prime Minister, first meeting of Steering Committee (SC) of NWP were scheduled by the then NWC-Secretariat for January 23, April 22, May 6, May 9 and July 4, 2019 but organization of meetings was postponed and hence SC- NWP could not meet. The worthy Federal Minister on July 02, 2019 directed to complete necessary spade work in particular consultation with the Provinces for organizing meeting of SC of NWC. Subsequently, two-prong approach was followed. M/o Water Resources took over the task of organizing water policy dialogue at federal and provincial capitals whereas O/o CEA&CFFC being the then NWP-Secretariat organized a preparatory meeting on November 11, 2019. Minutes of the meeting were circulated among the concerned organizations on December 11, 2019 for taking further action on the decisions reflected in the minutes.

In order to review finally, progress on decisions of 1st preparatory meeting and to identify any other potential issues of national importance for consideration by Steering Committee of National Water Policy, 2nd Review/ Preparatory meeting was held on January 29, 2020 under the chairmanship of Secretary Ministry of Water Resources. Minutes of meeting have been issued to concerned quarters on February 13, 2020 after approval from Ministry of Water Resources.

NWC-Secretariat in collaboration with Hisar Foundation developed initial draft Implementation Framework of National Water Policy. This draft was shared with all the concerned agencies and their views/comments on the same had been sought for its refinement. The same was also discussed during both the Review/ Preparatory meetings of NWC-Secretariat held on November 11, 2019 and January 29, 2020.

In response to decisions taken in both the Review/Preparatory meetings of NWC, the inputs from Ministry of National Food Security & Research, Ministry of Health Services, Governments of Sindh, Khyber Pakhtunkhwa, WAPDA, PCRWR, NDMA, PARC, PMD, IRSA, Survey of Pakistan Department, Gilgit-Baltistan and AJ&K have been received indicating their short, medium and long term priorities framed in line with objectives of NWP. The same were ascertained by Office of CEA & CFFC being former NWC-Secretariat for inclusion in this NWP-Implementation Framework. Besides, in pursuance of approved National Water Policy, the Provincial Governments are working on establishment of *Groundwater Regulatory Authorities* to regulate groundwater extraction for appropriate water pricing for industrial, agricultural and domestic use.

In the Punjab province, *Punjab Water Act 2019'* stands approved by the Punjab Assembly on November 20, 2019, the same had been enacted in the province after approval of competent authority for the purpose of regulation of water and sewerage services. Under the new Act, establishment of a new Authority had also been approved by the Punjab Government so as to regulate and monitor issues pertaining to water supply (including the abstraction of groundwater), sewerage and other issues like environment and recreation etc. O/o CEA & CFFC has been coordinating with the concerned quarters for early establishment of Groundwater Regulatory Authorities in the other provinces.

2.4. Progress towards achieving Targets set by National Water Policy

Pakistan first ever, National Water Policy was approved by the CCI in its meeting held on April 24, 2018 along with signing of Pakistan Water Charter as a commitment towards assigning top most priority to the water sector. The Policy has 33 No. objectives, 6 No. Strategies, 6 No. Planning Principles and having seven (07) No. most important targets set for achievement as enumerated below:

2.4.1. NWP's Strategic Priorities

1. Conservation and Efficiency: More than 50 per cent of canal water diverted from the Indus system does not reach the farm level. While the main canals cannot and should not be lined, a crash programme for lining the water courses can reduce the seepage by at least one third. Similarly conservation measures can be adopted for ground water by regulating its extraction and use. Both conservation and efficiency must be highlighted for Demand Side Management (DSM) of water resources. The current policies have a supply side bias. It is important to make the distinction between efficiency, which means reducing waste and doing more with less and conservation, which refers to restricting use.

2. Storage: The most important instrument of mitigation against the impact of climate change on water resources is storage. If the pattern of rainfall becomes erratic with more than average rain in one year and a drastic reduction in the next years' rainfall, the only way to conserve the surplus rainwater in wet years is to store it and release it in dry years, when required. For storage and new irrigation projects a national master plan must be developed which must cater for storage, floods, arid areas, irrigation, urban water and tariff rationalization. In addition there are vast possibilities of small and medium size dams, enhancing the life of existing storages and remodeling and rehabilitation of existing infrastructure in the country. Expansion of water storage will expand irrigation and also increase the proportion of hydro-power in the energy mix, reducing the need for thermal power.

3. Leveraging Technology: Adoption of new technologies is urgently needed for (i) sea water utilization and water recycling (ii) preparation of an inventory of water resources through remote sensing and GIS technologies (iii) accurate monitoring of irrigation water delivery. Home grown innovation in the water sector should be encouraged as much as possible, including investments aimed at start-up companies that promote remote sensing, demand side management and agricultural productivity.

4. Renewable Energy: Sustainable water resources development has a close nexus with renewable energy. Large, medium and small dams not only generate cheap and clean energy but also provide reliable source of water for agriculture and other human needs. With appropriate policies and subsidies, a large percentage of tube wells in Pakistan, can be converted to solar energy especially in areas where water table is not very low, to provide additional water at lower cost. Solar energy can also be used for day-time de-salinization of sea water, particularly in the coastal areas of Balochistan.

5. Integrated Water Resource Management: The management of water resources is shifting from sectoral to a more integrated approach in different parts of the world. Under IWRM, (i)

the interests of all upstream and downstream stakeholders can be protected against mining and contamination. (ii) Watershed and catchment areas can be protected to prolong the life of water storage facilities. This revolutionary IWRM concept will however require strengthening institutional and management capacity at all levels.

6. Comprehensive Regulatory Framework: The Federal government must play a leading role in facilitating regulations to ensure the efficient and sustainable utilization of ground water, industrial uses, and waste water management. Food security, water security and energy security being inextricably linked, so the regulatory framework must address all the associated issues comprehensively, including ground water contamination, waste treatment, open defecation (WASH).

2.4.2. NWP Planning Principles

The process of planning, development and management of water resources at the Federal and Provincial level, including the development of this policy will be guided by the following set of principles:

1) Equity and participatory decision-making; Water sector activities shall be participatory and consultative at each level and decisions will be taken by consensus

2) Water is a strategic resource and access to affordable and safe drinking water is a fundamental human right of all citizens

3) Efficiency and conservation will be promoted at all levels

4) Environmental Sustainability must be ensured

5) Practicability and Innovation will be encouraged and ensured

6) Command area development shall be the responsibility of farmers with government support in respect of small land-holdings.

2.4.3. NWP Targets set for 2030

1) Reduction of 33 percent in the 46 MAF river flows that are lost in conveyance, through accelerated programme of water course lining specially in saline or semi saline areas.

2) In order to augment the dwindling irrigation deliveries into the existing canal systems on account of ever decreasing existing storage capacity of Mangla and Tarbela due to sedimentation and to develop new cultivated area on canal irrigated water, the existing water storage capacity of 14 MAF shall be increased by immediately starting construction of the Diamer-Basha Dam Project having 6.4 MAF live storage on which consensus of all the federating units has already been achieved in 2009 at CCI level. The existing water storage capacity will be increased up to 10 MAF including Diamer-Basha Dam.

3) Increase of at least 30 percent in the efficiency of water use by producing "more crop per drop". This will require use of new technologies like drip and sprinkler irrigation and more realistic water pricing policy. The present average rate of water charges per acre is only one fourth of what the farmer pays for tube well water in the ground water market.

4) Gradual replacement and refurbishing of decades old irrigation infrastructure in accordance with an adequate asset management plan.

5) Real-time monitoring of river flows by IRSA is to be ensured through inter alia telemetric monitoring to maintain transparent water accounting system and to check the increasing trend of unaccounted-for water in the Indus System of Rivers. This task should be completed before the end 2021.

6) In order to establish and maintain a reliable assessment of water resources in the country, federal and provincial water sector organizations would develop a standardized and uniform mechanism for data collection of various parameters of water resources including but not limited to rivers/canals gauge and discharge, rainfall/snowfall, depth to groundwater table, surface/ subsurface water quality parameters, river/canal and reservoirs sedimentation.

7) National Water Policy also recognizes the need to ensure that water sector receives at least 10 percent of Federal PSDP allocation in 2018-19, gradually increasing to 20 percent by 2030. Correspondingly the Provincial Governments may also increase their development expenditure for this sector. Sub-sector wise estimates of investment needed by 2030 are given in the table below;

Table 2.1: Sub-sector wise investment needed by 2030 as per NWP

(Rs. Billion)

Sub Sector	Investment	Major Projects
Storage	1,600	Diamer-Basha Dam, Mohmand Dam
Conservation	800	HEIS Projects, lining of distributaries and minors, telemetric monitoring, improvement of conveyance efficiency
Drainage	150	RBOD-I, RBOD-II and RBOD-III, new reclamation projects
Flood Control	186	National Flood Protection Plan-IV (NFPP-IV)
Rehabilitation of Irrigation System	300	Rehabilitation of barrages, headworks and canals
Research 1% of Total	30	IWASRI Research Program, GMRC, Hi-AWARE

In addition, NWP demands for immediate opening of sectors that can benefit from PPP modalities and private sector participation (like urban water and sewage for example) for investment through appropriate policies. The introduction of private capital and discipline in project execution will not only introduce cost savings and efficiency during implementation but will also save time and create a competitive environment. However, NWP also urge to ensure that a public utility like water is not exploited for profit and the strictest regulatory standards are maintained.

2.4.4. Progress made so far towards NWP Implementation

Towards the implementation of NWP targets, given below is the present progress;

Table 2.2: Progress towards achieving NWP Targets set for 2030

Sr. #	NWP Target for 2030	Progress made so far
1.	**Reduction of 33 percent in water losses** (Reduction of 33 percent in the 46 MAF river flows that are lost in conveyance, through accelerated programme of water course lining specially in saline or semi saline areas)	• Federal Government is financing a program for lining of distributaries & minors in Sindh province costing Rs 13,828.322 million. Under this project, 109 channels have to be lined, out of which, 55 have been completed whereas 32 are in progress. The total length of 860 miles/ 1384 km has to be completed and it is expected **to save 950 cusecs** of water. • Under provincial ADP, about 52 schemes have been completed with cost of Rs. 22,085.010 million, covering the lining of about 631.588 miles /1016.41 km of main canals, distributaries and minors. The lining work on 37 numbers of schemes of total 567.539 miles/ 913 Km is in progress with cost of Rs. 37,179.904 million, which after completion, is expected **to save 1,100 cusecs** of precious water. • A National Program for Improvement of Watercourses (Phase-II) is also under execution in the country. Under this programme, Government of AJ&K has taken up the improvement of 1165 channels / watercourses (1283.66 Km) so as to irrigate 31243 acres area besides construction of 600 Water Tanks / Water Harvesting Structure to irrigate 2250 acres of land. • Response from Punjab and Balochistan Government are yet not received. Provinces/G-B and AJ&K have therefore been requested again to provide updated physical and financial progress of all water sector projects/ initiatives taken up so far, which are in line with objectives & targets of the NWP.

Sr. #	NWP Target for 2030	Progress made so far
2.	**Increase in Storage Capacity** (In order to augment the dwindling irrigation deliveries into the existing canal systems on account of ever decreasing existing storage capacity of Mangla and Tarbela due to sedimentation and to develop new cultivated area on canal irrigated water, the existing water storage capacity of 14 MAF shall be increased by immediately starting construction of the Diamer-Basha Dam Project having 6.4 MAF live storage on which consensus of all the federating units has already been achieved in 2009 at CCI level. The existing water storage capacity will be increased up to 10 MAF including Diamer-Basha Dam)	• Work on two mega dams (Diamer Bhasha Dam with live storage capacity of 6.4 MAF and Mohmand Dam with live storage capacity of 0.67 MAF) has been started by the Government of Pakistan; WAPDA is executing the projects through consortium of Consultancy Firms and Contractors. Detail of water storage projects, proposed by WAPDA under short term priority upto 2030, mid-term priority upto 2040 and long term priority upto 2050 is attached as **Appendix-I.** • Timely implementation of short-term, medium term and long term water storage projects shall result into availability of 11.52 MAF live storage plus 5,535 MW Hydropower under Short Term Priority, 17.10 MAF live storage plus 4,840 MW Hydropower under Mid Term and 7.60 MAF live storage plus 2,345 MW Hydropower under Long Term priority with cumulative effect upto 2050 of the order of 36.22 MAF in line storage and 12,720 MW in hydropower. • In Punjab Province Ghabir Dam, Papin Dam Project and Cherah Dam Project are under construction IN Islamabad region through federal PSDP. • In Sindh province, 28 number of small storage dams have been completed as of 2019 whereas 7 more are in progress. The total storage capacity of the completed reservoirs is 166,743 acre-feet (i.e. 0.167 MAF), whereas, 85,191 acres area shall be benefitted. • Under provincial ADP, 36 projects of construction of small storage dams / delay action dams, retention weirs and I.S.S.O (Impervious sub surface outflow) barriers have also been completed and 12 are in progress under provincial ADP. The total storage capacity of the completed dams is 230,951 acre-feet (0.231 MAF) whereas 91,409 acres area shall be benefitted. • In KP, a total of 13 No. of small dams have been completed while 14 No. of small dams are under various stages of execution. • In KP, In addition to raising of Baran Dam to redress

Sr. #	NWP Target for 2030	Progress made so far
		the problems of water shortages of agricultural lands of District Bannu and Lakki Marwat, PID, KP has also initiated work for construction of 5 more small storage dams which include Pezzu Dam in District Lakki Marwat, Chapra Dam in District Haripur, Chamak Maira Dam in Abbottabad and Ichar Dam & Manchura Dam in District Mansehra. Work on construction of small dams in Merged Areas has also been initiated. • There is a potential of construction of 600 small dams, in AJ&K as per Government of AJ&K, out of which, feasibility study, detail design and cost estimates for 34 No. potential projects have already been completed under ADP financing. Detail is as under. Package-I: 11 No. Package-II: 15 No. Package-III: 8 No. Reportedly work on two dam projects has also been started through financial assistance provided by the World Bank. • Overall status of dam projects being funded by GOP is attached **Appendix-II.**
3.	**Increase of at least 30 percent in the efficiency of water use** (Increase of at least 30 percent in the efficiency of water use by producing "more crop per drop". This will require use of new technologies like drip and sprinkler irrigation and more realistic water pricing policy. The present average rate of water charges per acre is only one fourth of what the farmer pays for tube well water in the ground water market).	• In order to effectively translate NWP strategies into actions, Provincial governments were requested on February 15, 2019 for taking immediate, practical and well-coordinated steps for devising ways and means to make the services of water delivery to all water consuming sectors (agriculture, urban service and industry) while ensuring economy and financial sustainability. • Through a D.O. of the Secretary M/o Water Resources, dated 15th February 2019, provinces were requested to expedite: (i) Establishment of Groundwater Regulatory Authorities (ii) Appropriate Water Pricing for industrial, agricultural and domestic use; and (iii) Awareness campaign for judicious use of water

Sr. #	NWP Target for 2030	Progress made so far
		• Another D.O letter from CEA & CFFC was issued on February 21, 2020 to Provinces/G-B/AJ&K requesting to expedite follow up actions for early establishment of Groundwater Regulatory Authorities. • Government of AJ&K has informed that due to minimal groundwater potential, establishment of an independent Ground Water Authority in AJ&K would not be feasible. They have further informed that Irrigation Department has been mandated to ensure sustainability, safety and affordability of Ground Water under Rules of Business. • Ministry of Climate Change project titled "*Recharge Pakistan: Building Pakistan's Resilience to Climate Change through Ecosystem Based Adaption for Integrated Flood Risk Management"* is included in 3rd Flood Protection Sector Project (FPSP-III) based on NFPP-IV. Concept Paper already stands approved by CDWP of Ministry of PD&SI on March 03, 2020. Four RAMSAR sites are included in this project for re-routing of flood water. PC-I of the project is under final stages of preparation. • Currently, Pakistan Council of Research in Water Resources (PCRWR) has undertaken following water-related projects; – Irrigation advisory services provided to 21,000 farmers in 41 districts of Pakistan. The service is being up scaled to 100,000 farmers. – Scientific monitoring of trans-boundary groundwater aquifers along the Eastern Rivers" was being done. The study is expected to be completed by 2021. – In collaboration with IRSA, PCRWR is planning to install state-of-the-art telemetry system along the main canals and barrages in Pakistan. The system has been piloted on 4 main canals in the provinces. • Rainwater harvesting is a relatively new and innovative concept being used in the country for water conservation for crops and livestock as well as groundwater recharge. Countrywide data regarding

Sr. #	NWP Target for 2030	Progress made so far
		implementation of Rainwater Harvesting Techniques is being gathered. Information received so far in this context, is attached as **Appendix-III.**
4.	**Irrigation System Rehabilitation** (Gradual replacement and refurbishing of decades old irrigation infrastructure in accordance with an adequate asset management plan)	• Through World Bank funding, PID Sindh has been implementing a 'Water Sector Improvement Project' which aims to modernize irrigation & drainage system in a systematic way and deal with floods & drainage issues so as to increase agricultural production, employment and income through irrigation of over 1.8 million ha in Sindh province. The total cost of the project is Rs. 30,353 million, out of which World Bank Loan is Rs. 28,840 million and Rs. 1513 million is Sindh share. Overall progress of the Project is 85%. • PID KP has planned to expand/rehabilitate irrigation network in order to bring 300,000 acres additional area; increased ADP (from 7.4% to 11%). • Detail of the Barrage Infrastructure Rehabilitation/ Remodeling Works, carried out by Provinces so far is given in **Appendix-IV.**
5.	**Transparent Water Accounting System** (Real-time monitoring of river flows by IRSA is to be ensured through inter alia telemetric monitoring to maintain transparent water accounting system and to check the increasing trend of unaccounted-for water in the Indus System of Rivers. This task should be completed before the end 2021)	• IRSA is working on development of real-time river-flow monitoring network initially on 7 key sites followed by the remaining 17 sites along the major rivers. Technical comments on the project proposal (i.e. PC I) were submitted by O/o CEA & CFFC to MoWR on April 17, 2020. Ministry of Water Resources, has advised IRSA to amend the PC I for execution by WAPDA as deposit work and financing under IRSA funds.
6.	**Unified Water Management Information system** (In order to establish and maintain a reliable assessment of water resources in the country, federal and provincial	• Concept Clearance Paper of the project titled "Sino-Pak Smart Water Management Project – Phase-I (SP-SWMP-I), costing Rs 3,456 million (Partner Agency: University of Hohai, China)" was approved by CDWP on April 03, 2020. The project proposal consists of three components as follows: (i) Establishment of Smart Water Management

Sr. #	NWP Target for 2030	Progress made so far
	water sector organizations would develop a standardized and uniform mechanism for data collection of various parameters of water resources including but not limited to rivers/canals gauge and discharge, rainfall/snowfall, depth to groundwater table, surface/ subsurface water quality parameters, river/canal and reservoirs sedimentation.	Centre; (ii) Establishment of Joint Hydrology Water Resources Research Centre; (iii) Establishment of Professional Training Centre on Water Resources. • The project will invest Rs. 3,456 million and plans to apply for funds from the Chinese government. Accordingly, MoWR has been requested to approach EAD for seeking/securing possible grant from Government of China. Work on PC-I preparation has also been started in parallel.
7.	**Increase in Water Sector Allocation** (National Water Policy recognizes the need to ensure that water sector receives at least 10 percent of Federal PSDP allocation in 2018-19, gradually increasing to 20 percent by 2030. Correspondingly the Provincial Governments may also increase their development expenditure for this sector)	• Allocation for the water sector in Federal PSDP increased up to Rs 61.616 billion (6.16%) in Financial Year 2018-19 and Rs 85.727 billion (9.01%) during Financial Year 2019-20. The provinces have also been requested to enhance their water sector allocation under their respective ADPs. • Provinces/G-B and AJ&K have also been requested on March 13, 2020 to provide the following details, response on which is yet awaited. • Year-wise total increase in ADP allocations made since 2018-19 upto current F.Y (2019-20) in line with Para 28.11 of National Water Policy; • Allocations proposed for next F.Y (2020-21) for ongoing and new water sector projects taken up in line with objectives of NWP; & Investment planned upto 2030 in proportion to the investment plan given in Para 28.11 of National Water Policy.
8.	**Research**	<u>Smart Water Management Sector</u> • O/o CEA/ CFFC is collaborating with College of Hydrology and Water Resources, Hohai University for conducting Joint Research on hydrology, water resources, smart water management and mitigation of floods hazards. CCP of the project was approved by CDWP on April 03, 2020, based on which PC-I is at final stage of preparation. The project will invest Rs. 3,456 million and plans to apply for funds from the Chinese government. Accordingly, MoWR has been requested to approach EAD for seeking/securing possible grant from Government of

Sr. #	NWP Target for 2030	Progress made so far
		China. • The grant will directly finance/ support the water management and flood control capability building in Pakistan, covering all the cost for construction of hydro-meteorological monitoring and forecasting system, developing the research center, training the practitioners, and human cost for maintaining the facilities. The research capacity and experimental facility for climate impact research will be significantly improved. <u>PCRWR's Agenda for National Research in Water</u> • PCRWR has undertaken various research studies on conjunctive use of saline groundwater and is also promoting saline agriculture in Southern Punjab and Sindh province through its research and demonstration farms. PCRWR in collaboration with US Pakistan Centre for Advanced Studies in Water Resources has also developed "National Research Agenda in Water 2016-25".
9.	**Flood Control NFPP-IV**	**<u>FPSP III</u>** • FFC has played a pivotal role in improving the National Flood Protection, Forecasting & Warning System in the country under the umbrella of three 10 yearly National Flood Protection Plans (NFPPs). NFPP-IV formulation began in the aftermath of devastating floods of 2010. It was formally approved by the CCI in May 2017, after a rigorous consultative process both at technical and political levels. • Based on the Plan, Umbrella PC-1 was prepared and approved by all provincial PDWPs, following which Ministry of Water Resources submitted it to Planning Commission in January 2019. The Umbrella PC-I was considered in the Pre-CDWP meeting held on 4th April 2019 wherein it was highlighted that projects like GLOF-I & GLOF-II, Project of Flood Forecasting and Warning System, besides, other projects had either been executed by NDMA, PMD and MOCC or under process of approval for which PD&R Division had received the project documents for approval of CDWP/ECNEC. Ministry of PD&R (Now Ministry of Planning Development & Special Initiatives) returned the Umbrella PC-I in July 2019 stating that neither

Sr. #	NWP Target for 2030	Progress made so far
		scope of the project was firmed up nor fiscal space available to take up the project. In light of Ministry of Planning Development & Special Initiatives advice, Ministry of Water Resources also decided that keeping in view the financial constraints, FFC may only pick top priority/emergent nature works at this stage in consultation with all stakeholders and formulate an Umbrella PC-I with firm scope of work and realistic cost estimates, so that implementation of NFPP-IV may be materialized. • Keeping in view the guidelines of M/o Planning, Development & Special Initiatives, Islamabad and Ministry of Water Resources regarding prioritization of sub-projects, FFC organized consecutive meetings on 20th August 2019 and 14th November 2019. The stakeholders agreed to re-prioritize the investment plan of NFPP-IV by picking up priority sub-projects having overall cost around Rs 95.00 Billion. It was also agreed that title of that mega project be kept as Flood Protection Sector Project-III (FPSP-III), as two mega projects i.e. FPSP-I&II were already executed under NFPP-II & III. After detailed discussions and deliberations, the Investment Plan of FPSP-III worth Rs 95.98 Billion based upon the proposals received from Irrigation Department Government of Punjab, Sindh, KP, Balochistan & Federal Line Agencies {Merged Area *(Ex. FATA)*, G-B, AJ&K, NDMA, PMD and WAPDA} was unanimously agreed for implementation in the time span of 5 years. Detail is attached as **Appendix-V**. • Concept Clearance Paper (CCP) for FPSP-III based on NFPP-IV (Cost of Rs 95.980 Billion) was prepared and forwarded to Ministry of Water Resources for further processing on 6th December 2019. CDWP approved the CCP on April 03, 2020 based on which Umbrella PC-I drafted through in-house capacity is under submission with MoWR for further processing for approval by CDWP/ECNEC. • Under FPSP-III, PMD has proposed four projects indicating their requirement for installation/ replacement of Weather Radars and Automatic Weather Stations (AWS) as well as establishment of Flood Early Warning Centers. List of projects indicating location and cost of proposed flood forecasting and warning interventions is placed at

Sr. #	NWP Target for 2030	Progress made so far
		Appendix-VI. • Furthermore, new Weather Surveillance Radars at Islamabad and Mardan are in Operation. Lahore and Mangla Radars are also fully operational. • Karachi Radar Project is being funded by Government of Japan on turnkey basis. Civil works at Radar building are near completion and installation of equipment is in progress presently. The project is in final stages of completion. • Arrangements for transfer of funds from Japan are underway for installation of Radar at Multan. PC-I for replacement of Radar at D.I Khan has been approved from NDMRF at estimated cost of Rs. 593.288 Million. • CDWP has approved the installation of Radar at Sukkur through JICA funding. • 37 AWS have been installed at various locations across the Pakistan. Field survey is underway by PMD for installation of three more AWS in Sindh Province. <u>Flood Telemetry Master Plan</u> • WAPDA has been requested to develop a country-wide National Flood <u>Telemetry</u> Master Plan comprising of details relating to provision of expansion and modernization of telemetry system in four (04) provinces, Gilgit-Baltistan and AJ&K. The Plan will cover the main river system, the secondary and tertiary rivers, all small streams/nullahs, hill torrents etc. having overall significance towards our precious water resources with regard to quantity, contribution and health of total surface water on efficient utilization. Once made and implemented on priority basis this will immensely support WAPDA's real-time contribution in the issuance of most precise reservoir operation criteria by IRSA, real-time forecasting/now casting by PMD/FFD and effective country-wide management of floods by all concerned including the O/o CEA/CFFC. • In the broader terms, this shall also reflect a true realization of strategic priorities enumerated in the National Water Policy.

3. FRAMEWORK (2018-30) FOR IMPLEMENTATION OF NWP

The O/o CEA/ CFFC (NWC-Secretariat) through in-house efforts and by also taking inputs from Hisar Foundation and all the other concerned agencies developed the Implementation Framework of National Water Policy. This framework is a follow-up of the National Water Policy (NWP) being the parent document which focuses to elaborate the appropriate actions relating to objectives, strategic priorities and targets set under NWP for Provincial Governments and other stakeholders so as to adopt a more coherent and consistent approach towards implementation of NWP. It would help to mainstream water scarcity concerns into decision making processes and shall be an integral and synergistic complement to future planning required for integrated water resources development in the country.

The framework has been designed as a living document covering the short, medium and long term actions to address issues in various sub-sectors such as storage, conservation, drainage, flood control, rehabilitation of irrigation systems and research etc. Detail is given in **Table 3.1.**

Table 3.1: Framework (2018-30) for implementation of NWP

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required		Priority/ Timeline
1.	2.1 Promoting sustainable consumption and production patterns throughout the water sector from exploitation to utilization	**Conservation and Efficiency**		
		2.1.1	Estimation of water demand for all sectors within and outside Indus Basin	Short term
		2.1.2	Promote nexus approach for conducting Environmental impact assessment studies and project feasibility studies for water programs.	Short term
		2.1.3	Review of all subsidies in water sector	Short term
		2.1.4	Launching of new national water saving campaign and other awareness programs	Short term
		2.1.5	Promote need based irrigation approaches through irrigation advisory services to farmers	Immediate
		2.1.6	Reduction of 33% losses in 46 MAF river flows by including the following Lining projects but not limited to Deg Nullah Project, Irrigation System Rehabilitation Project Punjab Phase-I, Lining of Distributaries and Minors in Sindh, Lining of Irrigation Channels in Punjab, Rehabilitation of Irrigation System in KP, Rehabilitation	Long Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		/revamping of Irrigation & Drainage System of Sindh.	
		Integrated Water Resources Management	
		2.1.7 Water zoning of the country and regulate the economic activities in accordance with such zoning	Short term
Level of Responsibility: Provincial Governments, Government of G-B and AJ&K **Institutional Responsibility:** WAPDA, PIDs, PADs, PHEDs PARC, PCRWR etc.			
2.	2.2 Augmentation of the available water resources of the country through judicious and equitable utilization via reservoirs, conservation and efficient use	**Conservation and Efficiency**	
		2.2.1 Water projects with power generation will be given priority	Short term
		2.2.2 PPP Model to be encouraged for Low Head Hydropower Projects by constructing following but not limited to: Raili-II Hydropower Project, Karot Hydropower Project, Suki Kinari Hydropower Project, Kathai-II Hydropower Project, Kohala Hydropower Project, Ashkot Hydropower Project, Azad Pattan Hydropower Project and Mahl Hydropower Project.	Long term
		2.2.3 Promote studies in integrated watershed management	Short term
		2.2.4 Ensure equity of water distribution between head and tail reaches between canal commands by controlling theft and violation of Water Accord	Immediate
		2.2.5 Artificial groundwater recharge in urban areas and dry lands	Immediate
		2.2.6 Prepare Water Conservation Plans, including: – Reuse and recycling of municipal and industrial water effluent after appropriate treatment at source – Adoption of rainwater harvesting technology – Adoption of water conservation techniques/ technologies at farm level	Short term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		2.2.7 Adoption of technology for sustainable use of drainage water in agriculture, horticulture and forestry sub sectors	
		Storage	
		2.2.8 In Increase of 10 MAF in Water storage by 2030 by including following Conservation projects but not limited to: Diamer Basha Dam, Mohmand Dam and various small dam projects such as Gomal Zam Dam, Mirani Dam, Satpara Dam, Darawat Dam, Kurram Tangi Dam, Na Gaj Dam, Chiniot Dam, Bhimber Dam, Hangol Dam, Tank Zam Dam, Badin Zai Dam, Sulkeji Dam, Murunj Dam, Bara Dam and Darban Zam Dam.	Long Term
		2.2.9 Build small and medium dams for local and regional use;	Medium to Long Term
		2.2.10 Build check dams and delay action dams for recharge of aquifers and to reduce the flow velocities and erosion;	Medium to Long Term
		2.2.11 Review and optimize reservoir operation rules for Safety of dams, embankments, spillways & hydraulic Structures by including following projects but not limited to: Guddu & Sukkur Barrages Rehabilitation Project, Rehabilitation of Sulemanki, and Trimmu & Panjnad Barrages in Punjab Province	Long Term
		2.2.12 Recharge the underground aquifers during floods and surplus water flow periods for later use;	Long Term
		2.2.13 Construction of additional multipurpose projects for flood protection, water conservation, storm water management by including	Long Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		following projects but not limited to: Extension of RBOD-II from Sehwan to Seam Dadu & Thatta, RBOD-I Kamber, Larkana, Dadu and Construction of 459 Flood Projects identified under FPSP-III of NFPP-IV.	
		2.2.14 Use of groundwater aquifers as water storage facilities	Long Term
		2.2.15 Provide subsurface dams, wherever feasible	Long Term
Level of Responsibility: Federal Government/ Provincial Governments **Institutional Responsibility:** WAPDA, PIDs, PADs, PHEDs PCRWR etc.			
3.	2.3 Improving availability, reliability and quality of fresh water resources to meet critical municipal, agricultural, energy, security and environmental needs	**Conservation and Efficiency**	
		2.3.1 Revise (Rationalize) urban water tariffs	Short term
		2.3.2 Quality Monitoring and action Plans to be prepared by agencies responsible for delivery of such services.	Immediate
		2.3.3 Strict compliance of NEQS	Immediate
		2.3.4 Initiation of professional courses on water resources quality management at National Capacity Building Institute (NCBI) of PCRWR	Short term
		2.3.5 Water quality monitoring of Major cities and rural areas of country with focus on stopping the dumping of garbage into local nullahs	Medium term
		Integrated Water Resources Management	
		2.3.6 Urban water management to be integrated into water management of the country	Long Term
		2.3.7 Development of water bodies for recreational use, water sports and fisheries	Long Term
Level of Responsibility: Federal Government /Provincial Government **Institutional Responsibility:** Provincial EPAs, WASAs/ Local Govts./ Housing & Urban Development Department/PCRWR WAPDA/PIDs/PHEDs/Tourism Departments etc.			
4.	2.4 Improving urban water	**Conservation and Efficiency**	
		2.4.1 Reduce system losses	Short Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
	management by increasing system efficiency and reducing non-revenue water through adequate investments to address drinking water demand, sewage disposal, handling of wastewater and industrial effluents	2.4.2 Devise strategies and action plans for non-revenue water, wastage and theft	Short Term
		2.4.3 100% water metering with safety nets for urban and peri-urban poor	Short Term
		2.4.4 Promote wastewater treatment at central level	Short Term
		2.4.5 Maintain specified quality standards for drinking water	Short Term
		Leveraging Technology	
		2.4.6 Adoption of urban rainwater harvesting	Medium Term
		2.4.7 Maintaining of specified standards in the quality of drinking water in urban/ rural areas	Medium Term
		2.4.8 Implementation of quality monitoring plans	Medium Term
		2.4.9 Development of dedicated warning systems for cities.	Medium Term
		2.4.10 Promotion of bioengineering measures against urban flooding	Medium Term
		Integrated Water Resources Management	
		2.4.11 Provincial Public Health Engineering Departments and WASAs to devise coordinated strategies under Provincial Action Plans.	Medium Term
		2.4.12 Industrial and municipal effluents to be treated before discharge	Medium Term
		Comprehensive Regulatory Framework	
		2.4.13 Regular monitoring of Illegal commercial hydrants and bring them in water taxing	Short term
		2.4.14 Issuance of NOC to newly built housing societies should be subjected to submission of integrated water resources plan considering water conservation, supply, treatment, sewerage and drainage aspects	Medium Term
Level of Responsibility: Provincial Governments **Institutional Responsibility:** Irrigation Department/WASAs/Provincial EPAs WASA/			

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
Local Govts/ Housing & Urban Development Department etc.			
5.	2.5 Promoting behavioral change to reduce wastage of water by raising public awareness through media campaigns and incorporating water conservation lessons in syllabi/ curricula at primary, secondary and tertiary levels	**Conservation and Efficiency**	
		2.5.1 Launch of public awareness campaigns in rural area to avoid huge loss in flood irrigation and in urban area to ensure saving in domestic, commercial and industrial use	Short term
		2.5.2 Conservation of water to be introduced in syllabi at primary, secondary and tertiary levels	Short-Medium term
		2.5.3 Launching of Degree Program in Water Policy	Long term
		2.5.4 Program for Comprehensive Capacity Building in WASH Cell in connection with SDG 6 in Pakistan	Short Term
		2.5.5 Awareness regarding degradation of water through print and electronic media.	Short Term
Level of Responsibility: Federal & Provincial Governments **Institutional Responsibility:** Ministry of Education, PIDs, PADs, PHEDs, Agriculture Universities, Universities, PEDs, PCRWR etc.			
6.	2.6 Hydropower development to increase the share of renewable energy	**Renewable Energy**	
		2.6.1 Hydropower Development by including following projects but not limited to: Dasu Stage-I, Golen Gol Project, Duber Khwar, Tarbela 4th Extension, Tarbela 5th Extension, Thakot, Keyal Khwar, Ghazi Brotha & Pattan Hydropower Project	Long Term
		2.6.2 Tube-wells converted to solar energy, particularly in areas where water table is not very low;	Medium to Long Term
		2.6.3 Solar energy will be used for desalinization of water particularly in coastal areas of Balochistan	Long Term
Level of Responsibility: Federal Government/ Provincial Governments **Institutional Responsibility:** WAPDA/Distribution Companies			
7.	2.7 Providing food security and	**Comprehensive Regulatory Framework**	Short Term
		2.7.1 Food security to be considered when	

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required		Priority/ Timeline
	expanding water availability to help adapt to climate change, population and other large-scale stresses		framing regulations for the sustainable utilization of groundwater, industrial uses and waste water management	
		2.7.2	Increase of 30% efficiency of water use by producing more crop per drop with the help of implementation of related food and agriculture policies for all the Provinces/ Line Agencies.	Long Term
		2.7.3	Provision of fruit plants, oil seeds/ pulses crops & fodder/ forage/range in command area of small/ mini dams	Medium term
		2.7.4	Farmers training to promote climate resilient crops and address other stresses including the population	Short Term
		Integrated Water Resources Management		
		2.7.5	Expansion of existing irrigation network/Construction of new canals/channels and Tube Wells to bring additional area under irrigation	Short to Medium Term
		2.7.6	Promote measures to control erosion of crop lands during climatic extremes like GLOFs, urban flooding, heavy rains and riverine floods	Immediate to Short term
		2.7.7	Development of dug wells for developing of water source to promote Irrigated Agriculture.	Medium term
		2.7.8	Rehabilitation of Karezes for sustainable groundwater management and livelihood improvements in Balochistan	Medium term
Level of Responsibility: Provincial Government **Institutional Responsibility:** PADs,				
8.	2.8 Treatment and possible reuse of waste water – domestic, agricultural and industrial	**Conservation and Efficiency**		
		2.8.1	Promote wastewater treatment in public and private sector	Short -Medium Term
		2.8.2	Wastewater profiling of major cities for the sustainable management of water resource and related	Medium Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		environment	
		Leveraging Technology	
		2.8.3 Reuse and recycling of municipal industrial wastewater effluent	Medium Term
		2.8.4 Adoption of technology for sustainable use of drainage water in agriculture, horticulture and forestry	Medium Term
		2.8.5 Use of treated sewage for non-edible crops	Medium Term
		2.8.6 Treatment of effluents and hazardous discharge before disposal by industrial units and municipal entities	Short Term
		2.8.7 In-house treatment of wastewater before transfer to municipal sewer (as per NEQ standards) by industry	Medium Term
		2.8.8 Extensive recycling arrangements in industrial areas	Medium Term
		2.8.9 Reusing drainage effluent at local level to minimize disposal	Medium Term
Level of Responsibility: Federal Government, Provincial Government **Institutional Responsibility:** WASAs, PADs, PIDs, Pak EPA, FWMC, PCRWR etc.			
9.	2.9 Upgrading water sector information system for improved asset management and to derive evidence and data driven decision making	**Leveraging Technology**	
		2.9.1 Use of radar, monitoring equipment software and hydrodynamic models for flood forecasting and early warning systems	Short Term
		2.9.2 Regular review and updation of river flood classification: main rivers, secondary rivers, tertiary rivers, Nullah and streams	Short Term
		2.9.3 Development of information systems for data storage and assessment	Short Term
		2.9.4 Updating and uploading laws, rules and guidelines on National Water Policy on national water web.	Short Term
		2.9.5 Provision of uniformly calibrated real-time data to WAPDA, IRSA, provincial governments and major users	Short Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		2.9.6 Hydrological Modeling for Flow Forecasting Study of Kabul River Using GIS/RS Technology	Short Term
		2.9.7 Development of advanced satellite data application for the monitoring or waterlogging and trans-boundary river water	Short Term
		2.9.8 Prepare an inventory of main rivers, secondary rivers, tertiary rivers, Nullah and streams	Short Term
		2.9.9 Digital inventory of Karez Water System in Balochistan.	Short Term
		2.9.10 Groundwater mapping of all country	Long term
		2.9.11 Development of GIS/MIS Centre and Decision Support System at IRSA and to enhance the capacity building of IRSA	Immediate
		2.9.12 Designing, development and deployment of national level repository of all available water resources should be considered. Data of all water resources must be prepared using GIS for integration with other geographical features from different fields such as agriculture, transport, built-up area, climate change etc. Many other attributes such as water level, seasonality, purpose, life period and so on must be encoded in the water resources inventory	Medium Term
		2.9.13 Development of GIS based mobile apps to keep update and provide information regarding the weather early warning and also have canal water flows.	Short Term
		Level of Responsibility: Federal Government, Provincial Government **Institutional Responsibility:** FFC, PMD, WAPDA, PCRWR, IRSA etc.	

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
10.	2.10 Improving watershed management through extensive soil conservation, catchment area treatment, preservation of forests and increasing forest cover	**Integrated Water Resources Management**	
		2.10.1 Flood protection plans should be updated using integrated approach.	Short Term
		2.10.2 Rainwater management plans in areas where it cannot be disposed or diverted to the river.	Short Term
		2.10.3 Converting culturable waste lands into productive agriculture lands through development of micro-watersheds.	Medium Term
		Level of Responsibility: Federal Government **Institutional Responsibility:** FFC	
11.	2.11 Restoring and maintaining the health of the environment and water related ecosystems	**Integrated Water Resources Management**	
		2.11.1 In adopting integrated planning, development and management of water, EIAs shall lay out concurrently with project feasibility studies	Short Term
		2.11.2 Develop a National Surface Water Drainage System for handling of saline and toxic effluents.	Medium Term
		2.11.3 Remove encroachments on streams, river beds and drains	Medium Term
Level of Responsibility: Federal Government/ Provincial Government **Institutional Responsibility:** EPA/FFC/MOCC/Irrigation Departments			
12.	2.12 Flood management to mitigate floods and minimize their damages	**Integrated Water Resources Management**	
		2.12.1 Allocation of funds for FFC by the Federal Government for conducting studies on emerging flood management issues and for extensive repair/ rehabilitation of flood protection dykes, flood fighting and drainage (as proposed in NFPP-IV)	Short Term
		2.12.2 Establishment of Dedicated Flood Division (out of existing strength) in PIDs for implementation of flood and drainage works only	Short Term
		2.12.3 Improved coordination among all concerned organizations	Immediate
Level of Responsibility: Federal Government **Institutional Responsibility:** MOWR/MOF, Mo PD&SI, PIDs, FFC etc.			

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
13.	2.13 Drought management with emphasis on long term vulnerability reduction	**Comprehensive Regulatory Framework**	
		2.13.1 Drought Management Contingency Plans be prepared and updated annually	Medium Term
		2.13.2 Regulations for controlled use of available water resources	Medium Term
		2.13.3 Drought monitoring by a Federal government agency like PMD based on scientific evidences	Short – Medium Term
		Integrated Water Resources Management	
		2.13.4 **Groundwater** mapping of canal commands in Sindh including Thar desert	Short Term
Level of Responsibility: Provincial Government **Institutional Responsibility:** PMD, PADs, PIDs and PDMAs, PCRWR etc.			
14.	2.14 Security of benefit streams of the water related infrastructure for sustained provision of services	**Storage**	
		2.14.1 Develop priority irrigation infrastructure to benefit large numbers of people in underdeveloped, water scarce and poverty stricken areas	Medium Term
		2.14.2 Apply special economic evaluation criteria in projects for less developed regions	Immediate – Short Term
		2.14.3 Resettlement and compensation for affectees of water sector projects	Medium Term
		2.14.4 Retrofitting of existing water infrastructure	Medium Term
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** WAPDA/PIDs, PADs, PHEDs etc.			
15.	2.15 Promoting appropriate technologies for rain water harvesting in rural as well as urban areas	**Leveraging Technology**	
		2.15.1 Adoption of water conservation techniques and technologies at farm level.	Short Term
		2.15.2 Construction of large scale programs of rainwater harvesting ponds and mini dams in rain-fed areas.	Short Term
		2.15.3 Harvesting of rainwater within agricultural fields and within drainage catchments.	Medium Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
Level of Responsibility: Federal Government, Provincial Government **Institutional Responsibility:** MOWR/PIDs, FWMC etc.			
16.	2.16 Regulating groundwater withdrawals for curbing over abstraction and promoting aquifer recharge	**Comprehensive Regulatory Framework**	
		2.16.1 Provinces to be encouraged to prepare a Groundwater Atlas for each canal command and sub-basin	Short term
		2.16.2 Undertake study for ground water assessment and formulation framework and its implementation to: • Regular the usage of ground water to avoid over exploitation and sub-soil water contamination; • Determine sustainable ground water potential; and • Reclaim land loss due to water logging and salinity.	Short term
		2.16.3 Establishment of Groundwater Regulatory Authorities	Medium term
	Level of Responsibility: Provincial Government **Institutional Responsibility:** Irrigation Departments		
17.	2.17 Adequate water pricing (Abiana) for irrigation and proper operation and maintenance of irrigation system as well as other uses sectors	**Comprehensive Regulatory Framework**	
		2.17.1 Enhance water charges to meet the O&M Cost of infrastructure	Short Term
		2.17.2 Regulations for stopping over abstraction of groundwater	Short Term
		2.17.3 Digitizing assessment and taxing mechanism to achieve: • Authenticity in assessment of irrigated area; • Enhance revenue receipts; and • Optimal utilization of available water resources.	Short Term
		2.17.4 Charge water tariff (rate per unit) according to the land acquired by a person/farmers and crop water consumption	Short term
	Level of Responsibility: Provincial Government **Institutional Responsibility:** PIDs, PADs / Law Department/ Planning and Finance Departments etc.		

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
18.	2.18 Promoting measures for long term sustainability of the Irrigation System	**Integrated Water Resources Management**	
		2.18.1 Making drainage component a necessary part of irrigation projects from the planning stage	Short Term
		2.18.2 Undertake studies to assess and mitigate the impacts for restoring salt balance in irrigated lands	Short Term
		2.18.3 Extension/Rehabilitation of canal systems	Short Term
Level of Responsibility: Provincial Governments **Institutional Responsibility:** Irrigation departments			
19.	2.19 Encouraging beneficiary participation and public private partnership	**Conservation and Efficiency**	
		2.19.1 PPP model to be encouraged for low-head hydropower projects	Medium Term
		2.19.2 Reduction in water conveyance losses through creating awareness in the community by formulation of Water User Associations.	Short Term
		2.19.3 Climate smart agriculture technique through public private partnership which are friendly for end user	Medium term
		Integrated Water Resources Management	
		2.19.4 Rights of sharing water to be respected in accordance with the water Apportionment Accord	Short Term
		2.19.5 Rights of lower riparian shall be scrupulously respected and followed according to the Water Apportionment Accord 1991	Short Term
		Leveraging Technology	
		2.19.6 Transition of SCARP tube wells in public sector to private sector.	Medium term
		2.19.7 Development of fresh groundwater projects by private sector	Medium term
		2.19.8 Promotion of awareness programs on water conservation in syllabi, curricula at primary, secondary and	Medium term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		tertiary levels of education	
		2.19.9 Development of a National Agenda for Research including model building to forecast glacier melt and snow melt in coming years	Medium term
		2.19.10 Launching of comprehensive public awareness campaign on media	Medium term
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** WAPDA, PPIB, IRSA, MOWR/PIDs, PADs, PHEDs etc.			
20.	2.20 Strengthening and capacity building of water sector institutions	**Conservation and Efficiency**	
		2.20.1 Establish Ground Water Authority in each province	Short Term
		2.20.2 Real time monitoring of river flows by IRSA (Telemetric monitoring to maintain transparent water accounting system and to check the increasing trend of unaccounted-for water in the Indus System of Rivers)	Short Term
		2.20.3 PC-I preparation by M/o WR to cover initial cost of capacity building at Federal and Provincial levels	Short Term
		2.20.4 Bi-annual review of NWP	Short Term
		Integrated Water Resources Management	
		2.20.5 Ministry of Water Resources to prepare PC-I to cover initial cost of capacity building at Federal & Provincial levels	Short Term
		2.20.6 Restructuring to meet the current and emerging needs of providing comprehensive and holistic institutional mechanism to optimally develop and efficiently manage the waters of the Indus river system. Duplication of work by different institutes must be avoided	Immediate
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** National Water Council (& Steering Committee on Water); PIDAs/ IRSA/WAPDA/ WR Division/Irrigation Department			

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
21.	2.21 Profitable use of flood water towards promotion of local irrigation practices	**Conservation and Efficiency**	
		2.21.1 Flood water shall be diverted towards dry lands through escape channels to ensure availability of groundwater by including but limited to: WWF's Project of Recharge Pakistan.	Medium Term
Level of Responsibility: Federal/ Provincial Governments/District Governments **Institutional Responsibility:** Ministry of Climate Change, WWF, PIDs, PADs, PHEDs etc.			
22.	2.22 Exploitation of vast potential of water generated through hill torrents	**Storage**	
		2.22.1 Build check dams and delay action dams in hill torrents region for recharge of aquifers and to reduce the flow velocities and erosion	Long Term
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** WAPDA/PIDs			
23.	2.23 Protection of wetlands and Ramsar Sites for the prevention of wildlife, flora and fauna	**Comprehensive Regulatory Framework**	
		2.23.1 Adoption of National Wetland Management Plan to preserve wetlands/Ramsar sites	Short Term
		2.23.2 Possible nomination of Karez Water System as cultural landscape in UNESCO's world heritage list	Short Term
Level of Responsibility: Federal Government and Provincial Governments **Institutional Responsibility:** Ministry of Climate Change, WAPDA, FFC, PCRWR etc.			
24.	2.24 Stoppage of further sea water intrusion into Sindh (upstream from coastline) for the sustainability of coastal environment, flora and fauna and mangrove growth including the use of skimming dug-wells in coastal areas	**Conservation and Efficiency**	
		2.24.1 National wetlands management plan shall be adopted	Short Term
		2.24.2 Studies to assess the impacts of salt build up in irrigated lands	Short Term
		2.24.3 Preserve Indus Delta and stop/check sea water intrusion into Indus Delta may include: • Exploring the potential of inland river storage to regulate environmental flows; • Release of freshwater separately through the 17 creeks rather in two main branches of Indus River; • Ban and penalties on untreated	Short Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		disposal of toxic industrial municipal effluents; and • Construction of dykes along the coastline.	
Level of Responsibility: Federal Government, Provincial Government **Institutional Responsibility:** Ministry of Climate Change.			
25.	2.25 Establishment of Hydro-meteorological disaster risk reduction complied integrated water resources management regime	**Integrated Water Resources Management**	
		2.25.1 Establish hydro-meteorological disaster risk management regime	Medium Term
		2.25.2 Ensure mainstreaming of DRR aspects into development projects	Short to Medium Term
		2.25.3 Promote IT based research and adoption of best international practices to better management Hydro-meteorological disaster risk	Medium Term
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** MOWR/PMD/PIDs NDMA etc.			
26.	2.26 Enhancing water productivity through infrastructure development and adoption of improved technologies in a sustainable manner	**Storage**	
		2.26.1 Promote policy on data sharing within and amongst all water related organizations through IT	Short Term
		2.26.2 Establishment of Regional Center on Water Management in Arid Zones under auspicious of UNESCO	Short Term
		2.26.3 Awareness for Diffusion and Adoption of Water Conservation Technologies and Practices	Short Term
		Leveraging Technology	
		2.26.4 Development of new varieties of crops with high yields and lower water consumption	Medium Term
		2.26.5 More crop per drop technologies	Medium Term
		2.26.6 National Plan for improved irrigation methods and practices	Medium Term
		2.26.7 Introduction of biofertilizers and bio pesticides	Medium Term
		2.26.8 Development of salt tolerant crops	Medium Term
		2.26.9 Extension of irrigation facilities to	Medium Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		new cultivable command areas for growing low delta high value crops	
		2.26.10 Solar pumping in rain-fed areas where groundwater is available	Medium Term
		2.26.11 Adoption of technologies for skimming of fresh groundwater layers overlying saline water	Medium Term
		2.26.12 Promotion of technologies for artificial recharge of aquifers	Medium Term
		2.26.13 Handsome incentives should be offered to the farmers who adopt drip irrigation and tunnel farming along with precision agriculture such practices. **(Survey of Pakistan)**	Medium Term
Level of Responsibility: Federal Government/ Provincial Government **Institutional Responsibility:** WAPDA/IRSA/ Irrigation Department, PCRWR, MONF&R/MOWR/PADs			
27.	2.27 Climate change impact assessment and adaptation for sustainable water resources development and management	**Conservation and Efficiency:**	
		2.27.1 Storing water in carry over surface storages and in underground storages to minimize impact of climate change	Short Term
		Integrated Water Resources Management	
		2.27.2 Research studies on climate change impact assessment on floods, droughts, ground water and fresh water reservoirs	Short Term
		Storage 2.27.3 Assess impacts of climate change on water resources development	Immediate
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** WAPDA/Irrigation Department			
28.	2.28 Promoting research on water resources related issues of national importance and building capacity/ delineating roles and responsibilities	**Integrated Water Resources Management**	
		2.28.1 Encourage studies in integrated watershed management	Immediate
		2.28.2 Trans-boundary effects on surface and ground water along the eastern border	Medium Term
		2.28.3 Groundwater assessment at districts level and Islamabad area as well	Short Term
		2.28.4 Ensure one percent allocation to	Short Term

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
	of Federal research institutions and promoting coordination among them	research and incentive of Pakistan water prize as envisaged in the Policy should be implemented.	
		2.28.5 Promote writing of research articles about water crisis and scarcity, water conservation, modern farming, water saving techniques, ground water table available water resources, and importance of drinking water and how to preserve rain water	Short Term
		2.28.6 Training on SDG 6.0 Policy Support System tool	Short term
Level of Responsibility: Federal Government and Provincial Government **Institutional Responsibility:** MOWR, MoF, WAPDA, PIDs, PADs, GCISC, PCRWR etc.			
29.	2.29 Setting major national targets for the water sector including those for water conservation, water storage, irrigation, water treatment and drinking water. These targets can be firmed up in consultation with the Provincial Governments and reviewed periodically for inclusion in the 12th and 13th Five Years Plans and future plans	**Integrated Water Resources Management**	
		2.29.1 PSDP allocation for water sector be increased to 20% by 2030.	Immediate
		2.29.2 Reduction of 33 % in 46 MAF river flows that are lost in conveyance, through accelerated programme of water course lining specially in saline or semi saline areas.	Immediate
		2.29.3 Existing water storage capacity of 14 MAF shall be increased by immediately starting construction of the Diamer-Basha Dam Project having 6.4 MAF live storage on which consensus of all the federating units has already been achieved in 2009 at CCI level. The existing water storage capacity will be increased up to 10 MAF including Diamer-Basha Dam.	Immediate
		2.29.4 Increase of at least 30 percent the efficiency of water use by producing "more crop per drop". This will require use of new technologies like drip and sprinkler irrigation and more realistic water pricing policy.	Immediate
		2.29.5 Gradual replacement and refurbishing	Immediate

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
		of decades old irrigation infrastructure in accordance with an adequate asset management plan.	
		2.29.6 Real-time monitoring of river flows by IRSA is to be ensured through inter alia telemetric monitoring to maintain transparent water accounting system and to check the increasing trend of unaccounted for water in the Indus System of Rivers. This task should be completed before the end 2021.	Immediate
		2.29.7 Federal and provincial water sector organizations would develop a standardized and uniform mechanism for data collection of various parameters of water resources including but not limited to rivers/ canals gauge and discharge, rainfall/ snowfall, depth to groundwater table, surface/ subsurface water quality parameters, river/ canal and reservoirs sedimentation.	Immediate
		2.29.8 Review of above national targets in consultation with the Provincial Governments and reviewed periodically for inclusion in the 13th Five Years Plans and future plans	Short term
Level of Responsibility: Federal & Provincial Governments **Institutional Responsibility:** WAPDA/MOWR, Mo PD&SI, MOF, IRSA, Provincial Planning & Finance Departments, PIDs, PADs, PHEDs, etc.			
30.	2.30 Secure Katcha areas and economy thereof	**Integrated Water Resources Management**	
		2.30.1 Flood plain development works to increase economic gains	Medium
		2.30.2 Incentives to land owners for promoting socioeconomic activities in un-utilized Katcha areas	Medium
Level of Responsibility: Provincial government **Institutional Responsibility:** Local Government, PIDs, PADs etc.			

Sr. No.	Policy Objectives given in NWP	Strategic Area and Actions Required	Priority/ Timeline
31.	2.31 Preserve delta area by providing sufficient supplies regularly	**Conservation and Efficiency**	
		2.31.1 Ensure environmental flows are maintained in rivers	Short
		Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** WAPDA, IRSA, Irrigation Department	
32.	2.32 Rainwater management in plains where it cannot be disposed of or diverted to the river	**Conservation and Efficiency**	
		2.32.1 Water conservation plans to include rainwater harvesting technology	Short Term
		2.32.2 Promoting rainwater harvesting for artificial groundwater recharge in urban areas and dry lands	Short Term
Level of Responsibility: Federal Government, Provincial Government **Institutional Responsibility:** MOWR/Provincial Irrigation Department/ PCRWR			
33.	2.33 Effective implementation of the 1991 Water Apportionment Accord in letter and spirit	**Integrated Water Resources Management**	
		2.33.1 Account for the contribution of consolidated storage achieved through construction of small and medium dams	Immediate
		Leveraging Technology	
		2.33.2 Development of real time monitoring of river flows through telemetric monitoring to maintain transparent water accounting system (IRSA)	Medium Term
		2.33.3 Grant administrative autonomy to IRSA	Medium Term
		2.33.4 Discharge Observation System with state-of-the-art technology in IRSA	Medium Term
		2.33.5 Indus-Telemetric system on main canals across Pakistan and piloting on Barrages	Medium Term
		2.33.6 Water auditing of Indus River System Authority(IRSA)	Medium Term
Level of Responsibility: Federal Government, Provincial Governments **Institutional Responsibility:** IRSA/Irrigation Department/WAPDA/PCRWR			

4. NEXUS APPROACH FOR NWP IMPLEMENTATION

With growing population, Pakistan is fast becoming a resource constrained country. We are facing growing issues of ensuring resource security in Water, Food and Energy compounded further by the increasing vulnerability to climate change. The water energy and food nexus is the study of the connections between three resource sectors of Water, Energy and Food together with the synergies, conflicts and trade-offs that arise from how they are managed under changing climate. The Nexus is considered a central aspect of sustainable development and gains greater importance under the changing climate scenario.

Some of key challenges and work areas to preserve nexus approaches for ensuring climate resilience, environmental sustainability and economic viability of water resources of Pakistan, are given in Table 4.1.

Table 4.1: Key challenges and work areas to preserve nexus approach

Water	Energy	Food	Climate Change
Scarcity and Low Water Shortage, Lack of Storage	Low Energy/Electricity Access and High Costs	Crop Damages due to Climate Extremes – Floods & Droughts	Agro-climatic zones in line with changing climate
Food Insecurity/ Lack of Access to Technologies	Energy Shortages	Small Land Holdings and poor Selection of Cropping Patterns	Legislation to Phase out high delta crops
Climate vulnerability	Dependence on Imported Fuels	Lack of Access to Technology	Water conservation & efficiency
Energy Insecurity	Energy Security at Risk	Lack of Credit Facilities and Support Price Mechanisms	Rational water pricing for all uses
Environmental Degradation	Lack of Data and Information and Awareness	High Cost of agricultural inputs	Priority for Solar and wind power with small hydropower
Lack of Evidence Based Data & Awareness	Develop Large Dams	Inefficient Irrigation Practices and Use efficiency	Integrate flood management practices with approved water, Food and CC policies
Lack of Coordination among Departments	Arresting WT Depletion, Efficient Use & Tariffs	Inappropriate Conversion of Electric Tube wells to Solar	Eccentric efforts of the three sectors
Lack of Policies at Local Level and Water Pricing		Poor Crop Production due to Polluted Water	Missing mechanism for enhancing community representation
Poor Extension Services			

The wastage of water in Pakistan's irrigation sector was one of the highest in the world. It is need of the hour to save precious water resources through shifting the trend from current irrigation practices which were inefficient leading to uneconomical and unfair distribution of the water, and low productivity in terms of the yield and value of crops per unit of water used. With this perspective in mind, O/o CEA/CFFC in association with PCRWR jointly organized a two days' consultation session on "Localization of Water, Energy and Food Nexus in Local Government" on 10th & 11th December 2019. Similar workshops were also held in Lahore, Karachi and Peshawar.

The main common strategies stemming from the synthesis of national policies on climate change, water, food and energy are enlisted below;

(i) Raise awareness and build capacities of all stakeholders in the four disciplines of water, energy, food and climate change (covered as per actions proposed in Chapter-3 under serial numbers at 2.1.4, 2.5.5, 2.19.2, 2.19.8, 2.19.10 and 2.26.3);

(ii) Build a reliable and research supported integrated database for use by all sectors (as per actions proposed in Chapter-3 under serial numbers at 2.9.12, 2.9.7, 2.9.5 and 2.9.3);

(iii) Develop rainwater harvesting for agriculture use and power generation (as per actions proposed in Chapter-3 under serial numbers at 2.2.6, 2.4.6, 2.15.2 and 2.23.2);

(iv) Undertake technology transfer in all fields – water conservation, food production, climate change mitigation and energy production/conservation; (covered as per some actions proposed in Chapter-3 under policy objectives No. 2.2.7, 2.4, 2.8, 2.9, 2.15, 2.19, 2.26, 2.32 and 2.33);

(v) Control groundwater depletion through engineering/ biological solutions and legislation with strict implementation mechanism (as per some actions proposed in Chapter-3 under policy objectives No. 2.2, 2.7, 2.9, 2.13, 2.16, 2.17, 2.21, 2.26, 2.28 and 2.32);

(vi) Increase water storage capacity for different uses including power and mitigate climate change (incorporated as per actions proposed under serial number 2.29.3, 2.24.3, 2.22.1, 2.26.1, 2.26.2, 2.26.3 and from 2.2.8 to 2.2.15 of Chapter-3);

(vii) Control resource pollution through strict implementation of legislation and use waste and wastewater to generate power (as per actions proposed under serial number 2.2.4, 2.8.1, 2.8.2, 2.8.3 and 2.8.7 of Chapter-3 above);

(viii) Rationalize water pricing structure for different sectoral uses; (covered as per all actions proposed under serial No. 2.17 of Chapter-3);

(ix) Ensuring involvement of all stakeholders in planning and implementing projects (as per serial No. i above).

5. ROLE OF PRIVATE SECTOR IN IMPLEMENTATION OF NATIONAL WATER POLICY

The National Water Policy (NWP) defines an encouraging role for the Private Sector as a policy enabler. The Private Sector is emphasized in the various sections of the policy document being attributed with different functions pertaining to the implementation of the Policy. These functions can be broadly categorized as *Public Private Partnerships*, *Water Resources Planning, Stakeholders Participation*, *Research*, *Investment, and Capacity Building*. Hashoo Foundation partnered with the O/o CEA & CFFC of Ministry of Water Resources and with the generous funding from Oxfam International, conducted provincial dialogues and expert interviews, to solicit informed opinions and nuanced insights of relevant stakeholders.

Aiming to increase the level of understanding of private sector about objectives, targets and investment plan of NWP and define a role for private sector in helping the government implement the NWP, very first workshop was held on November 25, 2019 in the conference room of CEA&CFFC exploring ways and means for involvement of private sector in implementation of NWP. Similar dialogues were also held in Rawalpindi on March 12, 2020 and in Peshawar on March 13, 2020. The workshops planned in Karachi and Quetta could not be held due to likely threat of spreading of Covid-19.

Based on the outcome of all above stated consultations with private sector (Detail attached as **Appendix-VII**), Hashoo Foundation suggests establishing a Public-Private Partnership Unit (PPPU) in the Ministry of Water Resources. Since the Ministry lacks human resource, Hashoo Foundation can sponsor a competent human resource for administering the unit within the Ministry. This unit will liaison with the Private Sector for all potential investments and collaborative opportunities. It can forge consequential partnerships amongst different Private Sector players, along with expediting endorsement and policy support from the Ministry.

The key functions of the PPPU may include, but are not limited to, the following:

Establish a Working Group

This will comprise of 20 members including 10 members from the key private sector players in water and 10 members from relevant government authorities that will be nominated by the Ministry of Water Resources. The Private Sector members will include representatives from multilateral donors, water related multinational corporations, private universities, and NGOs. The WG will be headed by a nominated official from the Ministry. It will convene every quarter in the Ministry to discuss policies, strategies, potential investment opportunities and ongoing projects. The meeting minutes will be circulated after every meeting to ensure ownership by all the members.

Online Repository

The PPPU can initiate an online repository of all the water related projects in the different sectors. This will curb duplication of efforts and resources in the water sector by different stakeholders. It will also improve the planning and design of new projects.

Capacity Building

During the process, the PPPU can build the capacity of the government officials in the Ministry to continue and expand this initiative sustainably after the technical and financial support of Hashoo Foundation is discontinued.

SDG-6

Enable long-term partnerships with key corporate sector players to achieve the targets of SDG 6 in Pakistan by 2030.

Support to the Ministry of Water Resources

The PPPU will report to the Chief Engineering Advisor/Chairman Federal Flood Commission so as to support Ministry of Water Resources as and when required.

APPENDICES

APPENDIX-I: WAPDA'S PROPOSED PLAN FOR WATER STORAGE PROJECTS

APPENDIX-II: LIST OF DAM PROJECTS DEALT BY DAMS SAFETY COUNCIL OF O/O CEA/CFFC

APPENDIX-III: IMPLEMENTATION OF RAINWATER HARVESTING TECHNIQUES/ PROJECTS IN PAKISTAN

ANNEXURE-IV: STATUS REGARDING BARRAGES REHABILITATION/ REMODELING & MODERNIZATION WORKS IN PAKISTAN

APPENDIX-V: INVESTMENT PLAN OF FPSP-III FOR IMPLEMENTATION PERIOD 5 YEARS

APPENDIX-VI: DEVELOPMENT PROJECTS PROPOSED BY THE PMD UNDER FPSP-III

APPENDIX-VII: ROLE OF THE PRIVATE SECTOR TOWARDS IMPLEMENTATION OF THE NATIONAL WATER POLICY

Appendix-I

WAPDA'S PROPOSED PLAN FOR WATER STORAGE PROJECTS

Priority	Projects	River/Tributary	Planned Completion Year	Live Storage (MAF)	Capacity (MW)
(2020 ~ 2030)	Mohmand Dam	Swat River	2024	0.67	800
	Kurram Tangi Dam (Stage-II)	Kurram River	2026	0.9	64.5
	Chiniot Dam	Chenab River	2027	0.85	80
	Diamer Basha Dam	Indus River	2027	6.4	4,500
	Sindh Barrage	Indus River	2029	1.8	-
	Wazirabad Reservoir	Chenab River	2030	0.9	90
	TOTAL			**11.52**	**5,535**
(2031 ~ 2040)	Shyok Dam	Shyok River	2034	5.0	640
	Kalabagh Dam	Indus River	2038	6.1	3,600
	Akhori Dam	Indus River/Off Channel	2039	6.0	600
			TOTAL	**17.10**	**4,840**
(2041 ~ 2050)	Dudhnial Multipurpose Project	Neelum River	2043	1.0	960
	Mid Ranjha storage project	Chenab River	2043	1.2	80
	Shah Jiwana Dam	Chenab River	2045	1.2	80
	Dhok Abaki Dam	Soan River	2047	1.0	25
	Skardu Dam	Indus River	2050	3.2	1,200
			TOTAL	**7.60**	**2,345**
GRAND TOTAL				**36.22**	**12,720**

Appendix-II

DAMS SAFETY COUNCIL

O/O CHIEF ENGINEERING ADVISER/CHAIRMAN, FFC
MINISTRY OF WATER RESOURCES

Following PC-I & PC-II were reviewed by Dam Safety Council Section during **FY 2019-20:**

Name of Province	Sr. No.	Name of Project	Financing
WAPDA	1	2nd Revised PC-I for Gomal Zam Dam Multipurpose Project (Khyber Pakhtunkhwa Province) (1st Revised PC-I Cost 20.626 billion)	Federal
	2	2nd Revised PC-I Acquisition of Land and Resettlement (AL&R) Diamer Basha Dam Project, Estimated cost Rs. 170.756 Billion	Federal
KPK	3	2nd Revised PC-I of construction of Zamir Gul dam project District Kohat (Estimated cost Rs 1128.22 million)	PID KP Federal
	4	PC-I for construction of 17 Nos. of small dams in Khyber Pakhtunkhwa (Estimated cost Rs 26,448.0199 million)	PID KP Federal
	5	PC-I for Construction of Khattak Banda Dam District Kohat Estimated Cost Rs.1460.544 Million	PID KP Federal
	6	PC-I for Construction of Chashma Akhora Khel Dam, District Karak, Estimated Cost Rs 1574.88 million	PID KP Federal
	7	PC-I for Construction of Pezu Dam Project, District Lakki Marwat	PID KP Federal
	8	PC-I for increasing storage capacity and improvement in command area of Tanda Dam, District Kohat, estimated cost Rs. 2,870.593 million	PID KP Federal
	9	Revised PC-I for PSDP Scheme Construction of Sanam Dam Project District Dir Lower (Estimated Cost Rs 1428.45 Million)	PID KP Federal
	10	PC-I for Construction of Sarozai Dam District Hangu, Estimated Cost Rs. 715.100 Million	PID KP Federal
	11	PC-I for Construction of Makh Banda Dam District Karak, Estimated Cost Rs. 814.519 Million	PID KP Federal
Sindh	12	PC-I for construction of (05) five Nos. Small Dams namely Dadvero Dam, Kasbo Dam, Mokhal Dam, Namarro Dam & Sadowaros Dam in Nagarparker Areas (Thar Region) (Estd. Cost Rs 541.849 million)	PID, Sindh/ Federal
	13	PC-I for Construction of Small Dams Storage Dams/ Delay Action Dams, Retention Weir and I.S.S.O Barrier in Sindh Component-X Construction of four (4) No. Small Dams Namely Samicha, Shore-iii, Ghatti and Luni Khaad Dams in	PID, Sindh/ Federal

Name of Province	Sr. No.	Name of Project	Financing
		Central Kohistan	
Balochistan	14	Updated PC-I for Construction of Winder Dam Project Estimated Cost Rs 15,230.76 Million	PID Balochistan/ Federal
	15	PC-I for Construction of Koshak Storage Dam, at Tehsil Khuzdar District Khuzdar (E/Cost Rs 643.452 Million)	PID, Balochistan/ Federal
	16	PC-I for Construction of Soorgaz Storage Dam, at Tehsil Khuzdar District Khuzdar (E/Cost Rs 1030.350 Million)	PID, Balochistan/ Federal
	17	Development of Water Resources by Construction of Small/Check Dam in District Zhob, Balochistan Estimated Cost Rs 480.00 Million	PID, Balochistan/ Federal
	18	Construction of Koe-E-Mahium Storage Dam in District Chaghi (Estimated Cost Rs 350.00 Million)	PID, Balochistan/ Federal
	19	Construction of Small Storage Dam at Sardari Goz Darkhalo, Tehsil Wadh, District Khuzdar (Estimated Cost Rs 80.00 Million)	PID, Balochistan/ Federal
	20	Construction of Baghi Storage Dam in District Nushki (Estimated Cost Rs 110.00 Million)	PID, Balochistan/ Federal
	21	Construction of Peer Bari Storage Dam at Kach District Khuzdar (Estimated Cost Rs 128.500 Million)	PID, Balochistan/ Federal
	22	Zindra Karez System District Ziarat (Estimated Cost Rs 56.50 Million)	PID, Balochistan/ Federal
	23	Construction of Small Dams in District Khuzdar, Estimated Cost Rs. 1,000.00 million	PID, Balochistan/ Federal
	24	PC-I for construction of 100 dams in Balochistan Package-IV (23 dams)	PID, Balochistan/ Federal
	25	Revised PC-I of Construction of Basol Dam Project District Gawadar (Estimated Cost Rs 18,679.89 Million)	PID, Balochistan/ Federal
	26	Construction of 10 Nos Small Storage Check Dams Arenji Area, Wadh, District Khuzdar (Estimated cost Rs 504.43 million)	PID, Balochistan/ Federal
	27	Construction of Anjeeri Storage/Delay Action Dam District	PID,

Name of Province	Sr. No.	Name of Project	Financing
		Nushki (Estimated Cost Rs 119.00 million)	Balochistan/ Federal
	28	Construction of Azdha Khol Storage/Delay Action Dam District Nushki (Estimated Cost Rs 123.00 million)	PID, Balochistan/ Federal
	29	Construction of Bugmaodwan Storage/Delay Action Dam District Chaghi (Estimated Cost Rs 221.00 million)	PID, Balochistan/ Federal
	30	Construction of Delay Action Dam at Western Bypass Akhtarabad, Quetta (Estimated Cost Rs 50.00 million)	PID, Balochistan/ Federal
	31	Construction of Gendar Storage/Delay Action Dam Kishingi Area, Nushki (E/Cost Rs 150.00 million)	PID, Balochistan/ Federal
	32	Construction of Hushbalo Dam, District Mastung (Estimated cost Rs 350.00 million)	PID, Balochistan/ Federal
	33	Construction of Jatti Small Storage Dam Lop Area Wadh, District Khuzdar (Estimated cost Rs 70.00 million)	PID, Balochistan/ Federal
	34	Construction of Juli Storage/Delay Action Dam District Chaghi (Estimated cost Rs 244.74 million)	PID, Balochistan/ Federal
	35	Construction of Mashkichah Storage/Delay Action Dam District Chaghi (Estimated cost Rs 158.00 million)	PID, Balochistan/ Federal
	36	Construction of Mashraqi Koh-e-Sultan Storage Delay Action Dam at District Chaghi (Estimated cost Rs 80.00 million)	PID, Balochistan/ Federal
	37	Construction of Posti Storage/Delay Action Dam at Boolo Arbabin in District Chaghi (Estimated cost Rs 123.13 million)	PID, Balochistan/ Federal
	38	Construction of Sari Kalag Delay Action Dam in U/C Raskoh District Kharan (Estimated Cost Rs 510.00 million)	PID, Balochistan/ Federal
	39	Construction of Small Storage Dam Kunj Ferozabad District Khuzdar (Estimated cost Rs 46.26 million)	PID, Balochistan/ Federal
	40	Construction of Small Storage Dam Shank, Tehsil Wadh, District Khuzdar (Estimated cost Rs 60.00 million)	PID, Balochistan/ Federal
	41	Construction of Delay Action Dam at Hanna Urak District Quetta (Estimated Cost Rs 100.00 million)	PID, Balochistan/

Name of Province	Sr. No.	Name of Project	Financing
			Federal
	42	Construction of Karudi Storage/Delay Action Dam District Chaghi (Estimated Cost Rs 131.00 million)	PID, Balochistan/ Federal
	43	Construction of Delay Action Dam at Sara Ghurgai, District Quetta (Estimated cost Rs 50.00 million)	PID, Balochistan/ Federal
	44	PC-I for Construction of Delay Action Dam at Zarkhune District Quetta Estimated Cost Rs 100.00 million	PID, Balochistan/ Federal
	45	PC-I for Construction of Delay Action Dams in Siaro Hazar Ganji Nall Area of District Khuzdar (Estimated Cost Rs 162,385 Million	PID, Balochistan/ Federal
Total	**45**		

PC-IIs Reviewed

Name of Province	S.No	Name of Project	Financing
WAPDA	1	Chiniot Dam Project – Draft Feasibility Study (PC-II) (Punjab Province)	Federal
	2	PC-II Proforma for Detailed Engineering Design, Preparation of Tender Documents & PC-I of Hingol Dam Project (new site) (Estimated Cost Rs. 421.372 million	Federal
Balochistan	3	PC-II Proforma for Feasibility Study, Detailed Engineering Design, Preparation of Tender Documents of Badinzai Dam Project Estimated Cost Rs 147.17 Million	PID Balochistan Federal
	4	PC-II Proforma for Feasibility Study, Detailed Engineering Design, Preparation of Tender Documents & PC-I of Sukleji Dam Project (Site-C) (Balochistan Province)	PID Balochistan Federal
Total	**04**		

Appendix-III

IMPLEMENTATION OF RAINWATER HARVESTING TECHNIQUES/ PROJECTS IN PAKISTAN

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Sr. No.	Name of Province	Proposed schemes	Completed schemes	Ongoing schemes	Total number of schemes	Remarks
1.	Punjab	3,480	180	320	3,980	3,480 schemes are under process of approval
2.	Sindh	25	60	23	108	-
3.	KP	9,135	3,606	42	12,790	-
4.	AJ&K	600	-	-	600	These proposed schemes have been submitted to Federal Govt. for approval.

Note: Based on the information received so far from the provinces.

Annexure-IV

STATUS REGARDING BARRAGES REHABILITATION/ REMODELING & MODERNIZATION WORKS IN PAKISTAN

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Punjab

Irrigation Department, Government of the Punjab has completed the rehabilitation/ remodeling & modernization works at **Jinnah, Taunsa, Baloki, and Khanki** Barrages whereas rehabilitation/ remodeling & modernization work was near completion at **Sulemanki** (99.96%) and in progress at **Trimmu** (91%) and **Panjnad** (52%).

- Rehabilitation work at Trimmu (with capacity to be enhanced from 6.45 to 8.65 lac cusecs) is planned to be completed by June 2022. Rehabilitation work at Panjnad Barrage (with capacity enhancement from 7.00 to 8.65 lac cusecs) is also likely to be completed by June 2022.

- New Khanki Barrage Construction Project stands completed with enhanced capacity from 8.50 to 11.0 lac cusecs.

- Capacity of Baloki Barrage has been increased from 2.25 lac cusecs to 3.8 lac cusecs.

Sindh

Rehabilitation and modernization of Guddu Barrage and its associated structures is under process. Rehabilitation of the Sukkur Barrage and its associated structures is also ongoing.

Khyber Pakhtunkhwa

The Baran Dam Raising has been taken up by Irrigation Department, Government of KP which envisions raising the dam height from present 120 ft to 142.90 ft (by 7 meters), thus increasing its storage capacity from 12,500 acre-feet to 100,000 acre-feet.

WAPDA

The level of Mangla Dam has been raised by WAPDA from 1234 ft to 1264 ft (height raised by 30 ft). This has increased the dam's storage capacity by an additional 2.88 MAF from 4.51 MAF to 7.39 MAF.

Appendix-V

INVESTMENT PLAN OF FPSP-III FOR IMPLEMENTATION PERIOD 5 YEARS

Sr. No.	Province/Line Agency	Estimated Cost (Rs Billion)
1.	Punjab	23.040
2.	Sindh	16.348
3.	Khyber Pakhtunkhwa	11.400
4.	Balochistan	7.769
5.	Merged Area	6.000
6.	Gilgit-Baltistan	6.996
7.	Azad Jammu & Kashmir	4.500
8.	National Disaster Management Authority (NDMA)	0.962
9.	Ministry of Climate Change	6.00
10.	Pakistan Meteorological Department (PMD)	4.505
11.	WAPDA (H&WM Directorate)	6.000
12.	**FFC** *(Technical/Model Studies & Monitoring Supervision of construction activities through consultants & its own staff)*	2.460
	Total:	**95.980***

* Based on d*etailed lists of sub-projects of the provinces & Federal Line Agencies*

Appendix-VI

DEVELOPMENT PROJECTS PROPOSED BY PMD UNDER FPSP-III

Sr. No.	Project Name	Cost (Rs in million)
1.	Installation and Replacement of Weather Radars of PMD under FPSP-III. (Sialkot, Lahore and Rahim Yar Khan)	1960.000
2.	Installation of Weather Radars at Mangla and Cherat under FPSP-III	1315.000
3.	Installation of Automatic Weather Stations in Balochistan and Khyber Pakhtunkhwa under FPSP-III.	235.000
4.	Establishment of Four Flood Early Warning Centers at Gilgit, Peshawar, Multan and Quetta under FPSP-III.	600.000
	Total	**4,110.000**

Appendix-VII

ROLE OF THE PRIVATE SECTOR TOWARDS IMPLEMENTATION OF THE NATIONAL WATER POLICY

Background

The National Water Policy (NWP) defines an encouraging role for the Private Sector as a policy enabler. The Private Sector is emphasized in the various sections of the policy document being attributed with different functions pertaining to the implementation of the Policy. These functions can be broadly categorized as *Public Private Partnerships, Water Resources Planning, Stakeholders Participation, Research, Investment, and Capacity Building*.

Hashoo Foundation partnered with the Ministry of Water Resources and with the generous funding from Oxfam International, conducted provincial dialogues and expert interviews, to solicit informed opinions and nuanced insights of relevant stakeholders. The entire process emphasized integrating the Private Sector in the Water Policy Arena and designating a permanent role for it in the Water discourse of Pakistan.

A brief history of the role of Private Sector in Pakistan

The Private Sector in Pakistan has endured a rigorous nationalization policy during the 1970's; after which it witnessed an upward trend of growth while simultaneously confronting challenges such as macroeconomic instability and political turmoil over the next few decades. The Privatization Act 2000 along with establishing the Board of Investment and Ministry of Privatization and Investment, and empowering the State Bank of Pakistan, intended to stabilize macroeconomic conditions and accelerate the growth of the Private Sector.

The government's certitude pertaining to the Private Sector is manifested by its strategy to allot state owned enterprises incurring financial losses to the Private Sector for restoration. The present government considers privatization of 200 state owned companies as a strategy for mitigating the impact of the economic crisis the country is experiencing. (Financial Times, 2018)

The Private Sector in Water has predominantly been involved in hydropower development. This association commenced in 1995, when the first policy specifically for private sector hydropower development was formulated. This was amended in 2002 to intensify Private Sector investments, unfortunately these projects were inconsequential in forging a perpetual role for the Private Sector in developing hydropower. The convoluted trajectory of the Private Sector in hydropower can be attributed to alternating political regimes; conventional outlooks for the Private Sector's involvement; including initial resistance by WAPDA; lack of commitment of resources by the Private Sector for an extended period before the revenue generating begins; and limited financial capacity for investing (LEAD Pakistan, 2018).

Presently, the National Transmission and Dispatch Company (NTDC) has submitted an Indicative Generation Capacity Expansion Plan (IGCEP) 2047 to National Electric Power Regulatory Authority (NEPRA). This indicates a negligible role for the Private Sector as addition in hydropower capacity over the next 20-27 years is assigned to public investments; the plan has also projected a decline in the share of hydropower in the energy mix (Dawn News, 2020).

On the contrary, the Standard Chartered envisages investment opportunities for the Private Sector in Pakistan. The Standard Chartered has devised an SDG investment map for Pakistan; this entails a synopsis of investment opportunities for the Private Sector in attaining the Sustainable Development Agenda for Pakistan by 2030. The report has identified SDG6, 7, and 9 as key areas of investment and estimated the combined potential private-sector investment opportunity at USD 96.2bn. It further apportions the investment opportunities with a potential of USD 44.7bn in the Power Sector and USD 4.0bn in Clean Water and Sanitation. These figures indicate that half of the investment opportunity lies in the Water Sector, comprising of hydropower and clean water and sanitation as subsectors (Standard Chartered , 2020). Detail is given below:

Sector	***SDG***	***Private Sector Investment Opportunity***
Power	SDG 7: Affordable and Clean Energy	USD 44.7bn
Digital access	SDG 9: Industry, Innovation, and Infrastructure	USD 34.0bn
Transport	SDG 9: Industry, Innovation, and Infrastructure	USD 13.5bn
Clean water and sanitation	SDG 6: Clean Water and Sanitation	USD 4.0bn
Total		USD 96.2bn

Source: (Standard Chartered , 2020)

Implementation Framework of the National Water Policy for the Private Sector

In addition to actions already proposed under NWP objective No. 2.2, 2.6 and 2.19 for private sector, Hashoo Foundation has prepared following measures based on the stakeholder's consultations for implementation over the next ten years till 2030 with priority as short-term to

be completed in 1-3 years whereas medium-term in the next 3-5 years and the long-term which will require timeframe of more than 5 years for their completion.

Sr. #	Description	Timeframe
Beneficiary participation and public private partnerships		
1.	Promote the Formulation of a public-private partnership strategy aligned with the National Water Policy that ensures a consistent policy regime till 2030.	Short-term
2.	Ensure political willingness and take actions to rebalance the public-private risk allocation, bear costs and guarantee risks, and prioritize developing a trusting relationship between the Government and the Private Sector.	Short-term
3.	Improve availability of water data including information, mapping, and accurate projections to enable a strong foundation for building public-private partnerships.	Medium-term
4.	Establish a Public Private Partnership Unit in the Ministry of Water Resources. This will coordinate Water related investments and projects across the sectors and explore new opportunities of investment by the Private Sector.	Short-term
5.	Management of assets in the water sector through partial transfer to the Private Sector resulting in shared ownership and operating responsibilities between private and public sector.	Medium-term
6.	Develop a long-term partnership with one of the key corporate sector players to achieve the targets of SDG 6 for Pakistan by 2030	Long-term
7.	Encourage and endorse Private Sector Networks and Groups for achieving the objectives of the National Water Policy.	Short-term
Basin Level Planning for Development of Water Resources		
8.	Arranging consultative meetings within the Ministry periodically for stakeholders such as water user unions and NGOs representing diverse groups to participate in water resources planning and management.	Short-term
9.	Include the Ministry for Energy (Power Division), Private Power and Infrastructure Board, and Public Private Partnership Authority during the basin level planning for encouraging hydropower development.	Short-term
10.	Integrate coordination protocols amongst the three key ministries: water, energy, food for planning and allocation of water for	Short-term

Sr. #	Description	Timeframe
	competing demands.	
11.	Building consensus of provincial authorities and Private Sector players to plan based on forecasting of future scenarios of water availability. Endorse risk sharing arrangements amongst the stakeholders especially during drought years for the most vulnerable areas.	Long-term
Hydropower Development		
12.	Ensure a greater share of hydropower in the projected energy mix for 2047	Short-term
13.	Prioritize the KP province for establishing PPP models in the hydropower sector	Short-term
14.	Collaborate with the Public Private Partnership Authority to initiate hydropower projects with increased policy support and improved project structures.	Medium-term
15.	Enable a connection of Gilgit-Baltistan with the National Grid to harness the hydropower potential of an estimated 41,200 MW.[1]	Medium-term
16.	Establish partnerships through the PPP cell with private renewable energy suppliers in Gilgit-Baltistan to increase their contribution to the National Energy supply.	Long-term
Groundwater: Transition of SCARP tube wells in the public sector to the private		
17.	Engage the Private Sector in adoption of technology for improving water data.	Short-term
18.	Establish a regulatory framework for sustainable management of groundwater balancing the abstraction and recharge rates especially for the Private Sector.	Short-term
19.	Encourage artificial recharge projects by the Private Sector prioritizing threatened aquifers.	Medium-term
20.	Design business models with the Private Sector in urban water stressed areas where wastewater from industries should be treated and managed for aquifer recharge.	Short-term
Stakeholders Participation		
21.	Engage the Civil Society for organizing awareness campaigns for	Short-term

[1] *http://www.gilgitbaltistan.gov.pk/DownloadFiles/InvestmentPotential/HydroEnergy.pdf*

Sr. #	Description	Timeframe
	farmers to align their practices with the encourage water conservation and efficiency practices	
22.	Develop a strategy to encourage rainwater harvesting at the household level in both urban and rural areas	Short-term
23.	Arranging programs for establishment of Water Users institutions for participation in water resource planning and management; and ensuring women's participation in domestic water planning and management.	Short-term
24.	Develop an online repository at the Ministry of Water Resources of all water related projects in the public and private sector to avoid overlap of resources and encourage effective partnerships amongst different stakeholders.	Medium-term
Water Quality Management		
25.	Establish an independent regulatory authority to monitor compliance with established water quality standards for drinking and agriculture purposes.	Short-term
26.	Prioritize installation of water meters to enhance availability of water data and rationalize penalties for both private and public polluters.	Short-term
Research		
27.	Delegate economic feasibility studies for technology adoption and innovations to improve water conservation, efficiency, quality, and recycling to the Chamber of Commerce in different cities.	Short-term
28.	Engage Private Sectors universities to conduct feasibility studies for water conservation technologies, water storage facilities and structures.	Short-term
29.	Preparation of Technical and Economic Feasibilities for Installation of Hybrid Energy systems.	Short-term
30.	Engage the Civil Society for developing and facilitating the government in adopting viable IWRM approaches.	Short-term
PPP modalities and private sector participation for urban water and sewage sectors		
31.	Introduce tax reforms to incentivize Private Sector for investing in water conservation and efficiency technologies in the Agriculture sector.	Short-term

Sr. #	Description	Timeframe
32.	Improve urban water governance by delineating clearly defined roles and responsibilities of institutions in urban centers.	Short-term
33.	Dedicate some percentage of the research budget to youth entrepreneurs focusing on social innovation in the water sector.	Short-term
34.	Create an enabling environment for the Private Sector to invest in wastewater treatment plants and desalinization plants in the coastal areas and operate them through a viable business model.	Medium-term
35.	Involve the Private Sector in the operation and maintenance of public sector schemes to improve urban water delivery and efficiency of the existing infrastructure	Medium-term
36.	Enable capacity building of public sector employees by including the Private Sector in service delivery and maintenance of infrastructure.	Short-term
Private sector representation in NWC		
37.	Ensure that the Prime Minister of AJK and Chief Minister of Gilgit-Baltistan is a permanent member of the National Water Council and is restricted to attend the meetings by invitation only.	Short-term
38.	Coordinate regularly with the 5 Private sector members to engage them for potential investments in the Water Sector	Short-term
39.	Engage the civil society for capacity building initiatives for an IWRM aimed at three levels: sectoral, institutional, and individual.	Medium-term