

GOVERNMENT OF PAKISTAN

**MINISTRY OF NATIONAL FOOD SECURITY AND
RESEARCH**



PC-I

FOR

**WATER CONSERVATION IN BARANI AREAS
OF KHYBER PAKHTUNKHWA**

**FEDERAL WATER MANAGEMENT CELL
MINISTRY OF NATIONAL FOOD SECURITY & RESEARCH,
ISLAMABAD**

SEPTEMBER 2019 (FINAL MODIFIED)

**GOVERNMENT OF PAKISTAN
PLANNING COMMISSION
PC-1 FORM**

1. NAME OF PROJECT:

Water Conservation in Barani Areas of Khyber Pakhtunkhwa

2. LOCATION:

The project will be implemented in all districts of Khyber Pakhtunkhwa including districts of erstwhile FATA

3. AUTHORITIES RESPONSIBLE:

3.1 Sponsoring

Government of Pakistan through Ministry of National Food Security & Research (M/o NFS&R), Islamabad and respective Khyber Pakhtunkhwa Departments

3.2 Execution

- M/o NFS&R through Federal Water Management Cell (FWMC)
- Directorate General Soil & Water Conservation & Directorate of Agricultural Engineering Khyber Pakhtunkhwa through their district/sub-offices & farmers/SWCA

3.3 O & M

SWCA/Farmers

**3.4 Monitoring, Evaluation
and Overall Coordination**

Federal Project Management Unit at FWMC through Project Consultant; Monitoring, Evaluation, TPV and PIES Consultant

**3.5 Concerned Federal
Ministry**

Ministry of National Food Security & Research through Federal Water Management Cell (FWMC)

4. PLAN PROVISION

- If the project is included in the medium term/five-year plan, specify actual allocation

- Not included -

- If not included in the current Plan, what warrants its inclusion and how is it now proposed to be accommodated

Agriculture is the backbone of Pakistan's economy, contributing around 18.9% to the national GDP. A Task Force on Agriculture was constituted in order to formulate strategy for the Government's 100 days agenda to realize the true potential of agriculture sector. The Task Force in consultation with all the provincial and relevant stakeholders, prepared presentation for the Prime Minister of Pakistan. The Prime Minister was pleased to chair a meeting on the subject

"Conserve & Increase Productivity of Water" held on 31st October, 2018 in the Prime Minister's office, Islamabad. Ministry of National Food Security & Research (M/o NFS&R) apprised the Prime Minister that about 95% of the available fresh water is being used for agriculture in Pakistan with dismally low irrigation water use efficiency, i.e., 40%. About 47 MAF of water is lost in conveyance in canals, distributaries and watercourses (**Annex-A**). Prime Minister was also informed about the initiatives undertaken by the Directorate General Soil & Water Conservation Khyber Pakhtunkhwa for protection/conservation of agriculture lands and water harvesting. The protection of erosion prone/eroded lands is undertaken through water conservation structures, check dams, water ponds, field inlets, mini dams and spring development etc. which would reduce scoring of land, reduce runoff, increase infiltration and supplement the aquifer recharge and raise the ground water table in addition to shift from mono-cropping to multiple cropping. It was also mentioned that the requirements and needs of Khyber Pakhtunkhwa are different from other provinces. With an organizational setup different from other provinces, the needs of the population and the intensity of their involvement, the difference of terrain, topography and climate, in addition to the cropping pattern in practice necessitates the development of need based proposal. The objectives of thus KP's water conservation effort differs as it requires small investments in infrastructure which can be implemented through local government. Record note of the meeting held on 31st Oct, 2019 attached as **Annex-B**.

In this connection, the M/o NFS&R submitted a summary to the PM on 9th November, 2018 soliciting approval for processing of the project and completion of further formalities and to secure funding from the PSDP and Provincial ADPs. Whereon, the PM was pleased to desire that M/o NFS&R may initiate processing of the projects in accordance with laid down rules and procedures (**Annex-C**). In order to firm up modalities for preparation of component as well as Umbrella PC-I a consultative meeting with all the stakeholders was held on 12th December, 2018 and guidelines for preparation of component PC-Is were agreed to (**Annex-D**).

To further sensitize the provincial governments with regard to PM National Agriculture Emergency Program, M/o NFS&R held meetings with the Provincial Planning and Development Departments including Agriculture Departments at respective provincial headquarters. The Provincial Governments were requested to submit their component PC-Is, duly approved by the competent forum, to the Ministry of NFS&R for formulation of Umbrella PC-I. Accordingly, PC-I titled "Water Conservation in Barani Areas of Khyber Pakhtunkhwa" has been prepared to implement Prime Minister's directive that pertains to conserve and increase productivity of water through differ cost effective interventions. Therefore, the project is proposed to be included in the PSDP 2019-20.

- If the project is proposed to be financed out of block provision, indicate:

Total block provision	Amount already committed	Amount proposed for this project	Balance available
N.A.	N.A.	N.A.	N.A.

- (b) Provision in the current year PSDP/ADP.

-Nil-

5. PROJECT OBJECTIVES & ITS RELATIONSHIP WITH SECTOR OBJECTIVES:

5.1 Sector/ Sub Sector Objectives:

The proposed project is in line with both, the mandate of the government and objectives of National Water Policy. **The Prime Minister's 100 days agenda** stresses on massively expanding water conservation efforts through smart interventions to reduce water losses. Similarly, **National Water Policy** of the country aims at: (i) reduction of 33% in 46 MAF river flows that are lost during conveyance-watercourses lining especially in saline and semi-saline areas; and (ii) increase at least 30% in efficiency of water use by producing "more crop per drop of water".

In the upcoming 12th Five Year Plan (2018-23), government is planning to make Pakistan a net food exporting country through: (i) agriculture diversification and value addition; (ii) import substitution; (iii) reforming/modernizing agriculture produce markets; (iv) harvest opportunities under the CPEC; (v) and taking sanitary and phytosanitary measures and quality compliance. Further, Pillar IV (Energy, Water and Food Security) of Pakistan Vision 2025 recognizes that sufficient, reliable, clean and cost-effective availability of energy, water and food – for now and the future – is indispensable to ensure sustainable economic growth and development. There is a need to fill the enormous gaps in these areas, while simultaneously making efforts to respond to the looming threat of climate change. There is a renewed national consensus - as articulated in the manifestoes of all leading political parties - to commit major new resources through public and private sector collaboration in these areas and ensure required production and storage capacities. At the same time, efforts will be made towards conservation, efficient distribution and usage of resources, and preventing contamination and environmental degradation. The Pakistan Vision 2025 emphasizes for water & food security that:

- i. Increase storage capacity to 90 days, improve efficiency of usage in agriculture by 20%, and ensure access to clean drinking water for all Pakistanis
- ii. Reduce food insecure population

Project Objectives

The main objective of agriculture sector is to make the country self-sufficient in food grains and make raw material available for agro based industries. The project will be encouraging the farming community through financial assistance for water conservation for ensuring timely irrigation. The project has designed to achieve the following long-run objectives:

- To conserve land and water resources through various interventions for supplemental irrigation, livestock, farm forestry and fish farming
- To increase cropping intensity and per unit of land and water productivity
- To improve livelihood standards of poor farmers
- To improve socio-economic stability

The project objectives in quantifiable terms are as follows:

1. To induce aquifer/ground water recharge by ponding water in > 300 water storage reservoirs.
2. To convert 15,032 acres of culturable wastelands into productive agriculture lands through development of 70 micro-watersheds.

3. To reduce soil erosion by containing flash floods through provision of soil & water conservation structures and check gulley erosion by plugging gullies through 3,000 check dams.
4. Minimize the adverse effects of drought by maximizing the irrigation water supplies through exploitation of sub-surface water from tube wells.
5. Conversion of around 43,225 acres of rain fed land into irrigated land through installation of 300 agricultural tube wells and solarization of 700 existing/new tube wells.
6. To enhance the capacity of the stakeholders in water harvesting and for sustainable use of land and soil resources for increased agriculture production.
7. To improve the socio-economic status of the farmer community.

These activities are aimed at achieving the sub-sect oral goals i.e. increasing agriculture production and reducing the water losses through runoff etc., reduce soil erosion carried out through runoff water and utilizing this stored water for supplementing irrigation, including lifesaving irrigation. In addition, more income will be realized through farm forestry and aqua culture. The Project is thus directly related to the objectives of Agriculture Sector.

The project is in line with specific objectives of National Water Policy and Provincial Implementation Plan of the agriculture sector for enhancing water productivity, efficient and harvesting runoff water to ensure farm productivity, economic uplift of small farmers and improving economy of the country as a whole. The proposed project is closely related to the recently completed water conservation schemes, which form an important element of the integrated rural development program within the agriculture sector.

DESCRIPTION OF SUB-COMPONENTS

The project will have two components; Component-A & B. Component-A will be executed by the Directorate General Soil & water Conservation Khyber Pakhtunkhwa through its provincial setup. It will comprise the following activities;

S.#	Name of activity	S. #	Name of activity
1.	Water Ponds	2.	Check dams
3.	Water Reservoir	4.	Stream-bank stabilization
5.	Gated field Inlet Outlet/Spillway	6.	Terracing
7.	Micro-Watershed Development	8.	Water Seepage harvesting Galleries
9.	Agronomic low-cost interventions	10.	Sand Dunes stabilization
11.	Capacity Building		

The Component-B will be implemented by the Directorate of Agricultural Engineering Khyber Pakhtunkhwa. It will comprise of the following activities:

1. Installation of Tube wells.
2. Solarization of Agricultural Tube Wells.

6. DESCRIPTION, JUSTIFICATION & TECHNICAL PARAMETERS

6.1 Description

Pakistan is an agriculture-based economy which holds true for Khyber Pakhtunkhwa as well where the farmland is small and people depend on the available land for their basic food needs. Although there is irrigated agriculture in Khyber Pakhtunkhwa (0.870 million hectares), about 0.760 million hectares area comprises of rain fed cultivation producing only one crop per year with very low production. An area of 1.245 million hectares lays barren because of want of water and has been termed as culturable waste land. Out of the total of 34 districts in the province (including the newly merged tribal districts), 19 districts are rain fed while the remaining irrigated districts also have major tracts of land that depend on rainfall for agriculture.

The agriculture sector is so intimately interwoven with almost all other sectors that it acts as engine of growth for the rest of the country. However, the performance of the agriculture sector in terms of water use and capacity as well as quality has remained very low for the last few decades. More importantly, the crop water productivity has been lowest than its potential because almost 50 percent agriculture lands of Khyber Pakhtunkhwa are rain fed; the main limiting factor being water. Water is the determining factor for agriculture development.

6.1.1 Background

The province of Khyber Pakhtunkhwa acts as a bowl catchment covered from three sides by the Himalayan Mountains in the north, Hindu Kush Mountains in the west and the Suleiman mountain ranges in the south. These mountains receive precipitation which drains out of the watershed quickly because of the undulating topography; the uneven terrain of the foothills which drain the areas quickly. While the plains of Peshawar valley (comprising of district Peshawar, Charsadda, Mardan, Swabi and Nowshera) is irrigated by the river Kabul and its tributaries, D. I. Khan which are being irrigated through the CRBC canal from the Indus and steps being taken for Gomalzai dam, majority of the agriculture lands of the province need to be supplemented through local water harvesting because of the uneven terrain.

In relation to the scope of the problem and the opportunity at hand, previously the idea of conversion of rain fed agriculture to irrigated agriculture have not been taken as it should have been. Projects like Barani Area Development Program were steps in the right direction, and were donor funded and could not extract the complete potential of the opportunity. This important sector has been seriously been ignored.

Water is the limiting factor in the rain-fed Districts of Khyber Pakhtunkhwa that hinder the production of crops and adversely affects human and animal life. On the other hand, enormous amounts of water are being lost through runoff without being utilized, carrying with it fertile topsoil. These waters induce flash floods on one hand and decrease the storage capacity of the dams due to siltation, on the other. The runoff water, if harvested and stored in small units at local level, can be used to supplement irrigation for increase in agriculture production, stabilize the ground water table by inducing ground water recharge, can be used for human and animal use and improve climatic conditions of the rain-fed areas.

An estimate by the International Water Management Institute (IWMI) indicate that Pakistan is among the 17 countries that are likely to face the most severe water scarcity by 2025. The situation can get grow tenser as rains are becoming more erratic and scarce due to climate change. Since there are, but very limited and akin to inadequate storage and rainwater harvesting

facilities, more than 95 percent of the water is lost. Owing to the climatic changes, the rainfalls normally received in March have drifted to April. In such a scenario, necessary water is needed to sow crops on time to avert crop failure, the sustenance of which is ensured by rains at a later stage.

Inadequate water availability is a major constraint in future expansion of agriculture to enhance agriculture productivity of the country for meeting growing food and fiber demands. On the basis of current water shortage and rapidly competing future demands, the foreseen situation would simply be unsustainable for agriculture on which national economy is based. Horizontal as well as vertical expansion of agriculture is, therefore, urgently needed for the purpose. It is particularly important to consider possible strategies for increasing crop productivity through efficient management of the scarce water resources.

It is high time to pour investment into the sector for the transformation of rain-fed (barani) and culturable waste land into productive agriculture lands and generate revenue in addition to making the country self-sufficient in food.

6.1.2 Proposed solution

The best solution to the problem of water scarcity in the rain fed areas of Khyber Pakhtunkhwa is the harvesting of rain/ runoff/ spring water at the local level; on-farm or in the immediate vicinity of the farmland. The water can be harvested in water ponds (earthen in low lying area while cemented in sloped/ terraced mountainous areas), earthen water reservoirs, mini dams, sailaba water harvesting through field inlets/spillways in the rod kahi areas of southern Khyber Pakhtunkhwa, check dams in the gullied lands for land reclamation and ground water recharge, sand dunes stabilization in the arid southern regions of the province, terracing for moisture conservation in hilly tracts and stream bank stabilization for protection of prime agriculture lands along the bank of water channels and micro-watershed demonstration sites. The schemes will be implemented on 80:20 cost sharing between the government and the beneficiaries/ farmers. The scheme will have active participatory approach wherein the beneficiary will be involved in all the phases of the development of the intervention as is the practice in place in the provincial setup.

A package of interventions comprises installation of agricultural tube wells and solarization of agricultural tube wells is proposed as minor component of this project. The combined effect of these advancements would lead to enhance output of available water resources.

The harvested water will be utilized at local level for the production of high value crops, fruits, stone fruits and vegetables (seasonal and off season). The cultivation of vegetables and fruits will boost the agriculture sector multi-folds. The availability of water can ensure the plantation of stone fruits, pistachio, almonds and similar dry fruits that can help boost the economy. Small and medium industry can flourish in many directions as the harvested water will play its role in the livestock drinking thereby increasing milk and meat production, increase grain production, increase fruit and vegetable production paving ways towards processed foods; jam jellies etc., dry fruit production, improve bio-diversity of local flora and fauna in the area and improve the local tourism within the area proving small recreational spots for the youth. The harvested water will have an enormous effect on ground water recharge will indirectly benefit many industries that use ground water in its processes. The harvested water decreases the occurrences of flash floods by utilizing most of the water in the field and reducing stream bank erosion, thereby protecting the already available agriculture land.

The Directorate General Soil & Water Conservation of the Agriculture Department Khyber Pakhtunkhwa extends financial and technical assistance to the farmers. The technical assistance to the beneficiaries is provided free of cost while the department supports soil conservation and water harvesting interventions to the farmers through 80:20 cost sharing basis from the funds provided through provincial ADP schemes, the district developmental funds and funds from the non-Governmental Organizations and International donor organizations.

The Directorate General Soil & Water Conservation Khyber Pakhtunkhwa has undertaken initiatives for protection/ conservation of agriculture lands and water harvesting. The protection of erosion prone/eroded lands is undertaken through water conservation structures, check dams, water ponds, field inlets, mini dams and spring development etc. which would reduce scoring of land, reduce runoff, increase infiltration and supplement the aquifer recharge and raise the ground water table in addition to shift from mono-cropping to multiple cropping. The achievements of the department in the last 10 years are presented in the table below:

Table No. 1: Achievements of the Department in the last 10 years

S. No.	Name of Intervention	Achievement 2008 to 2012	Achievement 2013-2017	Total Last 10 years
1.	Water Ponds	493	651	1144
2.	Water Storage Reservoirs	0	195	195
3.	Check dams	379	875	1254
4.	Field Inlets for Sailaba Water	295	650	945
5.	Field Spillways for Sailaba Water	80	250	330
Total (Figures in numbers)		1247	2621	3868
Percent increase		210 % increase in achievement.		
Cost (Rs. in million)		120.048	480.429	600.477
Rain water harvested (in Acre feet)		62,350	13,1050	193,400
Area brought under cultivation (Acres)		3,117	11,915	15,032

The conservation of agriculture lands and water harvesting are already the part of the department's policy, however, funds provided for the same are very meagre and amount to nothing in terms of the scope of the problem and the realizable potential benefits.

The scope of the problem encompasses all the agro-ecological zones of Khyber Pakhtunkhwa spread throughout the length and breadth of the province. Water is the main limiting factor, be it the mountainous north, the rugged west or the arid southern districts of Khyber Pakhtunkhwa. The project shall be implemented in all the 34 districts of Khyber Pakhtunkhwa including the newly merged tribal districts.

The implementation of the project will be accomplished by the already available setup of the provincial government. The Directorate General Soil & Water Conservation Khyber Pakhtunkhwa has a district equipped offices in 24 districts of the province wherein the below mentioned activities are being undertaken amicably by the field force in collaboration with the farming community utilizing the meagre resources of the provincial/ district setup.

However, the department does not have a setup in district Kohistan of Khyber Pakhtunkhwa and the newly merged tribal districts (South Waziristan, North Waziristan, Kurram, Orakzai, Khyber,

Mohmand and Bajaur). An office setup is proposed to be enacted in the districts by the provincial government, but until its establishment, a makeshift arrangement will need to be done to ensure the achievement of physical and financial targets in these areas.

Another minor issue is the lack of proper mobility in some of the district offices for monitoring and supervision of activities in the field. Suzuki Jeeps (dating back to 1980s) will cause hindrance in the proper implementation of the project in addition to putting the life of the officer/official in danger.

The scheme will have no negative impacts on the environment. Instead, positive benefits will be realized in the form of improvement of the improvement of bio-diversity in the area because of more green available. The native flora and fauna will flourish and the climatic conditions will improve.

6.2 DESCRIPTION OF SUB-COMPONENTS

Soil & Water Conservation Component

The details of sub-components are described in the following sections.

The average unit cost of each intervention and range between lower and higher sealing cost is described in Table 6. The cost will be determined on need basis and site suitability, feasibility and potential/scope of the problem. The site selection of interventions shall be taken into consideration depending on the catchment, pondage capacity and command area. A sample Detailed Cost Estimates, sketch and design are annexed at KP component cost tables.

A brief description of various interventions is mentioned as under:

6.2.1 Water pond:

A pond is a body of standing water that is usually smaller than a lake. It may be cemented or earthen, depending on the site and location. Water ponds serve as source of water, harvested from runoff or perennial springs. Typically, the water storage capacity of a pond is 5 to 10 acre feet.

The rain-fed areas of Khyber Pakhtunkhwa are solely depended on rainfall for their agriculture. The construction of small water ponds at local level will bring revolutionary changes in the lives of the inhabitants of these areas converting mono-culture into multiple cropping, helping in fish rearing, cattle drinking, groundwater recharge and associated purposes. Some of the areas have perennial springs where farmers use them for irrigating their fields but they are only possible when a water storage pond is built to store the flowing water.

The average unit cost of a water pond is set to be Rs.0.600 million (project cost) and will range between Rs.0.300 million and Rs.1.500 million project share. An estimated 5,000 water ponds will be constructed under the said project for which an amount of Rs.3,000 million have been allocated in this project.

6.2.2 Check dam

Check dams generally consist of a vertical barrier constructed on ditches, small streams, channels and gullies that have often been formed by the erosive activity of water. These structures are commonly constructed using stone, gravel bags, sand bags or masonry etc. These can include productive dams for creating farmlands, flood control dams for preventing flood water and

intercepting sediments, water-storage dams for irrigation, rock check dams for stabilizing vegetation or reducing bed gradient and gully check dams for controlling gully development. Each check dam is expected to control a limited drainage area; however, a series of check dams can be constructed if the drainage area is large. The distance between check dams depends upon the length and width of the channel. There are various types of check dams depend on the available financial resources and the site where check dams are supposed to be constructed. Some of them are low cost while the others are high cost check dams.

The average unit cost of a check dam is set to be Rs.0.700 million (project cost) and will range between Rs.0.300 million and Rs.1.500 million project share. An estimated 3,000 check dams will be constructed under the said project for which an amount of Rs.2,380 million have been allocated in this project.

6.2.3 Water reservoirs

A water reservoir is natural or artificial place where water is collected and stored for the use of a community or irrigating land, furnishing power etc. Water reservoir may be a small dam or a large dam. Directorate General Soil and Water Conservation Khyber Pakhtunkhwa is dealing with small/ mini dams. These small dams are constructed in the areas where rainfall water is collected. The collected water can be used for livestock, irrigation and for drinking purpose also after purification. Many districts of Khyber Pakhtunkhwa have feasible sites for constructing thousands of small dams. These dams will not only fulfill the requirement of water but also recharge aquifers and increase in the esthetic value of the areas.

The average unit cost of a check dam is set to be Rs.2.500 million (project cost) and will range between Rs.1.000 million and Rs.6.000 million project share. An estimated 330 water reservoirs will be constructed under the said project for which an amount of Rs.825.000 million have been allocated in this project.

6.2.4 Stream bank stabilization

A vegetative, structural or combination treatment of streams designed to stabilize the stream and reduce erosion is called stream bank stabilization. Stream banks are more susceptible to erosion with running water. During rainy season, this process accelerates and hence loses precious land of the farmers. In Khyber Pakhtunkhwa, this happens too much due to its topography and climatic conditions. Directorate General Soil and Water Conservation Khyber Pakhtunkhwa is working in all districts of the province and is continuously working for conserving agriculture land of the farmers in different ways. In case of stream bank stabilization, we use both vegetation and engineering structures like protection bunds, spurs etc.

The average unit cost of a stream bank stabilization structures is set to be Rs.0.350 million (project cost) and will range between Rs.0.200 million and Rs.0.900 million project share. An estimated 2,500 stream bank stabilization structures will be constructed under the said project for which an amount of Rs.875.000 million have been allocated in this project.

6.2.5 Field spillways/ Gated inlet outlets

A field spillway is a structure used to provide the controlled release of excess flow of water from field to a downstream area. In the rod-kohi area of southern Districts of Khyber Pakhtunkhwa, the sailaba water from mountains is harvested in large tracts of land to allow it to percolate for crop production and improve ground water recharge. These are structures where soil is protected from being lost with excess of runoff water. Field spillways not only harvests flood water in fields but also trap soil sediments to increase soil fertility and enhance crop productivity.

The average unit cost of inlet outlet/field spillway is set to be Rs.0.200 million (project cost) and will range between Rs.0.050 million and Rs.0.400 million project share. An estimated 1000 inlet outlet/field spillway will be constructed under the said project for which an amount of Rs.200 million have been allocated in this project.

6.2.6 Terracing

In agriculture, a terrace is a piece of sloped plane that has been cut into a series of successively receding flat surfaces or platforms, which resemble steps, for the purposes of more effective farming. This method of farming uses "steps" that is built into the side of a mountain or hill. On each level, various crops are planted. When it rains, instead of washing away all of the nutrients in the soil, the nutrients are carried down to the next level. Additionally, these steps prevent land sliding that would take plants with it and destroy all of the crops on the hillside. This type of landscaping is therefore called terracing. Most of the area of Khyber Pakhtunkhwa is mountainous type and here this method of farming is very suitable for agriculture and also for controlling erosion of fertile soil.

The average unit cost of one acre of terracing is set to be Rs.0.300 million (project cost) and will range between Rs.0.150 million and Rs.0.500 million project share. An estimated 370 acres of terracing will be constructed under the said project for which an amount of Rs.111 million have been allocated in this project.

6.2.7 Micro watershed development

Watershed is defined as any surface area from which runoff resulting from rainfall is collected and drained through a common point. It is synonymous with a drainage basin or catchment area. Some watersheds are very small (less than one acre) while other watersheds are very large and may cover thousands of square miles. Any place where you stand can be part of many watersheds of varying sizes.

For the development of a micro watershed, two things are very important to be conserved, namely; soil conservation and water conservation. In Khyber Pakhtunkhwa, there are some feasible sites where we can develop micro watersheds. Each micro watershed will consists of water conservation interventions like water ponds, mini dams, check dams and soil conservation interventions like protection bunds, spurs, contour ploughing etc. For the livelihood of the local community, fields and gardens will be developed which will be irrigated from the water ponds, mini dams etc.

The average unit cost of one micro-watershed development is set to be Rs.5.000 million (project cost) and will range between Rs.2.000 million and Rs.9.000 million project share. An estimated 70 watersheds will be established under the said project for which an amount of Rs.490 million have been allocated in this project.

6.2.8 Water seepage harvesting galleries

Water seepage harvesting galleries are sub-surface groundwater collection system (tank) with perforated pipes, typically shallow in depth, constructed in a sloppy area. These underground water collecting tanks can be built alone in a gully or inside a check dam. These tanks will receive seepage water from the adjacent wet soil. The tanks are connected with external pipes from where water continuously discharges by the force of gravity. The discharged water can be used for both irrigation or drinking purposes. This is a low-cost intervention where we can get pure and continuous supply of water.

The average unit cost of Water seepage harvesting galleries is set to be Rs.0.800 million (project cost) and will range between Rs.0.400 million and Rs.1.200 million project share. An

estimated 370 water seepage harvesting galleries will be constructed under the said project for which an amount of Rs.296.000 million have been allocated in this project.

6.2.9 Low cost intervention

By low cost intervention, we mean those interventions of soil and water conservation which are locally available and applicable with low cost. Some of them are biological while others are engineered structured which are constructed with very low cost.

The average unit cost of various low-cost interventions is set to be Rs.0.125 million (project cost) and will range between Rs.0.020 million and Rs.0.300 million project share. An estimated 800 low cost interventions will be undertaken under the said project for which an amount of Rs.100.000 million have been allocated in this project. The intervention may consist of any combination of below mentioned interventions.

6.2.9.1 Agronomic low-cost intervention

Agronomic low-cost interventions include cover crops like gram, peanuts etc. These crops are locally available and have the ability to cover soil surface, thus protecting the soil from the direct effect of rain drops which ultimately help in controlling soil erosion. We will include such type of intervention in our activities which will improve livelihood of farmers and also conserve soil and water.

6.2.9.2 Low cost brush wood check dam:

Brushwood check dams made of posts and brush are placed across the gully. This type of soil conservation activity is highly economical where plenty of the bushes, trees etc are locally available. The main objective of brushwood check dams is to hold fine material carried by flowing water in the gully. Small gully heads, no deeper than one meter, can also be stabilized by brushwood check dams.

6.2.9.3 Loose stone check dams

Loose stone check dams made of relatively small rocks are placed across the gully. The main objectives for these dams are to control channel erosion along the gully bed and to stop waterfall erosion by stabilizing gully heads. Loose stone check dams are used to stabilize the incipient (initial) and small gullies or gully network. The length of the gully channel is not more than 100 meters and the gully catchment area is two hectares or less. These dams can be used in all regions of Khyber Pakhtunkhwa.

6.2.10 Sand dunes stabilization

Sand dune is a ridge of sand created by the wind, found in deserts or near lakes and oceans. Sand dunes can be stabilized by a number of methods in which herbaceous plantation method is the best one in which these plants are grown at a distance for effective control of sand dunes. Few districts of Khyber Pakhtunkhwa Karak, D. I. Khan, Lakki Marwat have sand dunes. Kana (*Saccharum Mijga L.*) plantation etc. will be done in these districts to stabilize sand dunes. These plants require less water and care. These plants not only help in stabilization of sand dunes but also a source of income for the local community by making house made items from the stems Kana plants.

The average unit cost of one acre of sand dunes stabilization is set to be Rs.0.025 million (project cost) and will range between Rs.0.010 million and Rs.0.050 million project share. An estimated 230 acres of sand dunes will be stabilized under the said project for which an amount of Rs.5.750 million have been allocated in this project.

6.2.11 Capacity building

Capacity building or capacity development is the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment and other resources needed to do their jobs competently or to a greater capacity.

An estimated 500 trainings/exposure visits will be conducted for improving the capacity of the stakeholders. Trainings will be designed for farmers as well as the officers and officials of the Directorate General Soil and Water Conservation Khyber Pakhtunkhwa. Exposure visits to other countries having proven experience in soil and water conservation techniques like highway water harvesting, ground water recharging wells, subsurface check dams, series mini dams etc. will be arranged for selected regular officer of Directorate General SWC from own resources of KP component. Whereas, federal share mentioned under capacity building head will be utilized for arranging exchange visits of farmers to the project intervention sites for knowledge dissemination. Annual Plan Review meetings will also be organized between the stakeholders.

Agricultural Engineering Component

A brief detail of various interventions which will be provided by Agricultural Engineering Department is given below:

6.2.12 Tube wells

A Tube Well is a device which is constructed to draw ground water contained in an aquifer. Its design varies with the geological conditions of the formation and the purpose for which ground water is to be used. Tube wells are installed to supply water for irrigation and water supply. The required depth of Tube Well depends upon the depth of the water table. The main components of the Tube Well are as follows:

- i). The top housing or suction pipe.
- ii). Blank or blind pipe to cut off low water yielding zones
- iii). A bail plug or sand trap fixed at the bottom end of a tube well
- iv). The strainer or the screen to receive inflow from the formation
- v). A filter pack comprising of graded gravel and sand installed around the strainer or the blind pipe.

Development of water resources is the major means for increasing agricultural production. Installation of Tube wells is one of the means for development of water resources. Agricultural Engineering Department has got vast experience in the installation of Tube wells. Since fifties it has installed over 6,500 irrigation Tube wells bringing over 160,000 hectares (395,200 Acres) of land under irrigation in whole of Khyber Pakhtunkhwa.

Unit cost of a Tube well depends upon its depth. Under the project, average unit cost of a Tube Well is set to be Rs.0.632million and will range between Rs.0.464 million and Rs.0.742 million project share. An estimated 300 Tube Wells will be installed under the said project for which an amount of Rs.189.660 million have been allocated in this project.

6.2.13 Solar Pumping System:

A Solar-powered pump is a pump running on electricity generated by photovoltaic panels or the radiated thermal energy available from collected sunlight as opposed to grid electricity or diesel run water pumps. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs and has less environmental impact than pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable/expensive and alternative sources (in particular wind) do not provide sufficient energy.

Working of Solar pumps

- The solar system consists of PV array, inverter, controller, submersible / centrifugal pump and water tank at ground surface.
- When light falls on the active surface of the PV (photovoltaic) panel containing silicon cells, the electrons in a solar cell become energized and Photo voltaic array converts solar energy directly into electricity as DC and inverter converts it into AC. The AC water pump needs AC current which is supplied from inverter.
- Water is pumped from the well and stored in an appropriate size Water tank constructed at ground surface and Irrigation is done from the Tank water whenever required.
- The power from a solar system and the volume of water pumped varies with the amount of solar radiation.
- The pump will have its own optimum discharge depending on the type and size of panel/motor.

There are significant variations in depth of water-table within the Khyber Pakhtunkhwa. It varies from 50' in some parts to even beyond 90' in other parts. In some areas, it is estimated that further drilling of 100 ft to 320 ft within water bearing strata produce enough water to fulfill the irrigation requirement of 10 to 40 hectares of land. To be covered under the purview of the activities of the project, the diameter of the Tube well (Filter/ Blind Pipe) should be minimum of 8 inches. Solar pumping system doesn't require any specific arrangements except there should be enough secured space available for placement/installation of silicon cells (Solar) panels fully exposed to sun light. Water should preferably be initially pumped in a small reservoir and from where irrigation water shall be provided to the land through water courses whenever required.

Uptil now, Agricultural Engineering Department has installed over 650 Solar Pumping System on Tube Wells/Open Wells bringing over 16,250 hectares (40,138 acres) of land under irrigation.

Under the Project, average unit cost of a Solar Pumping System is set to be Rs.1.771 million and will range between Rs.1.280 million and Rs.2.000 million project share. An estimated 700 Solar Pumping System will be installed on Tube Wells under the said project for which an amount of Rs.1,266.340 million have been allocated in this project.

6.3 MODUS OPERANDI

6.3.1 Soil & Water Conservation Component

6.3.1.1 Methodology for Execution of Soil Conservation Works

The soil and water conservation interventions will be carried out on 80:20 cost sharing basis between the Government and the beneficiaries. A detailed terms of partnership (ToP, as per sample provided in the PC-I) will be signed with the beneficiary. The beneficiary will be assisted by soil conservation staff of the concerned district in financial and technical aspects for reclaiming their eroded lands and water harvesting. The field staff (skilled and technical) will survey the problem areas and will identify sites for their suitability. The project will be need driven and priorities will be fixed on the basis of suitability of sites and the extent of soil erosion. Detailed Cost Estimates (DCEs), site plan and sketch plans will be prepared for approval. Prevailing MRS 2017 (or latest) issued by Finance Department, Government of Khyber Pakhtunkhwa will be used for cost calculations. After validation of project parameters by the consultant and approval by the competent authority, the soil and water conservation interventions will be executed under the close supervision of the field staff by the beneficiaries.

6.3.1.2 Criteria for Site Selection

The land owners applying for soil and water conservation interventions shall produce fard of the land adjacent to the site of work along with application form. In case of fard of land is not available, the revenue department will verify the ownership of land. In case of communal lands, small Soil & Water Conservation Associations will be established and registered with the concerned District Office of Soil & Water Conservation.

On receipt of application asking for intervention, the technical staff will carry out preliminary feasibility survey of each site. Priority will be fixed on the need of the area and potentially expected benefits. The site will be judged in terms of potential for harvesting water and the transformation of land into a productive one. The detailed cost estimate will be prepared by the district staff and sent to the competent authority. Technical sanction of the schemes will be accorded by the Project Director/Director General soil and water conservation Khyber Pakhtunkhwa up to Rs.9.000 million. .

After the approval of the estimate by the competent authority, work order will be conveyed to the concerned beneficiary to start the execution of work on his land according to the specification and drawings approved in the estimate. The beneficiary will be responsible for satisfactory completion of the work. If deemed necessary for the execution of the scheme, approval will be taken from the competent forum/ Project Director/DG SWC in consultation with the administrative department to alter the district-wise target distribution of the project.

It will be ensured that the soil and water conservation works are executed for the betterment of agriculture lands or potential agriculture lands development. No works shall be executed for non-agriculture purposes such as to benefit housing/ municipality etc.

6.3.1.3 Role of Local Government

The project will be executed through the devolved setup of Directorate General Soil & Water Conservation Khyber Pakhtunkhwa. The devolved District Offices of Soil & Water Conservation are a part of the Local Government setup existing in the districts. The soil and water conservation work under this project will also be executed in consultation with the public representative at district/tehsil level. A database of the recommendations of the public representatives shall be prepared and the District Director/District Officer Soil and Water Conservation of the concerned district shall consider priority in terms of best suitable site for execution of work so as to ensure that maximum benefit is achieved from the invested precious national money.

6.3.1.4 Cost Sharing

The project will contribute all construction materials etc. that will be about 80% of the total scheme cost while the beneficiary will provide his/her share in the form of skilled and unskilled labor/ materials (20% of the cost of physical activities). Hence the cost sharing between the Government and the beneficiary will be in the ratio of 80:20.

6.3.1.5 Exemption of Sales and Income Tax on Interventions

The project is proposed to benefit low income farmers of the province to improve their agriculture income. Since agriculture income is a non-taxable commodity, it is very important that the subsidy given on small water harvesting interventions proposed in this project is exempted for any kind of government taxes. It also needs a mention that no contractor will be involved in the execution of soil & water conservation interventions. Furthermore, the projected will be implemented on 80:20 cost-sharing between the government and the beneficiary and the total cost of each intervention will have 20% financial share of the beneficiary.

6.3.1.6 Mode of Payment

The government share of 80% of the total cost will be made by the department to the farmer through cross-cheque, after due endorsement of TPV Consultants, issued from the project account in the name of the beneficiary/SWCA according to the sanctioned estimate after the successful completion of the construction work according to specification and design. An assignment account will be opened out of which payment will be made in two installments. Out of the total cost sanctioned in the detailed cost estimate, 40% cost of the total cost of the scheme (100%) will be made to the beneficiary after 50% work is carried out in the field, owing to the high cost of inputs and low financial status of the farming community. While the remaining 40% (of the 100% cost) will be made after satisfactory completion of the work, totaling onto 80% which will be the project share out of the total cost of the activity. The remaining 20% of the total cost will be borne by the beneficiary/SWCA.

6.3.1.7 Repair and Maintenance

The Soil & Water Conservation Associations/farmer will be responsible for the maintenance and repair of the completed structures.

6.3.2 Agricultural Engineering Component

Method of Execution for installation of Agricultural Tube Wells and Solarization of Agricultural Tube Well is as under:

6.3.2.1 Agricultural Tube Wells:

The project will be executed as per procedure proposed here-under:

1. The Scheme will be advertised in leading newspapers.
2. The concerned Agricultural Engineer/Assistant Agricultural Engineer will collect applications from land owners interested in the installation of Agricultural Tube-wells on their land. Communities will be encourage for installation of tubewell to adopt cluster approach.
3. Each application must be provided with following revenue documents (duly attested by the Revenue authorities):
 - a) Fard and shajra Aks of the Agriculture (Barani) land measuring minimum 20 Kanals (2.5 Acres) in a compact block that confirms ownership of the applicant (individual or group with attorney in favour of anyone of them). A certificate to that effect clearly indicating the ownership and land holding of the applicant / group of farmers will also be provided.
 - b) Land Classification Certificate showing availability or otherwise of the present irrigation facility will also be required with the application
- 4) Surety bond duly signed by the farmers/beneficiaries (attested by oath commissioner) mentioning that he/she/they have not availed similar facility (Tube Well installation) under government funded scheme in the last five years and that the Tube well shall be utilized for agriculture purpose only and thereby ensuring operation, maintenance and security of Tube well.
- 5) Departmental technical committee headed by the Agricultural/Assistant Agricultural Engineer and comprising of Drawing Disbursing Officer (DDO), Assistant Agricultural Engineer (Project) and Unit Supervisor (Regular and Project) of the concerned sub-office will scrutinize the applications and land ownership documents duly verified by district revenue department on the basis of criteria and physical inspection of site for availing the facility.
- 6) The site feasibility report will then be prepared by the departmental technical committee including GPS Coordinates and three pictures of the site.
- 7) Agricultural Engineer/Assistant Agricultural Engineer of the concerned sub-office will furnish all the verified applications along with the relevant documents received at

his end of the individual sites to the Director Agricultural Engineering Khyber Pakhtunkhwa. Director Agricultural Engineering will scrutinize the documents and accord final approval to the deserving beneficiaries keeping in view the very objectives of the project.

- 8) On the receipt of approval, work order will be issued by the concerned DDO to the applicant for installation of Tube Well according to the approved specifications. (Already Existing Tube well will not be considered for grant of incentive under the scheme). If the departmental drilling machinery cannot be spared from installation of tube wells, drilling work through private drilling agencies shall be carried out under close supervision of concerned Agricultural Engineer/Assistant Agricultural Engineer (DDO) and on the approval of Director Agricultural Engineering Khyber Pakhtunkhwa Tarnab, Peshawar.
- 9) After completion of tube well to the desired depth, the departmental technical committee and TPV consultant will confirm satisfactory completion of the tube well. Government Share @ 80% cost of installation of Tube Well of the relevant category will be paid to the individual beneficiary in shape of cross cheque through Accountant General Khyber Pakhtunkhwa/District Account Officer only after installation of pumping set on the Tube Well and upon provision of verification/satisfaction report by consultant regarding successful installation and operation of Tube Well.

6.3.2.2 Solarization of Agricultural Tube Wells

The project will be executed as per procedure proposed hereunder:

- 1) The Scheme will be advertised in leading newspapers.
- 2) The concerned Agricultural Engineer/ Assistant Agricultural Engineer will collect applications from land owners interested in the installation of solar pumping system on their Agricultural Tube Wells having minimum 8 inches diameter blind/filter pipe with enough sub-surface water availability for irrigation purpose. Preference will be given to solarize agricultural tubewell a community.
- 3) Each application must be provided with following revenue documents (duly attested by the Revenue authorities):
 - a) Fard' and 'shajra Aks' of the Agriculture (Barani) land measuring an area of minimum 20 Kanals (2.5 Acres) in a compact block that confirms ownership of the applicant (individual or group with attorney in favour of anyone of them). A certificate to that effect clearly indicating the ownership and land holding of the applicant / group of farmers will also be provided.
 - b) Land Classification Certificate showing availability or otherwise of the present irrigation facility will also be required with the application.
- 4) Surety bond duly signed by the farmers/beneficiaries (attested by oath commissioner) mentioning that he/she/they have not availed similar facility (Solar Pumping System) under government funded scheme in the last five years and that the system shall be utilized for agriculture purpose only and thereby ensuring operation, maintenance and security of the system.
- 5) Departmental technical committee headed by the Agricultural Engineer / Assistant Agricultural Engineer and comprising of DDO, Assistant Agricultural Engineer (Project) and Unit Supervisor (Regular and Project) of the concerned sub-office will scrutinize the applications and land ownership documents duly verified by district revenue department on the basis of criteria and physical inspection of site for availing the facility.
- 6) On the basis of the feasibility report (including the GPS Coordinates and three pictures of the site) to be provided by the Unit supervisor (Project) of the concerned sub-office and signed by the members of the departmental technical committee recommends the solar pumping system of appropriate category to be installed under the scheme.

- 7) Agricultural Engineer / Assistant Agricultural Engineer of the concerned sub-office will furnish all the verified applications along with the relevant documents received at his end of the individual sites to the Director Agricultural Engineering. Director Agricultural Engineering will scrutinize the documents and accord final approval to the deserving beneficiaries keeping in view the very objectives of the project.
- 8) On receipt of approval, the concerned farmer/group of farmers will be requested to deposit his or their share i.e. 20% of the total cost of solar pumping system in a designated PLS account opened for the purpose.
- 9) On confirmation of deposited amount from the bank, a solar pumping system of appropriate capacity and size will be issued to the respective farmer from the Agricultural Engineering store of the concerned sub-office, by adopting proper store procedure and the approved firm will install the system on Agricultural Tube Well of the beneficiary / beneficiaries.
- 10) Farmer Share @ 20% of the total cost of the Solar Pumping System of the relevant category deposited in a designated PLS account of Director Agricultural Engineering Khyber Pakhtunkhwa by the farmer will be released to the approved firm by the Director Agricultural Engineering Khyber Pakhtunkhwa only after provision of verification/satisfaction report by TPV consultant regarding successful installation and operation of Solar Pumping System.

6.3.2.3 Up-Grading of Solar Pumping System

If a farmer intends to upgrade the approved Solar pumping system, he (the beneficiary) will submit a written request to the Agricultural Engineer / Assistant Agricultural Engineer of the concerned sub-office for up-gradation of its approved Solar Pumping System in order to increase the discharge. The authority after receipt of request will examine the documents on file and site feasibility and if appropriate, allow the farmer to Up-Grade its approved solar pumping system on the following grounds:

- 1) The up-gradation should be at the "RISK AND COST" of the beneficiary and the quality and brands of the approved solar systems must not be changed at any cost.
- 2) The components needed for up gradation should be of the same make and brands.
- 3) The farmer will be bound to upgrade the solar system through the approved firm/supplier of the Directorate of Agricultural Engineering.

The additional cost of the material (PV panels, Inverter, pipes, Trackers, Pump etc.) required for up-gradation of solar pumping system shall be borne and settled / negotiated with the firm by the beneficiary himself and the Department should not be made responsible or party to any sort of dispute if cropped-up between the beneficiary and the supplier. The Department will work out possibilities for pilot testing of mobile solar power pumping system in the project area with the allocated budget.

6.3.2.4 Concept of Cost Sharing:

6.3.2.4.1 Tube Wells:

It is proposed that, those farmers who doesn't have sub-surface source of irrigation water in barani areas of Khyber Pakhtunkhwa and interested to install new Tube well, shall be benefited by sharing the cost of tube well installation @ 80:20% (Project : Farmer) basis, i.e., 80% share will be borne by the Project and 20% share will be borne by the Farmer.

The estimated cost of installation of Tube Well (320 feet depth) is Rs.927,240/- as such per foot cost of the tube well drilling comes out to be around Rs.2,900. Hence, the estimated cost of the tube well installation is based @Rs.2,900/- per foot and in accordance with the depths mentioned in the Table 2: The cost of installation of tube well including drilling charges, lowering

material etc. for different depths have been worked out for estimating the shares of Government and Farmers. The cost of drilling has been divided in three categories depending upon the depth of the tube well.

Table-2: Installation Cost of Agriculture Tube Wells

Rs. in millions

Category wise minimum Depth of Tube Well	Cost of Tube Well		
	Unit Cost	Project Share @ 80%	Farmer Share @ 20%
200 ft	0.580	0.4640	0.1160
250 ft	0.725	0.5800	0.1450
320 ft	0.928	0.7424	0.1856

The distribution of Government share will be as under:

Table 3: Distribution of Government Share in Tube Well Installation

S/No	Category wise minimum drilling depth of Tube well	Amount of Govt. Share @ 80% in Rupees
1	200 feet	464,000/-
2	250 feet	580,000/-
3	320 feet	742,400/-

Example:

A farmer interested in installation of a Tube Well would be eligible for Government Share of Rs.464,000/- if he completes the drilling depth of 200 feet. He will not be considered eligible for the above incentive, if the drilling depth is less than 200 feet (say 199 feet).

Similarly, under second category of depth i.e. 250 feet, the farmer must complete the drilling depth upto 250 feet and for less than 250 feet (say 249 feet) he will not be eligible for share of Rs.580,000/- under the second category of depth, i.e., 250 feet rather he will be eligible for Rs.464,000/- under the first category of depth, i.e., 200 feet.

6.3.2.4.2 Solarization of Agricultural Tube Wells:

The proposed solar pumping system will be provided to the individual farmers or group of farmers on cost sharing basis (80% project share and 20% farmer share). The cost of the pumping sets and share distribution will be as under:

Table 4: Distribution of the total cost of Solar Pumping System

(Rs. in Millions)

Category of Solar pumping system (Feet)	Cost of Solar Pumping System		
	Unit Cost	Project Share @ 80%	Farmer Share @ 20%
200	1.600	1.280	0.320
250	2.000	1.600	0.400
320	2.500	2.000	0.500

Note: The category of Solar Pumping System in feet corresponds to the hydraulic head of the system.

The power of motor and discharge of tube well is detailed in the table as under:

Head (ft)	Power of Motor (hp)	Discharge (IGPH)
200-320	10-15	5,000

The recurring expenditure after installation of the solar pumping system shall be borne by the farmer / beneficiaries. Cost for construction of water storage tank (if required) and all other costs including overhead charges shall be borne by the land owner/beneficiary of the scheme. Besides above, Solar panels, inverter and submersible pump will be under warranty with the supplier for certain period as per terms and conditions of the tender. During warranty period the supplier will bear the repair and replacement cost to be covered under warranty.

6.3.2.5 Mode of Payment:

6.3.2.5.1 Installation of Agricultural Tube Well:

Initially the cost of the installation of tube well will be borne by the farmer and upon successful completion and operation of tube well according to the approved specification, 80% share in the cost of installation of tube well will be issued in the name of the beneficiary in shape of cross cheque through Account General Khyber Pakhtunkhwa/District Account Officer after verification by the TPV Consultants.

6.3.2.5.2 Solarization of Agricultural Tube Wells:

After procurement of Solar Pumping System and its proper inspection and endorsement/verification by the TPV Consultants, 80% share will be paid to the approved firm as the project share through Accountant General Khyber Pakhtunkhwa/District Account Officer. On receipt of approval by the Director Agricultural Engineering Khyber Pakhtunkhwa regarding installation of Solar Pumping System of appropriate category on Agricultural Tube Well, remaining 20% of the total cost of Solar Pumping System will be deposited by the beneficiary in a designated PLS account of Director Agricultural Engineering Khyber Pakhtunkhwa opened for the purpose which will later be released to the approved firm by Director Agricultural Engineering Khyber Pakhtunkhwa after successful installation and operation of Solar Pumping System subject to endorsement/verification of TPV Consultants.

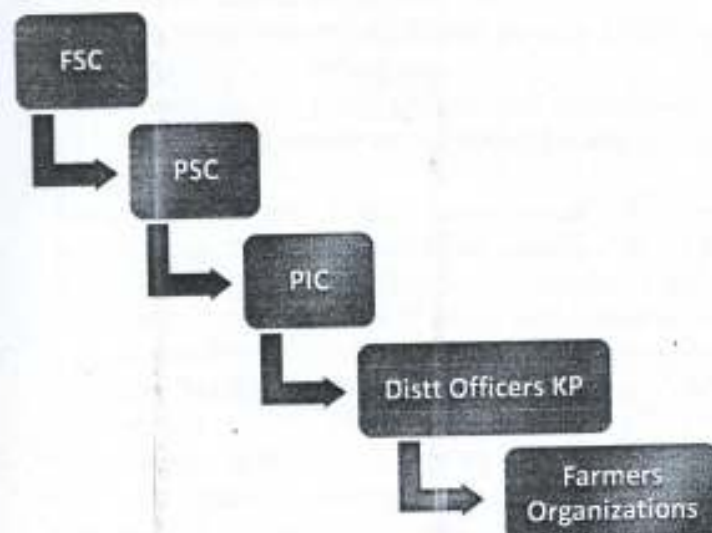
6.3.2.6 Repair and Maintenance:

Maintenance and Repair cost will be borne by the individual beneficiaries. In case of Solar Pumping System, during warranty period the supplier shall be responsible for its repair as per terms and conditions of the tender.

6.4 Project Implementation Mechanism (PIM)

The project implementation mechanism and funds flow mechanism at Federal level will follow the following step by step procedures. Provincial departments will follow the project implementation mechanism as provided in approved component PC-I.

Project Implementation Mechanism



6.5 Federal Project Management Mechanism

Project coordination and supervision activities will be carried out by the Federal Project Management Unit (FPMU) on regular basis. Concerned Departments of KP in collaboration with district government will assist the FPMU officers in holding monitoring and evaluation of physical and financial activities of the project. Monthly, quarterly and annual reports will be furnished by concerned KP departments to the FPMU. A database of all the activities will be managed at federal level in collaboration with provincial execution departments and TPV consultants.

6.6 Hiring of Consultancy Services:

- A) Project Consultant
- B) Monitoring, Evaluation, Third Party Validation and Impact Evaluation Consultant

A) Project Consultant

The services of project consultant will be hired as per TORs which would include but not limited to the following:

Requirements:

- Consultancy Firm / Individual / Joint Venture can participate in the bidding process.
- Be a legal entity registered in Pakistan and must have an office.
- Active Tax payer in Federal Board of Revenue (FBR).
- Experience in managing public sector development projects.
- Minimum 10 years of experience in project management including water/agriculture related development projects.

Proposed Terms of References (TORs):

- i. Prepare standards, parameters and specifications for all interventions (water ponds, check dams, water reservoirs, stream-bank stabilization, Gated field inlet/outlet/spillway, Terracing, Micro-watershed management, Water seepage harvesting galleries, sand dunes stabilization, tubewells and solar water pumping systems etc) under the project.

- ii. Inspect and advise on standards, specifications, and criteria for the construction materials/equipment etc.
- iii. Provide project management support services to NPC, provincial DG/Director and District Offices on need basis.
- iv. Review and validate plans, designs, cost estimates of all interventions under (i) Soil and Water conservation Component and (ii) Agricultural Engineering Component.
- v. Ensure quality and certify quantities of SWC and agri. Engineering interventions are implemented as per approved design and specifications.
- vi. Reporting to provincial DG, SWC/Director, Agri. Engg. and NPC on compliance/non-compliance of works with agreed criteria and specifications.
- vii. Submit monthly, quarterly, and annual progress reports of proposed project activities besides other periodic reports as per requirements of project management.
- viii. Development of GIS database of all the interventions, updation on weekly basis and its management. (GIS specialist in BPS-18 is being hired for the project. The updation on weekly basis and its management should be responsibility of GIS specialist)
- ix. Develop a website containing information of facilities and services, applications, procedures, watercourses, water storage tanks and Laser levelers database etc. (Maintaining website should be the responsibility of project staff)
- x. Provide technical support for the development of a custom-designed mobile application (Android) to capture on-site project progress, geo-tagged photos; should be synchronized with the central MIS/GIS database and application for instant reporting and feedback to the management. The said requirement is based on the following functional features:
 - a. *Development of a GIS database with all spatial layers related to activities being under taken under the project;*
 - b. *Give technical assistance for updation/upgradation of Water Management GIS database;*
 - c. *Development of web GIS application as a Dashboard interface for comprehensive representation of all spatial and tabular information; Custom designed web GIS application be developed for large LED screens, should be self-operative and represent project data on multiple layouts of application interface.*
 - d. *Development of a MIS application as an integral part of web GIS to maintain information on facilities and services, applications, procedures, water courses database etc.*
 - e. *Development of a custom-designed mobile application (Android) to capture on-site project progress, geo-tagged photos; should be synchronized with the central MIS/GIS database and application for instant reporting and feedback to the management*
 - f. *Application should generate custom-designed reports and analysis as per user defined requirements*
 - g. *Application should generate alerts (SMS, email, web notifications) to the user on the non-conformance of project's key performance indicators; application should have the provision to custom define Alert levels and desired notifications.*

B) Monitoring, Evaluation, Third Party Validation and Impact Evaluation Consultant

The services of Monitoring, Evaluation, Third Party Validation and Impact Evaluation Consultant will be hired as per TORs which would include but not limited to the following:

Requirements:

- Consultancy Firm / Individual / Joint Venture can participate in the bidding process.
- Be a legal entity registered in Pakistan and must have an office.
- Active Tax payer in Federal Board of Revenue (FBR).
- Experience in development of monitoring strategy, mechanism and framework.
- Developed Result Based Monitoring (RBM) of public sector development projects.
- 15 years' experience in Monitoring, Evaluation and Third-Party Validation of firm / individual (experience in monitoring of public sector development projects will be preferred).

Proposed Terms of References (TORs):

- i. Undertake baseline, midline and end line surveys of the water conservation activities in project areas.
- ii. Develop monitoring strategy, framework and Result Based Monitoring (RBM) indicators.
- iii. Validation of implementation of project activities before making final payments.
- iv. Preparation of Monthly, Quarterly and Annual Monitoring, Evaluation and Validation Reports of the project activities.
- v. Assessing the improvement in water availability due to provision of conveyance system and other interventions.
- vi. Assessing the water saving per annum due to the project interventions
- vii. Assessing the economic benefits to the agriculture in terms of changes in irrigated area, area under cultivation, crop yields, cropping pattern, cropping intensity, farm income and employment.
- viii. Assessing the extent of community mobilization, financial and administrative sustainability of Soil & Water Conservation Associations (SWCAs) and ensuring the maintenance of project interventions.
- ix. Carryout impact evaluation of the project investment on the economy and stakeholders.

The Consultants' will primarily report to the National Projects Coordinator (NPSC), Government of the Pakistan, Islamabad and will coordinate with the concerned Director General, Soil Conservation and Director Agri Engineering at provincial level for smooth execution of project activities. All records and sites will be open and available to the consultants to enable them to perform their functions. The Consultant Selection Committee (CSC) at federal level comprising of representatives from NFS&R, Finance and PD&R Divisions, Representative of concerned directorates under KP Agriculture Deptt, Dy Project Coordinator, FPMU with NPSC as Chairman will recruit the consultants in accordance with relevant PPRA rules and procedures on Quality Base Selection (QBS) basis. The entire cost of Project Consultant and TPV consultancy services will be borne by the Federal Government as per minutes of consultative meeting of stakeholders held on 12th December 2018 circulated vide No.F.1-6/2018-Tech(WM) dated 27th December 2018.

7. CAPITAL COST ESTIMATES

a) Indicate date of estimation of project cost estimates

The cost estimates of the project have been prepared during April 2019.

b) Year-wise/Component wise physical activities:

i) Soil & Water Conservation Component

S. No.	Activity*	Unit	2019-20	2020-21	2021-22	2022-23	2023-24	Total*
1.	Water Ponds	No.	800	1,050	1,050	1,050	1,050	5,000
2.	Check dams	No.	400	650	650	650	650	3,000
3.	Water Reservoir	No.	40	80	70	70	70	330
4.	Stream-bank stabilization	No.	500	500	500	500	500	2,500
5.	Gated field Inlet Outlet/ Spillway	No.	200	200	200	200	200	1,000
6.	Terracing	Acres	50	80	80	80	80	370
7.	Micro-Watershed Development	No.	35	35	0	0	0	70
8.	Water Seepage harvesting Galleries	No.	70	75	75	75	75	370
9.	Agronomic low-cost interventions	No.	100	200	200	150	150	800
10.	Sand Dunes stabilization	Acres	30	50	50	50	50	230
11.	Capacity Building	No.	100	100	100	100	100	500
TOTAL			2,325	3,020	2,975	2,925	2,925	14,170

* The list of targets is tentative and can be interchanged between the activities depending on the demand of farming community, the socio-political status and law and order condition of the area and subject to approval of FSC/PSC. The year-wise targets can be changed from one year to another depending on the release of funds.

ii) Agricultural Engineering Component Year-wise Physical Targets and Financial requirements

S.No	Activities / Interventions	Unit	Physical Targets					Total*
			2019-20	2020-21	2021-22	2022-23	2023-24	
1.	Installation of Tube Wells	No	60	60	60	60	60	300
2.	Solarization of Tube Wells	No	140	140	140	140	140	700

* The year-wise targets can be changed from one year to another depending on the release of funds and subject to approval of PSC.

Financial Requirements

Rs. in Millions

Activities / Interventions	Financial Requirements					
	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Solarization of Tube Wells	248.000	248.000	252.000	256.550	261.790	1,266.340

c) **Year-wise/Component-wise Financial Requirements**

Rs. in Million

Province	Year-1	Year-2	Year-3	Year-4	Year-5	TOTAL
KP	1,312.187	1,407.620	1,290.826	1,291.790	1,463.112	6,765.536
Beneficiary	393.133	500.233	452.483	452.371	523.681	2,321.901
FPMU	770.336	1,022.706	988.687	1,046.541	1,262.161	5,090.431
TOTAL	2,474.740	2,932.656	2,731.660	2,790.311	3,248.501	14,177.868

d) **Cost Sharing between Federal and Provincial Governments**

Cost Allocation	Details
Federal Government (100%)	<ul style="list-style-type: none"> • Project Consultant; Monitoring, Evaluation, Third Party Validation and Impact Evaluation Consultant • FPMU and Coordination activities • Mass awareness at Federal Level
Provincial Governments (100%)	<ul style="list-style-type: none"> • Supervision and administration • Transport and Equipment • Mass awareness and capacity building • Provincial PMUs
Govt. Share of Intervention Costs	<ul style="list-style-type: none"> • To be shared between Federal and Provincial Governments on 40:60 basis

8. **ANNUAL OPERATING AND MAINTENANCE COST AFTER COMPLETION OF THE PROJECT:**

The farmers/SWCA would be responsible for the operation and maintenance of the project interventions and as such there would be no recurring expenditure for these facilities on the part of government after completion of project gestation period. In case of Solar Pumping System, during warranty period the supplier shall be responsible for its repair as per terms and conditions of the tender.

9. **DEMANDS AND SUPPLY ANALYSIS:**

Not applicable

10. **FINANCIAL PLAN & MODE OF FINANCING:**

a) **Equity**

- Sponsors own resources Rs.11,855.967 Million
 - Federal government Rs. 5,090.431 Million (PSDP)
 - Provincial government Rs. 6,765.536 Million (ADP)
- Farmers/Beneficiaries Rs. 2,321.901 Million (Cash/Kind)

b) **Debt**

-

c) **Grants along with source**

-

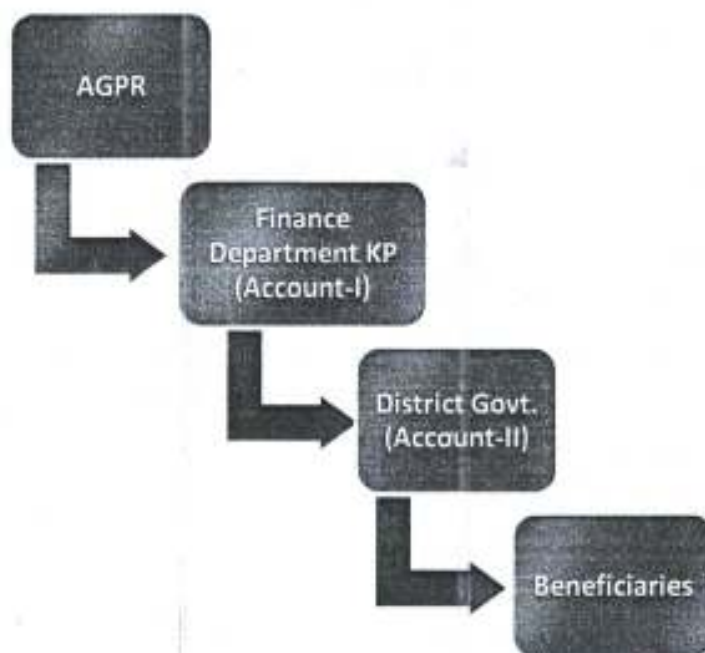
d) **Weight cost of capital**

-

Total:

Rs.14,177.868 Million

Funds Flow Mechanism



11. PROJECT BENEFITS AND ANALYSIS:

Successful completion of the proposed project would result in harvesting of water in water scarce and rain fed areas. The harvested water will be used to transform rain fed area into irrigated area. Additionally, the waste lands will be converted into productive agriculture lands which will mean a 100% increase in production. An estimated 50% water losses reduction will be observed in conveyance & application. Moreover, efficient use of available water will increase 10% crop yields.

The project shall go a long way in uplifting the socio-economic conditions of the farming community and the rural population of Khyber Pakhtunkhwa. In the long term, it will be contributing a lot towards poverty alleviation by increasing the overall agricultural yield. By installation of 300 Tube Wells and Solarization of 700 Tube Wells, about 43,225 acres of land will be brought under irrigation.

11.1 Employment generation (direct and indirect)

Trained & experienced staff for all positions is made available by the provincial government and district government setup in addition to their own duties with some incentive from the project. However operational cost will be borne from the Project funds. Due to project interventions, employment opportunities would be generated for skilled and unskilled labor either at scheme site or material yards. The instant project will generate 189,620 (Component A 164,620 + Component B 25,000) short term employment while 81,135 (Component A 59,260 + Component B 21,875) permanent employment opportunities (direct/indirect) to help in poverty alleviation in the province.

11.2 Impact on environmental

All the SWC schemes are pro-environment while both the DAE schemes are generally environment friendly as there is no involvement of heavy machinery of displacement. The soil and water conservation interventions will have a highly favorable effects on the environment which will helps in proper management of water through ponding water for agriculture, animal

and local fauna use. The indigenous flora and fauna will flourish which will favor bio-diversity of the area, improve ground water table, reduce soil erosion that will increase the life of dams and water bodies. It is expected that after completion of the project, the micro climate of the area would have very positive effects.

Agricultural Engineering Component:

Since the project is aimed at the development of water resources through installation of Tube Wells and Solarization of Tube Wells, therefore scope for vegetation and afforestation will be widened. Also the socio-economic development that would be brought forth by the project shall further result in a better awareness about the environmental protection on part of the rural population. The project is thus expected to cast positive impact, though indirectly on the environment.

11.3 Impact of delays on project cost and viability

Delay in implementation of the project will further exaggerate the erosion risk and heavy losses will occur in shape of loss of nutrient rich top-soil. The runoff water lost every year, if utilized, can contribute to a mammoth increase in agriculture production. The delay in implementation would mean loss of opportunity to store water for agriculture and associated uses. Furthermore, considering the inflation, greater amounts of money will be required to spend on similar activities with every delayed year. Productivity of land will be adversely affected and food security problem may arise. Due to unstable market situation and unprecedented price hike, a delay in the project will result in increased project cost and delayed benefits.

Agricultural Engineering Component:

Delay in implementation of the scheme will increase the project cost and if timely availability of funds is not ensured, the outputs and outcomes of the project will be adversely affected and poverty will increase.

11.4 Economic Internal Rate of Return (EIRR) & Benefit-Cost Ratio (BCR)

The IRR of 32% and cost-benefit ratio of 1:2.166 and IRR of 22% and cost-benefit ratio of 1:1.695 at 30% and 20% discount rates for the project has also been calculated, respectively.

12. IMPLEMENTATION SCHEDULE:

- i. Date of Commencement : 1st July, 2019
- ii. Date of Completion : 30th June, 2024 (Extendable)
- iii. Project Implementation Schedule is attached at Appendix-II.

b) **Result Based Monitoring Indicators:**

Soil & Water Conservation Component

S. #	Input	Output	Outcome		Targeted impact
			Baseline indicator	Target after completion of Project	
1.	Construction of 5,000 water ponds	Approximately 12,500 acres of agriculture land will be irrigated from these interventions.	2,000 water ponds	Crop production per unit area will increase by conserving runoff water/ water from perennial springs. Livestock will be increased; ultimately farmer's living standards will improve.	Approximately 12,500 acres of the land will be changed into crop fields and fruits orchids, which will increase farmer's income. More than 25,000 farmers will permanently engage in agriculture sector. These will provide short term employment to approximately 40,000 labors during the construction period of the interventions.
2.	Construction of 3,000 Check dams	Approximately 7,500 acres of the land will be reclaimed.	2,500 check dams	Approximately 7500 acres of the land will conserve; ground water table of the nearby wells will rise.	Land value of the project area will increase; more than 7,500 acres of the land will bring under cultivation. Climatic condition of the area will improve and livestock will be benefited. More than 15,000 people will permanently engage in agriculture activities in the project area. More than 24,000 labors will be provided with short term employment during the construction period of the intervention.
3.	Construction of 330 Water Reservoir	Approximately 9,900 acres of land will be irrigated from this intervention.	250 mini dams	Ground water table will be improved; farmer's income will be increased. Livestock will be benefited.	Culturable wasteland will be developed by supplying stored water. Ground water table will rise up. Fish farming, livestock and forestry will be improved. Over all livelihood of the farmer community will improve. Approximately 19,800 people will permanently engage in agriculture, livestock and fish raring etc. More than 2,640 labors will be benefited from the scheme.
4.	Construction of 2,500 Streambank stabilization	Protecting/ reclaiming about 6,250 acres of agricultural land from erosion with floods water.	15,000 stream bank stabilization structures.	Per unit area of crop production will be saved.	Approximately 6,250 acres of agriculture land will be saved directly from floods water. This will further enhance the life of precious dams and reservoirs. This may engage approximately 12,500 farmers for long time in agriculture sector. 20,000 labors will work during construction period of these intervention

5.	Construction of 1,000 Gated field Inlet Outlet/Spillway	Sufficient amount of water will be provided to about 2,500 acres of land for irrigation in rod kahi areas of the province.	1,500 field inlets and spillways.	Farmer's income will increase; fertile land degradation will be minimized.	Approximately 2,500 acres of agriculture land will be benefited directly from this intervention. Approximately 5,000 farmers will permanently engage in agriculture sector for long period of time. These interventions will provide short term employment to about 5,000 labors.
6.	Development of 370 acres land for terracing	Farmer's income will be increased by increasing agricultural land due to terraces development.	500 acres	Per unit production of farmers will increase by converting approximately 370 acres of non-culturable waste land into culturable.	Crop production will increase; land sliding will reduce due to terraces formation; rainwater infiltration will increase. Approximately 740 farmers will permanently engage in agriculture. Approximately 1,850 labors will be benefited from these interventions.
7.	Development of 70 numbers of micro-watershed areas	Approx 7,000 acres of the area will be converted into agriculture/ forest land which will improve the aesthetic value of the area.	02 micro watershed developed	Culturable wasteland will be converted into an agricultural productive land. Farmer's income will be increased through agriculture, livestock, fisheries and forestry etc.	Developing micro-watersheds will improve climatic condition of the area; floods chances will be minimize by harvesting rainwater in water harvesting interventions; land sliding and soil erosion will be minimized. Moreover, aesthetic value of the land will be improved. Approximately 14,000 people will engage in agriculture sector permanently. Approximately 14,000 labors will be directly benefited during the process of micro-watersheds development.
8.	Constructing 370 numbers of water Seepage harvesting Galleries	Approx 925 acres of land will be irrigated from this intervention.	15 water seepage galleries	More area will bring under cultivation by establishing crop fields and fruits gardens in the project area. Livestock will increase and more people will engage in agriculture sector.	Continuous supply of clean water for agriculture, livestock and human beings will be ensured. Water crises will be minimized in the project area. More than 1,850 number of people will engage in agriculture activities for long period of time. About 1,850 labors will be directly benefited during the construction process.
9.	800 numbers of Agronomic low-cost interventions	Approx 2000 acres of land will be protected from erosion by these interventions.	2000 various low cost small interventions	More area will bring under cultivation; economic condition of the local community will be improved.	Land will be protected from erosion; infiltration will be improved during rainfall; livestock will be benefited. Approximately 2400 farmers will permanently engage in agriculture. These will also provide short term employment to about 2400 labors.
10	230 acres of Sand Dunes stabilization	Approx 230 acres of sand dunes will be stabilized by growing kana plants.	200 acres Sand dunes effects stabilized.	Non-culturable sand dunes will be converted into an economically productive piece of land.	Sand dunes stabilization through plantation will be a direct source of income generation for the local community by making homemade items from the stems of the kana plants. These will also

					help in improving climatic condition of the project area. Meanwhile about 460 numbers of labor will be benefited.
11	500 Nos Capacity Building	An estimate. 500 trainings will be conducted for stakeholders including farmers and departmental staff.	2000 Capacity building trainings conducted.	Enhanced capacity for better management of soil and water resources.	Soil and water resources of the province will better be managed with better management practices. The capacity of the stake holder will be enhanced in better management of soil and water resources of the country in general and Khyber Pakhtunkhwa in particular.
Agricultural Engineering Component					
12.	Procurement and installation of 700 Solar, pumping System and 300 Tube Wells.	Irrigation of 17,500 hectares (43,225 acres) of land.	> 650 solar pumping systems installed.	Conversion of rain fed land into irrigated land will add more value to the land and the enhance production from crops/Orchard will help in improving the socio-economic condition of the farming community.	Provision of irrigation water will lead to increase Agriculture production and self-sufficiency in food grain.
13.	700 on-site training of farmers in adaptation of new techniques for pumping sub-surface water.	Irrigation water Pumping cost will be reduced by adopting solar technology.	> 2,000 trainings conducted.	The cropping intensity will be enhanced.	Farmers of the project area will be educated in the modern techniques being adopted in Agriculture and therefore, pay more attention to increase crop yield and Farm income.

SWOT ANALYSIS

Strengths:

- Well established offices in the 24 districts of the province covering activities in the whole of Khyber Pakhtunkhwa.
- Highly skilled professional and qualified field staff in the relevant technology.
- Directorate of Agricultural Engineering has got vast experience in the installation of Tube wells/Solarization of Tube Wells. Since fifties it has installed over 6,500 irrigation Tube wells and over 650 Solar Pumping systems on open wells/tube wells.
- Availability of HR institution within the department having vast experience of donor/ internationally funded projects.

Weaknesses:

- Non-existence of a proper setup/building in some of the districts;
- Low capacity of SWC/DAE staff in latest crop/water management techniques
- Old field vehicles, most of which have already spent their service life;
- The SWC/DAE staff and offices not exist in erstwhile districts of FATA. However, SNE for establishment of seven offices with required staff of erstwhile districts were sent to the government;

Opportunities:

- Enormous water harvesting opportunity in rain fed areas of the province for cultivation of timely crops with the availability of water
- Increased cropping intensity and sustained per acre yield from the irrigated land.

- c) Adaptation of new technology for improved irrigation techniques;
- d) Demonstration effect of the scheme would attract the attention of more farmers of the area to adopt the new techniques which would result in yield increase
- e) Improve the social economic position of the farming community;
- f) Motivation of farming community for participatory approach.
- g) Trainings of staff and farmers would help to acquire the knowledge and improve the skills of the farmers in practicing.

Threats:

- a) Security situation in some of the project areas may not be conducive for normal operation and may cause delay in execution of the scheme.
- b) Delay in the release of funds may cause difficulty in achieving the target in stipulated time;
- c) Natural calamities and weather condition & may affect smooth functioning of field activities;
- d) Unforeseen natural disasters, such as floods, may cause hindrance in normal field activities.

13. MANAGEMENT STRUCTURE & MANPOWER REQUIREMENTS INCLUDING SPECIALIZED SKILLS DURING EXECUTION AND OPERATIONAL PHASES

13.1 Management

The National Projects Coordinator (NPsC), who will be hired under the project National Program for Improvement of Watercourses, Phase-II, will be the overall incharge of this project as well. Required experienced manpower will be hired on contract basis for Federal Project Management Unit (FPMU) strictly for the project period only and will be paid on the rates approved by the Federal Government for project employees vide Finance Divisions OM No.F.4(9)R-14/2008 dated 19th July, 2017 as amended from time to time. The Deputy Project Coordinator (DPC) will be hired on contract basis for FPMU supported by handpicked officers both from private and government sectors. DPC, FPMU will be reporting to the NPsC. The project positions will be filled by the Recruitment Committee proposed by NPsC and approved by the Secretary, MNFS&R. The NPsC in consultation with the recruitment committee will prepare a methodology for recruitment of project staff based on the professional requirements of the project. It will include computer-based test, to be conducted by FPMU, of the candidates before its interview by the recruitment committee. The methodology will be got approved from the Secretary MNFS&R. Assets necessary for smooth execution of the project will be acquired during the first year of the project. Procured assets will be transferred to FWMC upon completion of the project. Technical Advisor/Consultant, as per TOR given in the recruitment rules given in the PC-I, will be recruited when required for assistance of NPsC in technical matters relating to the project. The NPsC, will exercise administrative and financial powers in accordance with the prescribed procedures and regulation specified in PD&R and Finance Division manuals. The overall institutional arrangement for the project management is presented in below Figure.

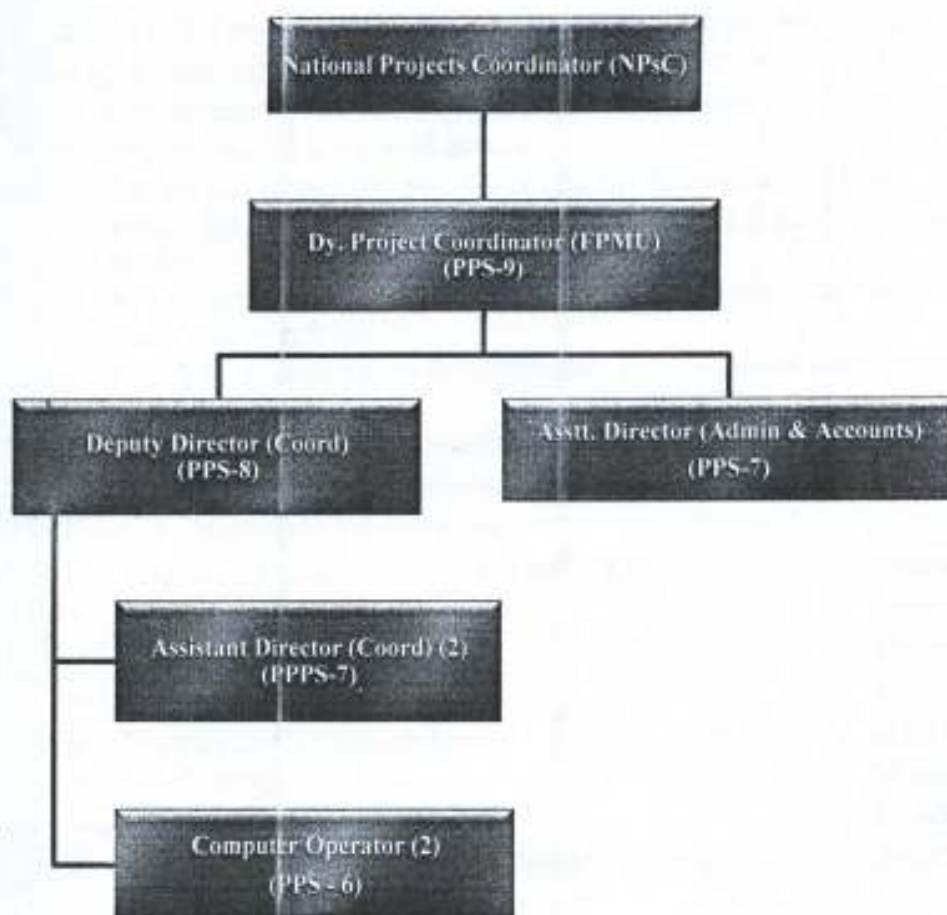


Figure: Federal Project Management Unit (FPMU)

The program's management will be governed by the following Institutional Committees.

- i. Federal Steering Committee (FSC)
- ii. Federal Coordination Committee (FCC)
- iii. Provincial Steering Committee (PSC)
- iv. Provincial Implementation Committee (PIC)

i) Federal Steering Committee (FSC)

FSC would be responsible for overall policy guidance, coordination, approval of AWP, etc. Its organization set-up would be as under:

➤ Secretary, M/o NFS&R	Chairman
➤ Member (FS&CC) &/Chief (F&A Section) and Chief (Water), PD&R Division	Members
➤ Additional Finance Secretary (Budget), Finance Division	Member
➤ Additional Chief Secretary (Dev), KP	Member
➤ Secretary Agri Deptt, KP	Member
➤ Senior Joint Secretary (Plan), NFS&R	Member
➤ Economic Consultant, NFS&R	Member
➤ Provincial DG, SWC and Director Agr Engg	Member
➤ Representative of FWMC, NFS&R	Member
➤ National Projects Coordinator, FPMU	Member/Secretary

Terms of Reference of the Federal Steering Committee will be:

- Supreme body of project at Federal Level
- Provide administrative and financial policy guidelines
- Approve annual Cash/Work Plan
- Review and approve the physical targets and financial allocations
- Revise financial allocations and intervention targets, if need be, within the approved budget
- Any other policy issue and matter presented by the provincial executing agencies for consideration and approval
- FSC to be conveyed annually/by-annually and also as and when necessary

ii) Provincial Steering Committee (PSC)

A PSC shall be constituted to provide policy guidelines, approval of AWP and budget etc.

The PSC would comprise the following members:

➤ Additional Chief Secretary (Dev) P&D, KP	Chairman
➤ Secretary Agriculture, KP	Member
➤ Secretary Finance, KP	Member
➤ Provincial Coordinator (PMU)	Member
➤ Team Leader TPV Consultants	Member
➤ NPsC, FPMU	Member
➤ Director, Agri Engineering, KP	Member
➤ Director General, SWC/Project Director, KP	Secretary/Member

The PSC will have the following mandate:

- To provide policy guidelines and approve annual work plan and budget etc.
- The PSC would be responsible for coordination, adjustment, modification & clarification within the framework of approved PC-I.
- To review and revise physical intervention targets, if needed, while remaining within overall physical targets and financial allocations
- In addition, monitoring of project implementation status at least twice a year and resolution of project implementation issues will also be the responsibility of PSC.

iii) Provincial Implementation Committee (PIC)

Two project implementation committees are proposed in the proposed PC-I.

a) Provincial Implementation Committee (PIC-I)

PIC-I would review the progress on monthly basis. All the DOs/DDs, would be the members of PIC-I. Its constitution would be as under:

➤ Director General, SWC	Chairman
➤ Project Director	Member
➤ Representative of Consultants	Member
➤ District Directors/District Officer (all districts)	Member
➤ Representative of PPMU	Member
➤ Director SWC	Secretary/Member

b) Provincial Implementation Committee (PIC-II)

PIC-II would review the progress on monthly basis. All the Agricultural/Assistant Agricultural Engineers (DDOs) of respective sub-offices would be the members of PIC-II. Its constitution would be as under:

1. Director Agricultural Engineering, KP	Chairman
2. Representative of PPMU	Member
3. Representative of Consultants	Member
4. Agril: Engr/Asstt: Agricultural Engineer (DDO all sub-offices)	Members
5. Deputy Director Planning	Member
6. Deputy Project Director (AE Component)	Member/Secretary

The Provincial Implementation Committees (both I & II) will have the following mandate

- To review the physical and financial progress.
- To ensure effective project implementation.
- To ensure arrangement of transparent internal monitoring of project activities.
- Suggest recommendations to PSC for improving the pace of the project implementation.
- To communicate the policy guide lines and approval of annual work plan and budget etc to District Implementation Committees.

13.2 Supervision

In this program, KP province is responsible for activities involving mostly the social mobilization and construction of civil works. The Federal Project Management Unit (FPMU) will act as facilitator and focal point for overall coordination and supervision activities through concerned Provincial Departments. FPMU will share periodic progress reports with Federal Water Management Cell (FWMC) and FWMC may review mid-term progress and prepare future projects based on reports and data shared by FPMU. NPsC will be responsible for carrying out Project Management activities in coordination with provincial PMUs. Data on key project indicators collected by the consultants and provincial departments will be transmitted to NPC for analysis and reporting.

13.3 Mass Awareness:

A comprehensive mass awareness program using print and electronic media will be an integral part of this proposed project. The federal and provincial governments through respective information departments will launch an intensive media and awareness campaign and expenses will be met out of fund allocated under federal and provincial components for the purpose in the project.

13.4 Training staff and officials of district administration and beneficiaries

Technical Assistance and training are integral part of project. The project is designed to fund study tours, technical assistance and training in beneficiary participation, community development and strengthening, project planning and management, financial accounting and auditing, and modern construction and contract administration techniques. The project, therefore, arranged technical assistance in areas of:

- i) Community Development/Social Organization and supporting technical services;
- ii) Project Management Cycle;
- iii) Surveys, design, and construction supervision of civil works, including the role of Engineer in contract management;
- iv) Impact evaluation studies; and services for detailed project supervision on behalf of the Government.

13.5 Provincial Project Management Unit:

The unit will carry out the same functions at provincial level as that of Federal PMU but limited to the provincial level. The provincial PMU would be responsible for smooth execution of the project components and implementation of the FSC and PSC decisions and guidelines. The Provincial PMUs will be answerable to the Federal PMU for the physical and financial progress.

14. ADDITIONAL PROJECTS/DECISIONS REQUIRED TO MAXIMIZE SOCIO-ECONOMIC BENEFITS FROM THE PROPOSED PROJECT:

- Ownership at the highest level - Prime Minister to review the progress of the project on quarterly basis
- Proactive approach of Federal, Provincial and District Governments
- Timely allocation and release of required funds.

15. **CERTIFICATES.**

Certified that the project proposal has been prepared on the basis of Instructions provided by the Planning Commission for the preparation of PC-I for production sector projects

Prepared by:



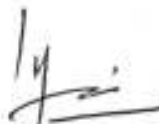
Tehmeena Iqbal
Research Officer
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Phone # 051-9245229

Checked by:



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Ministry of National Food Security & Research
Phone # 051-9245103

Approved by:



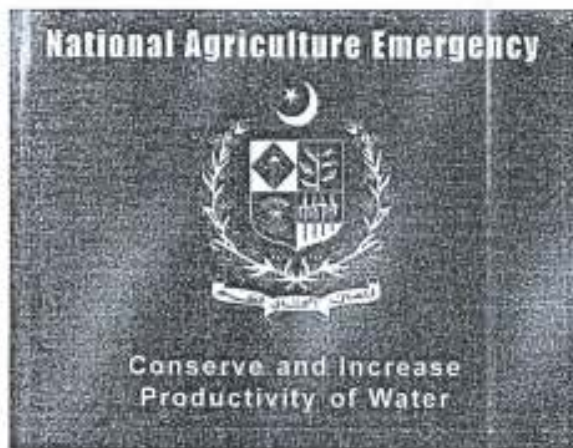
(Dr. Muhammad Hashim Popalzai)
Secretary
M/o National Food Security & Research
3rd Floor, Block B, Pak Secretariat, Islamabad
Phone #: 051-9210351

APPENDIX – I
DIRECTIVES

APPENDIX – I

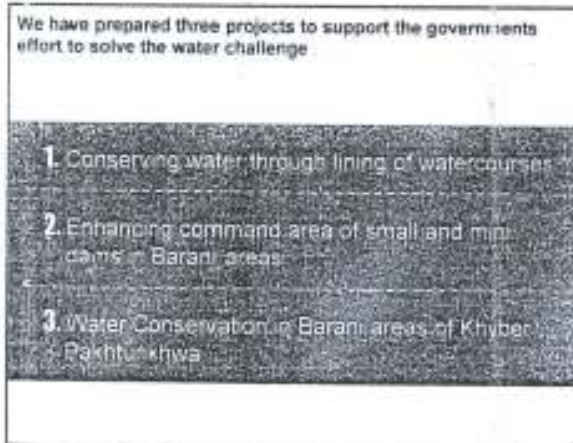
DIRECTIVES

Presentation to Prime Minister	Appendix – A
Record Note	Appendix – B
Prime Minister Summary	Appendix – C
Minutes of consultative meeting of stakeholders regarding Project on Agriculture: “Conserve and increase productivity of water”	Appendix – D



Today, we will present on the 3rd project

3 Conserve and increase productivity of water



~95% Fresh water is used in Agriculture

~40% Efficiency of water use in Agriculture

The proposed interventions are in line with both, the mandate of the government and objective of our National Water Policy

Prime Minister's 100 days agenda

- Massively expand water conservation efforts through smart interventions to reduce water losses

National Water Policy

- Reduction of 33% in 46 MAF river flows that are lost in conveyance – watercourses lining especially in saline and semi-saline area
- Increase of at least 30% in efficiency of water use by producing "more crop per drop"

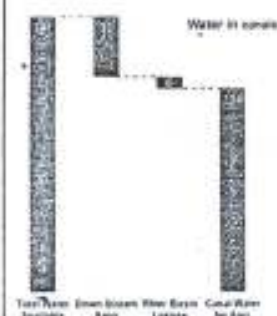
1. Conserving water through lining watercourses

2. Enhancing command area of small and mini dams in Barani areas

3. Water Conservation in Barani areas of Khyber Pakhtunkhwa

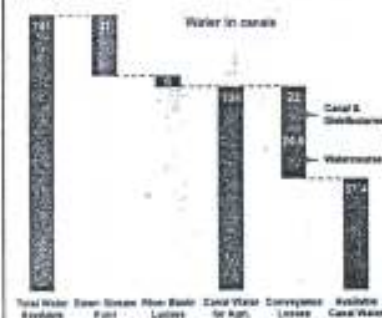
104 MAF water is available in canals for agriculture...

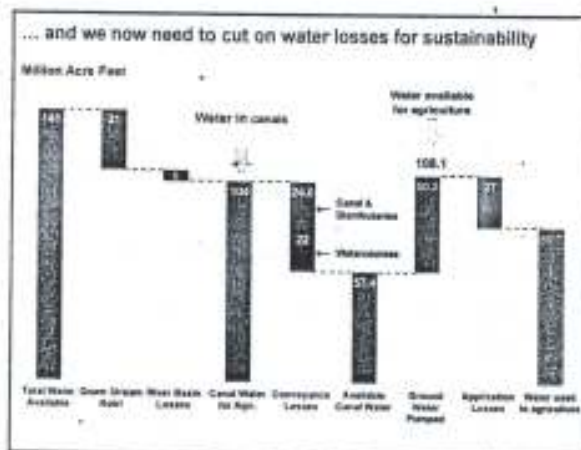
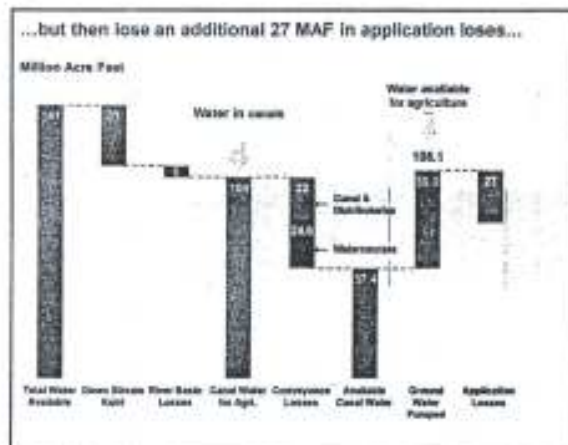
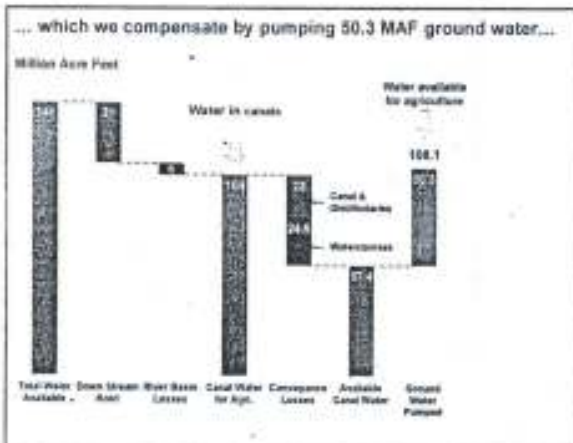
Million Acre Feet



... and we lose 46.6 MAF in conveyance losses...

Million Acre Feet





Main challenges

- Shrinking water resources (fresh water is finite)
- Inadequate storage and sedimentation of reservoirs
- High water losses in irrigation system
- Low water and land productivity
- Limiting/diminishing energy resources
 - Shortage of electricity
 - High cost of diesel

However, we have a successful intervention to refer to...

**National Program for Improvement of Watercourses
Summary of Achievements (2004-2011)**

- Successfully lined 72,787 watercourses, inclusive of 6,776 water storage tanks
- Achieved 84% of the target to line 86,903 watercourses
- Snapshot of financial

Total Cost:	Rs. 66 billion
Government	Rs. 51 billion (77%)
Provinces	Rs. 1 billion (02%)
Farmer	Rs. 14 billion (21%)

Rs. 51 billion of Rs. 66 billion (77%) allocated to the allocated Rs. 52 billion

**National Program for Improvement of Watercourses
Summary of Achievements (2004-2011)**

Punjab

Before



After



**National Program for Improvement of Watercourses
Summary of Achievements (2004-2011)**

Sindh

Before

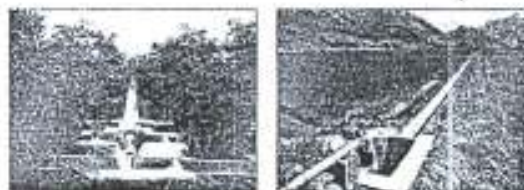


After

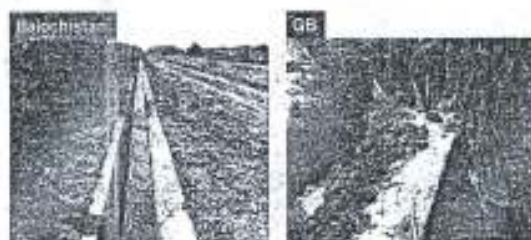


National Program for Improvement of Watercourses Summary of Achievements (2004-2011)

KPK



National Program for Improvement of Watercourses Summary of Achievements (2004-2011)



National Program for Improvement of Watercourses Summary of Achievements (2004-2011)

Administrative Unit	Physical Progress		Financial Progress	
	Targets (PC-I)	Achievement	GOP Share Allocation (PC-I)	Released
Punjab	30,000	22,205	20,588.7	15,438.3
Sindh	29,000	20,456	18,185.2	11,855.4
KP (NWFP)	10,000	12,859	8,085.1	6,064.8
Balochistan	13,485 ¹	14,618 ²	4,272.0	4,272.1
AJK, FATA & GB	2,600	2,350	1,131.7	903.7
ICT	337	249	80.3	106.5
FWMC	-	-	514.7	102.1
TOTAL	86,005	72,787	\$0,666.0	\$8,731.4

Budget allocated for watercourses: \$0.666 billion
Actual cost for watercourses: \$0.666 billion

¹ Includes 10,000 for NWFP and 3,485 for Balochistan.

² Includes 10,000 for NWFP and 4,618 for Balochistan.

National Program for Improvement of Watercourses Project Impact Evaluation Study

Consultants: M/s AABUAFISURGAAB

Average Water Savings/Annum/Watercourse	123 AF (151,504 m ³)
Aggregate Water Savings / Annum	6.82 MAF (8.41 BCM)
Average Reduction in Conveyance Losses	30%
Improvement in Equity	39.5%
Reduction in Waterlogged Area	27%
Reduction in Salinity	87%
Reduction in Litigation	91%
Reduction in Tampering	87%

Continued...

Increase in Irrigated Area	21%
Improvement in Yields	6 - 15%
Increase in Cropping Intensity	4.4%
Increase in Gross Margins	3%
Increase in Net Farm Income	14.5%
Increase in Employment	12% for casual 10% for permanent

Financial Analysis reveals that the project is financially viable and supports the investments made on such type of interventions - 31% FIRR

Economic Analysis reveals that project interventions show economic acceptability and profitability - 29% EIRR

21

Recommendations from the Impact Evaluation Study

1. Improve the on-farm irrigation practices by introducing efficient irrigation practices and technologies:
 - Land leveling
 - Bed and furrow irrigation systems
 - High Efficiency Irrigation Systems - drip & sprinkler technologies
 - Rainwater conservation
 - Irrigation scheduling
2. Improve the watercourses both by lining and katcha improvement with the additional objectives of:
 - Cluster specific water efficiency and agronomic technology implementation
 - Alignment and coordination between key stakeholders such as FOCs, Private Sector, & Government Stakeholders
 - Long term financial sustainability of Water User Associations (WUAs) and capacity building

Water perspective

- Tarbela Dam stores 6.17 MAF
- Mangla Dam stores 7.35 MAF

Dams are expensive to build but can store water!

However, the watercourse lining project saved and made available 6.82 MAF of water for farm use at a fraction of the cost (Rs. 10 billion).

Which is why we propose phase II of the watercourse lining project.

National Program for Improvement of Watercourses in Pakistan - phase II

Project objective is to replicate our success from phase I and further improve the project based on findings from study

- Social mobilization through capacity building of WUAs/ Fes
- Minimization of conveyance and field application losses
- Reduction in water logging and salinity
- Equity in water distribution
- Reduction in water disputes/theft/misgation
- Motivation/participation of farmers
- Poverty reduction through employment generation
- Increase in crops yield/sufficiency in food

Project profile

Project Title:	National Program for Improvement of Watercourses in Pakistan Phase-II
Sponsored:	GOP and Provincial Governments
Implementation:	MNF S&R / Provincial Ag Depts
Execution:	Provincial CFWM Dees. and Depts. of AJK, GB & ICT
Coverage:	All areas of Pakistan
Total Cost – 5 yrs:	Rs. 179.7 billion
Govt.	Rs. 139.3 billion (Federal & provincial governments)
Farmer	Rs. 40.3 billion
Proposed Targets:	
Watercourses:	73,078 (Inclusive of 13,675 Water Storage Tanks)
Laser leveling:	12,110 Units
Duration:	5 Years (After approval of the Project)

Proposed interventions and targets

Challenges	Details	Farmer share
Improvement of watercourses	<ul style="list-style-type: none"> • Reconstruction/renovation of watercourses which have outlived 20 years • Remaining inventory of Phase-I watercourses • Lining up to 50% of total length (reconstruction & new) 	<ul style="list-style-type: none"> • Approx. 20-30% of civil work cost
Provision of laser land leveling	<ul style="list-style-type: none"> • Subsidize 12,110 laser levelers • Government share to be capped at Rs. 250,000/- per beneficiary 	<ul style="list-style-type: none"> • 50% subsidy on equipment cost

Improvement of watercourses

Provincial Area	Watercourses (Nos.)				Laser Land Leveling (Nos.)
	OLD	NEW	Water Storage Tanks	Total	
Punjab	3,000	7,000		10,000	5,000
Sindh	7,149	5,000	2,000	14,149	5,000
KPK/FATA	3,000	10,000	5,000	18,000	600
Balochistan	3,589	16,800	5,200	25,589	1,500
AJK	0	1,000	600	1,600	5
Gilgit-Baltistan	0	2,500	825	3,325	5
ICT	0	0	250	250	0
Total	13,638	22,300	8,675	44,613	12,110

Provision of laser land levelers



Units in Operation:

Punjab	11,500
Sindh	1,713
KPK	50
Balochistan	16

Increase

We will subsidize an additional 12,100 laser levelers for all 4 provinces with emphasis on Sindh

Proposed Cost Sharing Formula

Cost allocation

Details

Project Impact Evaluation Studies (PIES)

- Project Impact Evaluation Studies (PIES)
- 3rd Party Validation Consultants
- Coordination, Monitoring & Evaluation and FPMU
- Costs of other federating units AJK, Gil and ICT

Supervision & Administration

- Supervision & Administration
- Transport & Equipment
- Mass awareness and Capacity Building
- Provincial PMUs

To be shared between Federal and Provincial governments on 40:60 basis

- To be shared between Federal and Provincial governments on 40:60 basis

Provincial Shares as per proposed formula

Province/Unit	Distribution of Govt. Share			% of Govt Share	
	Federal Govt.	Prov. Govt.	Total	Federal	Provincial
Punjab	9,740	18,499	28,239	34%	66%
Sindh	15,082	28,648	43,730	34%	66%
KPK	5,840	9,653	15,493	37%	63%
Balochistan	15,212	26,125	41,337	37%	63%
Digit Baltistan	4,072	-	4,072	100%	0%
AJK	1,660	-	1,660	100%	0%
ICT	340	-	340	100%	0%
PWMC	4,720	-	4,720	100%	0%
Total	56,686	82,925	139,611		

Overview of implementation Roadmap

Approve project from Prime Minister and through consultative process finalize financials	Nov-Dec 2018
Approve PC-1 and launch project	July 2019
Establish Federal and Provincial PMU's	July 2019
Initiate implementation of initiatives	Till June 2024

Economic Benefit

Water Saving per Watercourse per annum (AF)	123
Watercourse to be improved (Nos)	73,078
Estimated water to be saved per annum (MAF)	8.99
Estimated Economic Value per MAF under present productivity conditions (Million US\$)	400
Total economic benefit due to saved water	USD 3.5 billion
(1 US\$ = Rs. 133)	PKR 478 billion

To set perspective:

- Basha Dam planned gross capacity is 8.1 MAF, which will cost ~USD 14 billion and will take 10 years to build
- Whereas, the watercourse lining project can save and make available ~9 MAF of water for farm use
- At 10% of the cost of Basha Dam (~USD 1 billion) in ~5 years

1. Conserving water through lining watercourses**2. Enhancing command area of small and mini dams in Barani areas****3. Water Conservation in Barani areas of Khyber Pakhtunkhwa****Overview**

- The water runoff losses from cultivated rain-fed areas are about 6 MAF
- The cultivable land of 8.4 million acres exist in rain fed areas that can be brought under sustainable agriculture
- There are mini dams are 1853 and farm pond 3253 in rain fed areas

However,

- The developed command area of existing small dams is 40 % and mini dams is 20 %
- Hence, the crop intensity and crop production in command areas is extremely low

Appendix - A

Small Dams and Mini Dams Command Area in Provinces

Province	Small Dam No.	Small Dam Command Area (Acres)	Small Dam Area under Irrigation (Acres)	Mini Dam No.	Mini Dam Command Area (Acres)	Mini Dam Area under Irrigation (Acres)
Punjab	58	59,601	26,540	1,853	46,325	9,285
Sindh	81	229,689	27,560	NA	NA	NA
Balochistan	619	367,350	32,190	NA	NA	NA
KP	14	16,800	4,300	1,144	2,268	1,830
Total	772	680,420	90,590	2,997	48,613	11,095
Undeveloped area		589,825				37,514
Undeveloped command area under small dams and mini dams is 630,000 acres which needs to be developed before we construct more dams or reservoirs.						

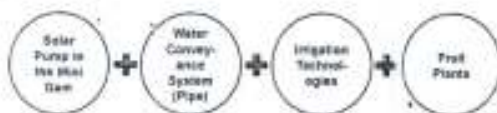
Command areas are undeveloped because...

- Unavailability of energy at farm
- Unavailability of skilled manpower
- Low land / water productivity
- Less linkages between federal and provincial research and development departments

Piloted Interventions to develop command area of Mini Dams Success Story

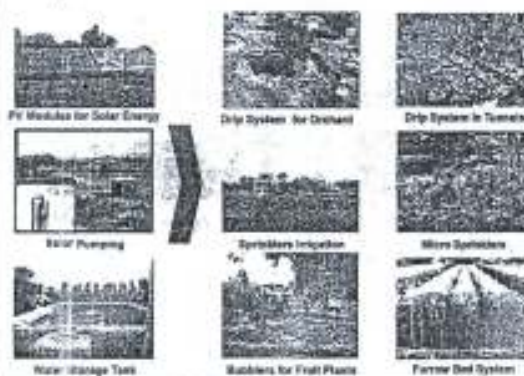
Intervention

- Pakistan Agricultural Research Council integrated solar pump with high efficient irrigation systems for horticulture and 100% development of mini dam command areas
- Agency for Barani Area Development (ABAD), Punjab piloted a project on 200 mini dams.



Such interventions need to be replicated to enhance the command areas of all existing small dams/mini dams.

Piloted Interventions to develop command area of Mini Dams Examples



Proposed scenarios of financial share of GOP and Farmers (%)

Scenario	Government (%)	Farmers (%)	Investment (Rs. Million)	Payback (Years)
1	70	30	12,628	5.412
2	80	20	14,432	3.608
3	90	10	16,236	1.804
3	90	10	16,236	1.804
4	100	0	18,040	0.0

Over 5 Yrs

Extra share (in percent):

- 65 - 35 (Watercourse lining)
- 60 - 40 (PDS in Pumps and Sinks)
- 60 - 20 (Local water pumping)
- 50 - 50 (Laser leveling)

Outcome of the project activities to develop command areas

Water structure	Water available (acre feet)	Solar energy at Farm (KW)	Crop area under irrigation (acre)
Farm pond	42,180	25,345	42,340
Small Dam	NA	NA	128,640
Dugwell	NA	1,400	1,400
Total		26,745	170,380

The project will also include:

- Water Course Development/Rehabilitation and subsidizing Laser Levelers
- Promoting Fruit Plants, Oilseed/Pulses Crops, Fodder/Forage/Range
- Research, Capacity Building and Monitoring/Impact Activities

If implemented successfully, only then should we invest in building more small and mini dams - however, we may still continue building small ponds

1. Conserving water through lining watercourses

2. Enhancing command area of small and mini dams in Barani areas

3. Water Conservation in Barani areas of Khyber Pakhtunkhwa

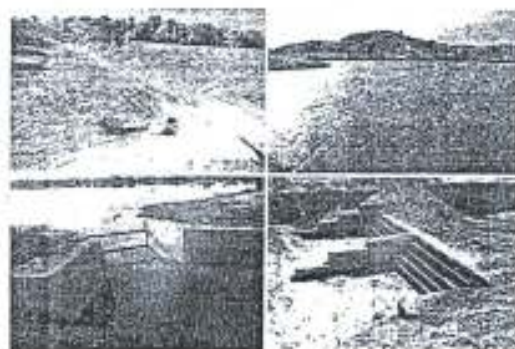
The objective of KP's water conservation effort differs as it requires small investments in infrastructure which can be implemented through the local government

Appendix - A

Check dams and Water Retaining Facility



Water Storage Reservoirs



Check dams and Water Retaining Facility



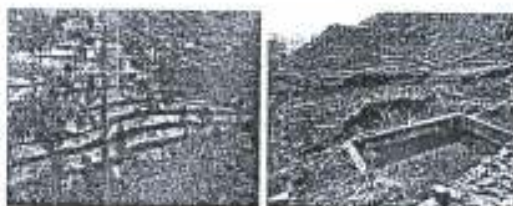
Rainwater Harvesting Structures (Earthen ponds)



Spurs



Water Pond and Terracing



Intervention set 1

Intervention	No.	Unit	Cost (PKR)
Water Ponds	No.	0.6	5000
Check Dams	No.	0.7	1000
Water Control Spillways	No.	0.2	1400
Water Retaining Facility/Retractor	No.	2	400
Drainage	Area	0.3	150
Sand Barren Stabilisation	Area	0.02	300
Streambank Stabilisation	No.	0.1	140
Capacity Building	No.	0.05	450

Total cost: ~PKR 5.5 billion over 3 yrs

Intervention set 2

Intervention	Unit	Cost (PKR)
Pipe lining/open channel flow watercourses	(km)	600
WDS-Drip & Sprinkler Irrigation System	(hect)	3000
Solarisation of water reservoirs/pond and HDS	(No.)	300
Demonstration & capacity building		

Total cost: ~PKR 2 billion over 3 yrs

Takeaways from today's presentation...

Projects	Est. cost	Impact
1. Conserving water through lining watercourses	140	<ul style="list-style-type: none"> Save and make available ~9 MAF of water for farm
2. Enhancing command area of small and mini dams in Barani areas	18	<ul style="list-style-type: none"> 26,945 Kw Solarisation 170,380 acres command area developed
3. Water Conservation in Barani areas of Khyber Pakhtunkhwa	8.4	<ul style="list-style-type: none"> 11,000+ small interventions through local govt. 237,500 MAF water saved and 61,380 acres irrigated
Total cost - 3 yrs (PKR billions)	166.4	

**MINISTRY OF NATIONAL FOOD SECURITY & RESEARCH
GOVERNMENT OF PAKISTAN**

Subject: RECORD NOTE OF THE MEETING HELD ON 31-10-2018

Prime Minister was pleased to chair a meeting on the subject "Conserve & increase productivity of water" held on 31st October, 2018 in the Prime Minister's office, Islamabad. Ministry of National Food Security & Research apprised the Prime Minister that about 95% of the available water is being used for agriculture in Pakistan with 40% of water use efficiency. About 47 MAF of the water is lost in conveyance in canals, distributaries and watercourses. Prime Minister was informed about the success story of the phase-I of the project, which was completed in 2011 and saved and made available 6.82 MAF of water for farm use at a fraction of the cost (Rs. 38 billion).

Ministry of National Food Security & Research presented three components of the project on Conserve & increase productivity of water, which are given below:

- i- Conserving water through lining of watercourses
- ii- Enhancing command area of small and mini dams in Barani areas
- iii- Water Conservation in Barani areas of Khyber Pakhtunkhwa

Total Project cost (Federal Government share) is 68.6 billion.

Honorable Prime Minister approved above projects of the Ministry of National Food Security & Research.

PRIME MINISTER'S OFFICE
ISLAMABAD

Subject: DEVELOPMENT PROJECTS IN AGRICULTURE SECTOR

6. The Prime Minister has seen and is pleased to desire that the Ministry of National Food Security & Research may initiate processing of the projects in accordance with laid down rules and procedure.



(Muhammad Azam Khan)
Secretary to the Prime Minister

26-11-2018

Secretary, Ministry of National Food Security & Research

No 2756/SPM/18

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SECRET

No F.2-6/2018-Plan
Government of Pakistan
Ministry of National Food Security & Research
<<<<>>>>

Islamabad the, 9th November, 2018

SUMMARY FOR THE PRIME MINISTER

Subject:- **DEVELOPMENT PROJECTS IN AGRICULTURE SECTOR**

The Prime Minister was pleased to take briefings from Ministry of National Food Security & Research on available potential in the areas of Water Conservation & Management, Fisheries and other major crops on 30-31, October 2018. During the briefing Prime Minister was further pleased to approve three major projects in these areas. These initiatives are summarized as under:-

- a) Conserve and increase the productivity of water.
 - i) National Program for Improvement of Watercourses in Pakistan (**Annex-I**)
 - ii) Conservation and Efficient Use of Water in Barani Areas of KP (**Annex-II**)
 - iii) Enhancing Command Area of Small and Mini Dams in Barani Area (**Annex-III**)
- b) Harness the untapped potential of Fisheries Sector.
 - i) Promotion of Trout Farming in Northern Areas of Pakistan (**Annex-IV**)
 - ii) Cage Fish Culture Cluster Development Project (**Annex-V**)
 - iii) Pilot Shrimp Farming Project (**Annex-VI**)
- c) Increase yields of major crops and boost adoption of oilseeds.
 - i) Productivity Enhancement of Wheat (**Annex-VII**)
 - ii) Productivity Enhancement of Sugarcane (**Annex-VIII**)
 - iii) Productivity Enhancement of Rice (**Annex-IX**)
 - iv) National Oilseeds Enhancement Program (**Annex-X**)

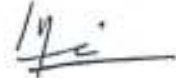
Contd....P/2,

These initiatives would supplement the efforts of the Government of Pakistan to conserve water and improve water use efficiency, tap the potential of fisheries sector and improve productivity of crops including wheat, rice, sugarcane & oilseeds. The projects would be funded from PSDP at the federal level with a major share of the provinces who will get this funding from their respective Annual Development Programme (ADP). This would enhance food security, poverty alleviation and generate employment opportunities in addition to increasing exports and reducing the import bill on agriculture products.

3. In view of above, it is proposed to allow the processing of three projects on overall development of the Agriculture Sector with an estimated cost around Rs.80 billion (spread over 3-5 years) and completion of further formalities and to secure funding from the PSDP and Provincial ADPs.

4. Approval of the Prime Minister is solicited to the proposal contained in Para 3-above.

5. The Minister for National Food Security & Research has seen and authorized submission of this Summary to the Prime Minister.



(Dr M. Hashim Popalzai)
Secretary

Secretary to the Prime Minister

Government of Pakistan
Ministry of National Food Security and Research
(Federal Water Management Cell)

<><><><><>

PROJECT PROPOSAL

Name of the Project **Conservation and Efficient Use of Water in Barani Areas of Khyber Pakhtunkhwa**

Authorities Responsible for:

- | | |
|--|--|
| i) Sponsoring | Government of Pakistan |
| ii) Coordination at Federal Level | Federal Water Management Cell (FWMC),
Ministry of National Food Security and Research
(M/o NFS&R), Islamabad |
| iii) Execution at Provincial Level | Provincial Department of Agriculture, Livestock
and Cooperation through Directorates of Soil and
Water Conservation, OFWM and Local
Governments, and Water Users Associations
(WUAs) |
| iv) Supervision & Consultancy | M/o NFS&R through FWMC |
| v) Monitoring & Evaluation and
overall Coordination | M/o NFS&R through FWMC and Provincial PMU |
| vi) Operation and Maintenance | Farmers / Beneficiaries |

Time Required for Completion: Five (05) Years

Location of the Project: Rainfed Areas of Khyber Pakhtunkhwa

Capital Cost of the Project:

a) Government Share	Rs.8.7 Billion
b) Farmers' Contribution	<u>Rs. 1.9Billion</u>
Grand Total (a + b)	Rs.10.6Billion

Objectives of the Project:

- To contain soil erosion and degradation through soil conservation activities
- Safe disposal of rain water.
- Inland diversion of flood water for maximum benefits from flood water.
- Harvesting run off/perennial water for ground water recharge, lifesaving
- To increase agriculture production through better soil and land management practices irrigation, livestock and associated uses

Proposed Cost Sharing:

Federal and provincial government shares will be decided in consultation with the provincial governments.

Institutional and Funds Flow Arrangements:

Institutional and funds flows arrangements shall be the same as is to be adopted in Phase-II of NPIWC.

Proposed Physical Targets and Financial Requirements – Intervention-I

S. No.	Activity	Unit	Physical Targets	Unit Cost (Rs. Million)	Total Cost (Rs. Million)
1	Water Ponds	No.	5000	0.6	3000.000
2	Check Dams	No.	3000	0.7	2100.000
3	Inlet Outlet Spillway	No.	1400	0.2	280.000
4	Water Retaining Facility/Reservoir	No.	450	2	900.000
5	Terracing	Acres.	450	0.3	135.000
6	Sand Dunes stabilization	Acres.	220	0.02	4.400
7	Streambank stabilization	No.	500	0.3	150.000
8	Capacity Building	No.	450	0.05	22.500
9	Contingency Cost	lump sum			180.000
10	Physical Assets	lump sum			76.200
	Sub-Total-1				6848.100
11	Cost of Third party validation and impact evaluation study (@ of 3%).				205.443
	Sub-Total-2				7053.543
12	20% farmers" share of the project				1487.663
	Total Project Cost				8541.206

Proposed Physical Targets and Financial Requirements – Intervention-II

#	Activities	Unit	Physical Targets	Unit Cost (Rs. Million)	Total Cost (Rs. Million)
1	Pipe Lining/Open channel flow watercourses of water reservoir/ponds/springs other than ground water etc	No	600	0.065	390.000
2	HEIS-Drip & Sprinkler irrigation System	Acres	3000	0.200	600.000
3	Solarization of water reservoirs/pond and HEIS in rainfed area	Nos	300	2.000	600.000
Sub-Total (interventions cost)					1590.000
4	Demonstration & capacity building			LS	40.000
5	Operational charges			LS	40.750
Total Project Share					1670.750
Farmers Share (20 %) on interventions cost only					397.500
Grand Total Cost					2068.250

Expected Outcomes:

#	Name of Intervention	No. of Intervention for five years	Average water Storage per Intervention (ac-ft)	Total Water Storage (ac-ft)	Culturable Command Area Reclamation/Conservation/Irrigation per Intervention Acres	Total Culturable Command Area reclamation/conservation/Irrigation Acres
1	Water Ponds	5000	10	50000	5	25000
2	Check Dams	3000	40	120000	1	3000
3	Inlet Outlet Spillway	1400	0	0	6	8400
4	Water Retaining Facility/Reservoir	450	150	67500	50	22500
5	Terracing	450	0	0	2	900
6	Sand Dunes stabilization	220	0	0	1.5	330
7	Streambank stabilization (protection bunds/diversion structure/spurs)	500	0	0	2.5	1250
Grand Total		11020	200	237500	68	61380

Proposed Implementation Roadmap:

- Approve project from Prime Minister and formulation of PC-I through consultative process
- Approve PC-I and launch project
- Establish Federal and Provincial PMU's
- Engagement of 3rd party consultants
- Initiate implementation of initiatives

Nov 2018 - Jan 2019
Feb - July 2019
July - Sept 2019
July - Sept 2019
Sept 2019 - June 2024

X _____ X

Most Immediate



Ph: 051-9245105
Fax: 051-9245102

No. F.1-6/2018-Tech (WM)
Government of Pakistan
Ministry of National Food Security & Research
(Federal Water Management Cell)

69-East (1st Floor), Adeel Plaza, Blue Area
Islamabad, the 27th December, 2018

- | | |
|---|---|
| 1. The Secretary,
Agriculture Department,
Government of Punjab,
Lahore | 2. The Secretary,
Planning & Development Department,
Government of Punjab, Lahore |
| 3. The Secretary,
Agriculture Department,
Government of KPK, Peshawar | 4. The Secretary,
Agriculture Department,
Government of Sindh,
Karachi |
| 5. The Secretary,
Agriculture Department,
Government of Balochistan,
Quetta | 6. The Secretary,
Agriculture Department,
Government of AJK,
Muzaffarabad |
| 7. The Chief Commissioner,
Islamabad Capital Territory (ICT),
Islamabad | 8. The Secretary,
Agriculture Department,
Gilgit-Baltistan, Gilgit |
| 9. The Chairman,
Pakistan Agricultural Research
Council, Islamabad
Islamabad | |

Subject: MINUTES OF CONSULTATIVE MEETING OF STAKEHOLDERS REGARDING
DEVELOPMENT PROJECTS ON AGRICULTURE: "CONSERVE AND INCREASE
PRODUCTIVITY OF WATER"

A consultative meeting of stakeholders regarding Development Projects on Agriculture "Conserve and Increase Productivity of Water" was held under the Chairmanship of Secretary, Ministry of National Food Security and Research on 12th December, 2018 at 1130 hours in the Committee Room of Ministry of NFS&R. The minutes of the meeting are enclosed herewith for further necessary action in the matter, please.

Encls: As above

(Ali Raza Naqvi)

Asstt: W. M. Engineer (Admn)

Copy for information and similar action to:-

1. The Director General (OFWM), Agriculture Department, Government of Punjab, 21-Sir Agha Khan Soyyam Road, Lahore.
2. The Director General, Agriculture Barani Area Development (ABAD), Rawalpindi.
3. The Director General (AE&WM), Directorate General (Agriculture Engineering and Water Management, Agriculture Department, Government of Sindh, Shahbaz Building, Block-C, 2nd Floor, Hyderabad.
4. The Director General, Directorate of On-Farm Water Management (OFWM), Agriculture Department, Government of Khyber Pakhtunkhwa, 19-Jamrud Road, Opposite Islamic College Campus, Peshawar.
5. The Director General, Soil and Water Conservation, Government of Khyber Pakhtunkhwa, Peshawar.
6. The Director General Agriculture (On Farm Water Management), Agriculture Department, Government of Balochistan, Saryyab Road, Rani Bagh, Quetta.
7. The Director General, Irrigation and Small Dams, Government of AJK, Muzaffarabad.
8. The Director (AES), Office of the Chief Commissioner, Islamabad Capital Territory (ICT), Islamabad.
9. The Director, On Farm Water Management (OFWM), Government of Gilgit-Baltistan, Gilgit.
10. The Director (CEWRI), National Agricultural Research Centre (NARC), Islamabad.

Asstt: W. M. Engineer (Admn)

Copy to:-

1. SPS to the Secretary, Ministry of National Food Security and Research, Government of Pakistan, Islamabad
2. P. S to the Additional Secretary, Ministry of National Food Security and Research, Government of Pakistan, Islamabad
3. A. P. S to the Senior Joint Secretary, Ministry of National Food Security and Research, Government of Pakistan, Islamabad

Asstt: W. M. Engineer (Admn)

27/12/18

Government of Pakistan
Ministry of National Food Security and Research
(Federal Water Management Cell)

Subject: MINUTES OF CONSULTATIVE MEETING OF STAKEHOLDERS
REGARDING DEVELOPMENT PROJECTS ON AGRICULTURE:
"CONSERVE AND INCREASE PRODUCTIVITY OF WATER"

A consultative meeting of the all the provincial and federating units stakeholders regarding development projects on agriculture - "Conserve and Improve Productivity of Water" was held under the Chairmanship of the Secretary, Ministry of National Food Security and Research (MNFS&R) on 12th December, 2018 in the Committee Room of the Ministry, Islamabad. The list of participants is annexed as 'Annexure-A'.

2. The meeting started with the recitation from the Holy Quran. The Chair, after introduction of the participants told that Task Force on Agriculture, in consultation with all Federal and Provincial stakeholders, finalized a presentation on "conserve and improve productivity of water" for the Prime Minister of Pakistan. The Prime Minister was pleased to receive the presentation on 31st October, 2018. In pursuance of the decisions taken during the briefing, M/o NFS&R moved a Summary for the Prime Minister soliciting approval for completion of formalities for approved initiatives. Whereon, the Prime Minister was pleased to desire that M/o NFS&R may initiate processing of the following projects in accordance with laid down rules and procedures:

- i) Conserving water through lining of watercourses
- ii) Enhancing command area of small and mini dams in Barani areas
- iii) Water Conservation in Barani areas of Khyber Pakhtunkhwa

3. The Chair indicated further that the PM's Office will soon be monitoring implementation status of Task Force recommendations and therefore, urged the participating provinces/units to proceed quickly with preparation and approval of component PC-Is so that timelines for launch of the projects are adhered to. The Chair informed the meeting that the Ministry will apprise the Chief Secretaries, Chairman, P&D, ACS (Dev) and respective departmental Secretaries of participating Provinces/Federating Units regarding decisions taken by the PM for launch of the projects to address the issues of crop productivity, water conservation and

productivity, fisheries and livestock at national level, in coordination with the provincial governments. during financial year 2019-20 Thereafter, the Chair invited Director General FWMC for a presentation about the approved initiatives. Mr. Muhammad Tahir Anwar, DG (FWMC) made a detailed presentation on the following projects:

- i) National Program for Improvement of Watercourses in Pakistan - Phase-II
- ii) National Program for Enhancing Command Area of Small and Mini Dams in Barani Areas of Pakistan
- iii) Water Conservation in Barani areas of Khyber Pakhtunkhwa

4. After threadbare discussion and suggestions from the participants, following consensus decisions were taken:

- i) **National Program for Improvement of Watercourses in Pakistan, Phase-II**
 - a) FWMC in consultation with the stakeholders will devise a uniform criteria for selection of 20 years old watercourses that outlived for reconstruction/renovation;
 - b) Use of PCPL structures will be given preference for improvement of watercourses. However, the participating stakeholders shall identify other site specific types of lining for improvement of watercourses and water storage tanks and reflect these in their respective component PC-Is;
 - c) The physical targets for improvement of watercourses and provision of laser land leveler of each province and federating units are given are under:

Province/ Area	Watercourses (Nos.)			Total	Laser Land Levelers (Nos)
	OLD 20 Years Old W/cs	NEW Water courses	Water Storage Tanks		
Punjab	3,000	7,000	-	10,000	5,000
Sindh	7,149	5,000	2,000	14,149	5,000
KPK/FATA	3,000	10,000	5,000	18,000	600
Balochistan	3,589	16,800	5,200	25,589	1,500
AJK	0	1,165	600	1,765	5
Gilgit- Baltistan	0	2,500	825	3,325	5
ICT	0	0	250	250	0
Total	16,738	42,465	13,875	73,078	12,110

- d) Punjab Government may consider inclusion of water storage tanks in the project at this stage;

- e) Following cost sharing formula shall be used for preparation of component PC-Is by the provinces and federating units:

Cost Allocation	Details
Federal Government	<ul style="list-style-type: none"> Project impact evaluation studies (PIES) 3rd party validation consultants Coordination, monitoring, evaluation & FPMU Costs of federating units AJK, GB & ICT
Provincial Governments	<ul style="list-style-type: none"> Supervision and administration Transport and Equipment Mass awareness and capacity building Provincial PMUs
Intervention Costs (Government Share)	<ul style="list-style-type: none"> To be shared between Federal and Provincial Governments on 40:60 basis

- f) The aforementioned cost sharing formula will be used for cost calculations of the projects given at S.No.ii & iii hereafter;
- g) The province/federating unit-wise financial requirements and cost sharing (government share only) of the project is given as under:

Million Rs.

Province/Unit	Distribution of Govt. Share			% of Govt Share	
	Federal Govt	Prov. Govt	Total	Federal	Provincial
Punjab	9,740	18,499	28,239	34%	66%
Sindh	15,082	28,648	43,730	34%	66%
KPK	5,640	9,653	15,293	37%	63%
Balochistan	15,212	26,125	41,337	37%	63%
Gilgit Baltistan	4,072	-	4,072	100%	0%
AJK	1,660	-	1,660	100%	0%
ICT	340	-	340	100%	0%
FWMC	4,720	-	4,720	100%	0%
Total	56,466	82,925	139,391		

- h) Institutional and Financial arrangements as adopted for implementation of NPIWC Phase-I will be used for Phase-II;
- i) Following provincial departments will be responsible for preparation of component PC-I and submission, after approval from respective Development Working Parties, to FWMC for further processing:

Province/Unit	Department
Punjab	On Farm Water Management Dte, Agriculture Department
Sindh	Agriculture Engineering & Water Management Dte., Agriculture Department
Balochistan	On Farm Water Management Dte., Agriculture Department
KP	On Farm Water Management Dte., Agriculture Department
GB	Water Management, Agriculture Department
AJK	Agriculture Department
ICT	AES, Chief Commissioner Office

- j) Re-plantation of trees chopped during alignment of watercourses shall be ensure under the project by the executing agencies to protect the environment.

ii) **National Program for Enhancing Command Area of Small and Mini Dams in Barani Areas of Pakistan**

- a) Physical targets of various interventions under the project are as under:

Intervention	Unit	Quantity
Farm Pond	Nos.	3,625
Solar Pumping System for Farm Pond (5 HP)	Nos	700
Dug Well Development/ Rehabilitation	Nos	5,134
Solar Pumping System Dug Wells (2 HP)	Nos	700
Watercourses Development/ Rehabilitation (Precast)	Nos	848
Laser Levelling Units	Nos	200
Fruit Plants'	Acres	45,500
Oilseed/Pulses Crops	Acres	112,500
Fodder/Forage/Range	Acres	84,030

- b) The criteria for interventions' quota sharing shall be based on the percentage of command area of small and mini dams, reported by the provinces earlier, and is given as under:

Province/ Agency	Command Area- Small & Mini Dams (Acres)	%age
Punjab	112,926	15%
Sindh	229,669	31%
Balochistan	367,350	49%
KP	33,650	5%
AJK	-	-
GB	-	-
ICT	-	-
Total	743,595	100%

- c) Share of interventions' have not been allocated to AJK, GB and ICT earlier. It has been therefore, decided that AJK, GB and ICT will share proposed physical targets against each intervention which are to be undertaken with FWMC within a week. The final allocation of intervention targets to the provinces and federating units will be shared with all the stakeholders by FWMC till end December, 2018.
- d) Following provincial departments will be responsible for preparation of PC-I and submission, after approval from respective Development Working Parties, to FWMC for further processing:

Province/Unit	Department
Punjab	Agency for Barani Area Development (ABAD), P&D Department in consultation with Soil and Water Conservation Dept., OFWM Dte., Irrigation and Revenue Departments
Sindh	Agriculture Engineering & Water Management Dte. , Agriculture Department in consultation with Revenue and Irrigation Departments
Balochistan	On Farm Water Management Dte. , Agriculture Department, in consultation with Revenue and Irrigation Departments
KP	On Farm Water Management Dte. , Agriculture Department in consultation with Soil Conservation Dte. and Revenue and Irrigation Departments
GB	Water Management , Agriculture Department
AJK	Agriculture Department
ICT	AES , Chief Commissioner Office

iii) Water Conservation in Barani Areas of Khyber Pakhtunkhwa

- a) Physical targets and financial requirements are given as under:

Interventions/Activities - I	Unit	Physical Targets	Financial Requirements (Million Rs.)
Water Ponds	No.	3,000	3,000
Check Dams	No.	3,000	2,100
Inlet Outlet Spillway	No.	1,400	280
Water Retaining Facility/Reservoir	No.	450	900
Terracing	Acres	450	135
Sand Dunes stabilization	Acres	220	5
Stream bank stabilization	No.	500	150
Capacity Building	No.	450	23
Contingency Cost	lump sum		180
Physical Assets	lump sum		76
Total (Base Cost)			6,848
Third Party Validation Consultants and Impact Evaluation Study (@3% of base Cost)			205
Total Cost (Government Share)			7,054
Farmers' Share (20% of intervention cost)			1,485
Total Cost (Intervention-I)			8,541

Interventions/Activities - II	Physical Targets	Financial Requirements (Million Rs.)
Pipe Lining/Open channel flow watercourses of water reservoir/ponds/springs other than ground water etc (Nos)	600	390
HEIS-Drip & sprinkler irrigation System (Acres)	3,000	600
Solarization of water reservoirs/pond and HEIS in rainfed area (Nos)	300	600
Sub-Total (Interventions cost)		1,590
Demonstration & capacity building	15	40
Operational charges	15	41
Total Cost (Government Share)		1,671
Farmers Share (20 %) on interventions cost only		398
Total Cost (Intervention-II)		2,068
Total Project Cost (Intervention Cost-I + Intervention Cost-II)		10,609

- b) Soil and Water Conservation Dte. in consultation with OFWM Dte, KP will be responsible for preparation and submission of PC-I, after approval of competent forum, to FWMC for further processing.

5.

Miscellaneous Decisions:

- i) Following timelines shall be observed for preparation of component PC-Is and approval; finalization and approval of umbrella PC-Is and launch of the projects:

Activities	Timeline
Formulation, Approval of component PC-Is by respective Development Working Parties and submission to FWMC	End Jan 2019
Finalization of Umbrella PC-Is by FWMC and submission to the competent forum for approval	End February 2019
Approval of Umbrella PC-Is	By June 2019
Launching of projects	July 2019
Establishment of Federal and Provincial PMUs	July – Sept 2019
Project Implementation	Sept 2019 to June 2024

- ii) In order to have meaningful Impact Evaluation Studies of the projects, it has been decided that the field teams will gather baseline data where intervention(s) will be implemented;
- iii) Only one Project Management Unit at Federal level will be established for monitoring of all water conservation related projects to be launched under National Agriculture Emergency.
- iv) Executing agencies shall ensure that the interventions of various projects shall not be duplicated.
- v) AJK, GB and ICT components shall rationalize Supervision & Administration and Transport & Equipment costs in consultation with FWMC and in light of austerity measures.
- vi) The meeting to review the progress in the matter will be convened during first week of January 2019. The provincial governments and federating units may however, approach the Ministry in case of any issues arisen during processing of PC-Is for redressal at an appropriate level by the Ministry.
- vii) It has been suggested that Provincial Governments of Balochistan and Sindh may establish Soil & Water Conservation Directorates for development of Barani Areas in their respective provinces.

The meeting ended with vote of thanks from and to the Chair.

Annexure-"A"List of Participants

**CONSULTATIVE MEETING OF STAKEHOLDERS REGARDING DEVELOPMENT
PROJECTS ON AGRICULTURE HELD ON 12TH DECEMBER, 2018 AT 1130
HOURS IN THE COMMITTEE ROOM OF MINISTRY OF NATIONAL FOOD
SECURITY AND RESEARCH, ISLAMABAD**

Sr. #	Name	Designation	Organization
1.	Dr. Muhammad Hashim Populzai	Secretary	M/o NFS&R, Islamabad
2.	Mr. Muhammad Tahir Anwar	Director General	FWMC, Islamabad
3.	Mr. Tahir M. Qureshi	Deputy Secretary (P)	M/o NFS&R, Islamabad
4.	Dr. Munir Ahmed	Member (NRD)	PARC, Islamabad
5.	Dr. Muhammad Munir Ahmed	Director	CEWRI-NARC, Islamabad
6.	Engr. Muhammad Zubair	S.P.O PMU,	Secretary Agriculture Office, Punjab
7.	Dr. Muhammad Kamran	Chief	ABAD, P & D Punjab
8.	Hafiz Qaiser Yasin	Director (OFWM)	OFWM Punjab
9.	Mr. Muhammad Waris	Dy. Director (OFWM)	OFWM Punjab
10.	Sheikh Shakil Ahmed	Additional Secretary	Agriculture Department Government of Sindh
11.	Mr. Shakeel Ahmed Rahemoun	Director	Agri. Deptt. Sindh
12.	Mr. Abdul Wahab	Director	OFWM, Balochistan
13.	Engr. Muhammad Khurshid	Director General	Water Management KPK
14.	Mr. Zahoor Ahmed Khattak	Director General	Agriculture KPK, Soil & Water Conservation
15.	Engr. Behram Jan	Director (Planning)	OFWM KPK
16.	Mr. Farman Ullah Khan	Deputy Director	Soil & Water Conservation KPK
17.	Engr. Muhammad Asif	Deputy Director (Planning)	OFWM KPK
18.	Engr. Abdul Khan	Assistant Director (Planning)	Soil and Water Conservation, KPK
19.	Mr. Ghulam Akbar	Director	Soil Conservation, Punjab
20.	Mr. Basharat Hussain Durrani	Director	Irrigation & Small Dams AJK
21.	Mr. Ghufuran Shahzad	Deputy Director (Dev)	ICTA, Islamabad
22.	Mr. Ishtiaq Ahmed	Water Management Officer	ICTA, Islamabad
23.	Mr. Ali Raza Naqvi	Asstt. W. M. Engineer	FWM, Islamabad
24.	Mr. Asif Masood Malik	Computer Coordinator	FWMC, Islamabad

APPENDIX-II

SUMMARY OF PROJECT COSTS

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

PHASING OF FINANCIAL REQUIREMENTS

MAIN SUMMARY OF PROJECT COST

Items	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total Cost
Supervision and Administration	173.379	167.711	169.884	173.631	175.702	860.306
Transport & Equipment	211.625	2,200	2,420	2,662	2,928	221,835
Mass Awareness Programme/Capacity Building	1,500	1,500	1,500	1,500	1,500	7,500
Intervention Costs including Farmer's share	2,018.315	2,611.415	2,367.665	2,365.853	2,722.403	12,085,651
Project Consultants and Monitoring, Evaluation & TPV/Impact Evaluation Consultant and Specialist/Advisory Consultant	48.755	63.335	57.455	57.404	65.962	292,913
Total Base Cost (A)	2,453.574	2,846.161	2,598.924	2,601.051	2,968.495	13,468,205
Physical & Financial Contingencies (B)	22.083	84.398	133.072	189.652	280.459	709,664
Total Project Cost (A+B)	2,475.657	2,930.559	2,731.996	2,790.702	3,248.954	14,177,868
GOP Share	770.336	1,022.706	988.687	1,046.541	1,262.161	5,090,431
Provincial Government Share (KP)	1,312.187	1,407.620	1,290.826	1,291.790	1,463.112	6,765,536
Farmer's/Beneficiary Share	393.133	500.233	452.483	452.371	523.681	2,321,901
Grand Total (GOP + Provincial Government + Farmer's Share)	2,475.657	2,930.559	2,731.996	2,790.702	3,248.954	14,177,868

(Million Rs.)

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

PHASING OF FINANCIAL REQUIREMENTS

Details of Project Financing

Items	GO Share	Provincial Share	Farmers Share	Total Cost
Supervision and Administration	146,110	714,196	-	860,306
Transport & Equipment	28,745	193,090	-	221,835
Mass Awareness Programme/Capacity Building	7,500	-	-	7,500
Intervention Cost including Farmer's share	3,905,500	5,858,250	2,321,901	12,085,651
Project Consultant; Monitoring, Evaluation & TPV/Impact Evaluation Consultant; and Specialist/Advisory Consultant	292,913	-	-	292,913
Total Base Cost (A)	4,380,768	6,765,536	2,321,901	13,468,205
Physical & Financial Contingencies (B)	709,664	-	-	709,664
Total Project Cost (A+B)	5,090,431	6,765,536	2,321,901	14,177,868

(Million Rs.)

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

Phasing of Financial Requirements

Component-wise Cost with %age (Excluding Contingencies)

(Million Rs.)

Items	Total	%age of Total
Supervision and Administration	860.306	6.39
Transport & Equipment	221.835	1.65
Mass Awareness Programme/Capacity Building	7.500	0.06
Intervention Cost including Farmer's share	12,085.651	89.76
Project Consultant, Monitoring, Evaluation & TPV/Impact Evaluation Consultant, and Specialist/Advisory Consultant	292.913	2.18
Total Cost	13,468.205	100

SUMMARY

(Million Rupees)

(Million Rupees)

(Million Rupees)

(Million Rupees)

(Million Rupees)

IMPLEMENTATION SCHEDULE

S.No	Activity	Year-1					Year-2	Year-3	Year-4	Year-5
		Each Cell Shows Time Lapse of 20 Days					Each Cell Shows Time Lapse of 4 Months			
1	Preparatory arrangements									
2	Advertisement for selection of National Projects Coordinator									
3	Selection of NPC									
4	Advertisement for hiring of office building									
5	Hiring of office building									
7	Advertisement for selection of Project Staff									
8	Hiring of Project Staff									
9	Preparation of ToRs for TPV & PIES Consultants									
10	Advertisement for hiring TPV & PIES Consultant									
11	Hiring of Third Party Validation & PIES Consultant									
12	Advertisement for purchase of vehicles									
13	Purchase of vehicles									
14	Advertisement for purchase of equipment									
15	Purchase of equipment									
16	Provincial staff Engagements (By respective Prov. Directorates)									
17	Preparatory arrangements for implementation of interventions									
18	BLD, Lining, TPV & GPS of Interventions									
21	Project Impact Evaluation Study (PIES)									
22	Preparation of Provincial PC-IVs									
23	Preparation of Federal PC-IV									
24	Winding-up of project									

BLD = Base Line Data Collection TPV = Third Party Validation Consultants

GPS = Global Positioning System (Digitization of Coordinates of Watercourses)

APPENDIX-III

COMPONENT COSTS

Annex-I FPMU

Annex-II SWC KPK

Annex-III Agri Engg. KPK

ANNEX-I

FEDERAL PROJECT MANAGEMENT UNIT, FWMC

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

SUMMARY

(Federal Project Management Unit Component)

(Million Rupees)

S. No.	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Administration, Coordination at Federal Level	29.391	26.800	28.167	29.930	31.823	146.110
2	Transport & Equipment	18.535	2.200	2.420	2.662	2.928	28.745
3	Mass Awareness Programme/ Training	1.500	1.500	1.500	1.500	1.500	7.500
4	Consultancy Services Project Consultants and Monitoring, Evaluation & TPV/Impact Evaluation Consultant and Specialist/Advisory Consultant	48.755	63.335	57.455	57.404	65.962	292.913
5	Federal Share (40% of Intervention cost)	650.073	844.473	766.073	765.393	879.489	3,905.500
	Sub-Total	748.254	938.308	856.615	856.889	981.702	4,380.768
6	Physical & Price Contingencies	22.063	84.398	133.072	189.652	260.469	705.664
	Total	770.336	1,022.706	988.687	1,046.541	1,262.161	5,090.431

Federal Project Management Unit (FPMU)

ITEMS	Unit	Quantity	PPS	Unit Price Rs.	Year 1 Million Rs	Year 2 Million Rs	Year 3 Million Rs	Year 4 Million Rs	Year 5 Million Rs	Total
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Administration, Coordination at Federal Level

A. ESTABLISHMENT

1. PAY OF OFFICERS

Deputy Project Coordinator	No.	1	9	175,000	2,100	2,205	2,310	2,415	2,520	11,550
Deputy Director (Coord)	No.	1	8	125,000	1,500	1,575	1,650	1,725	1,800	8,250
Assistant Director (Coord)	No.	2	7	90,000	2,160	2,268	2,376	2,484	2,592	11,880
Assistant Director (Admin & Accounts)	No.	1	7	90,000	1,080	1,134	1,188	1,242	1,296	5,940
Sub-Total		5		480,000	6,840	7,182	7,524	7,866	8,208	37,620

II. PAY OF STAFF

Assistant	No.	2	6	60,000	1,440	1,512	1,584	1,656	1,728	7,920
Computer operator	No.	2	6	60,000	1,440	1,512	1,584	1,656	1,728	7,920
Driver	No.	3	2	20,000	0,720	0,756	0,792	0,828	0,864	3,960
Dispatch Rider	No.	1	1	16,000	0,192	0,202	0,211	0,221	0,230	1,056
Office Boy	No.	3	1	16,000	0,576	0,605	0,634	0,662	0,691	3,168
Security Guard	No.	3	1	16,000	0,576	0,605	0,634	0,662	0,691	3,168
Sweeper	No.	2	1	16,000	0,384	0,403	0,422	0,442	0,461	2,112
Sub-Total		16		204,000	5,328	5,594	5,861	6,127	6,394	29,304
TOTAL A:-					12,168	12,776	13,385	13,993	14,602	66,924

Federal Project Management Unit (FPMU)

ITEMS	Unit	Quantity	pps	Unit Price Rs.	Year 1 Million Rs.	Year 2 Million Rs.	Year 3 Million Rs.	Year 4 Million Rs.	Year 5 Million Rs.	Total
B. FURNITURE/FURNISHING/FIXTURE										
Sub-Total					3.613		0.000	0.000	0.000	3.613
TOTAL B:					3.613					3.613

C. Operating Expenses

I. GENERAL

COMPUTER RELATED SOFTWARE	LS				0.20	0.30	-	-	-	0.500
COMPUTER STATIONARY	LS				0.50	0.50	0.50	0.50	0.50	2.500
OFFICE STATIONARY	LS				0.50	0.50	0.50	0.50	0.50	2.500
NEWSPAPERS & PERIODICALS	LS				0.10	0.10	0.10	0.10	0.10	0.500
OFFICE RENT	Month	12			6.72	7.39	8.13	8.94	9.84	41.020
UTILITIES	LS				1.00	1.10	1.21	1.33	1.46	6.105
RATE & TAXES	LS				0.70	0.05	0.05	0.05	0.05	0.900
*POL (4 vehicles)	LS	4		20,000	0.96	1.06	1.16	1.28	1.41	5.861
Sub-Total					10.66	11.00	11.65	12.70	13.86	59.89

II. REPAIR AND MAINTENANCE

MAINTENANCE OF VEHICLES		3		15,000	0.54	0.57	0.60	0.63	0.66	2.984
REPAIR OF MACHINERY & EQUIPMENT	LS				0.05	0.06	0.06	0.07	0.07	0.305
REPAIR OF FURNITURE AND FIXTURE	LS				0.03	0.03	0.03	0.03	0.04	0.160
REPAIR OF OFFICE/MAINTENANCE	LS				1.00	1.00	1.00	1.00	1.00	5.000
REPAIR OF HARDWARE	LS				0.05	0.05	0.06	0.06	0.06	0.276
Sub-Total					1.670	1.705	1.741	1.780	1.830	8.725

III. COMMUNICATION EXPENDITURES

POSTAGE/TELEGRAPH/COURIER SERVICE	LS				0.060	0.063	0.066	0.069	0.073	0.332
TELEPHONE/FAX MACHINE (INSTALLATION & OPERATION CHARGES)	LS				1.20	1.26	1.32	1.39	1.46	6.631
Sub-Total					1.260	1.323	1.389	1.459	1.532	6.962
TOTAL C:					13.610	14.024	14.782	15.937	17.222	78.574
TOTAL A+B+C:					29.391	26.800	28.167	29.930	31.823	146.110

Federal Project Management Unit (FPMU)

ITEMS	Unit	Quantity	PPS	Unit Price Rs.	Year 1 Million Rs.	Year 2 Million Rs.	Year 3 Million Rs.	Year 4 Million Rs.	Year 5 Million Rs.	Total
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Transport & Equipment

A. TRAVEL /TRANSPORTATION										
TA & DA	LS				2,000	2,200	2,420	2,662	2,928	12,210
TOTAL A:					2,000	2,200	2,420	2,662	2,928	12,210

B. PROCUREMENT EQUIPMENT/MACHINERY/VEHICLES

LAPTOP	No.	2		120,000	0.240					0.240
COMPUTERS	No.	8		60,000	0.480					0.480
MULTIMEDIA	No.	1		150,000	0.150					0.150
LASER PRINTER	No.	3		40,000	0.120					0.120
COLOURED PRINTER	No.	1		100,000	0.100					0.100
PHOTO STAT MACHINE	No.	1		300,000	0.300					0.300
DIGITAL CAMERAS	No.	1		100,000	0.100					0.100
SPLIT A.C 1.5 TON	No.	6		100,000	0.600					0.600
OFFICE FRIDGE	No.	1		60,000	0.060					0.060
UPS	No.	2		30,000	0.060					0.060
TV 48 "	No.	1		75,000	0.075					0.075
Vehicles/Motorcycle										
MOTOR CYCLE	No.	1		150,000	0.150					0.150
Double Cabin (4*4) (Field Vehicle)	No.	2		5,500,000	11,000					11,000
MOTOR CAR 1300 CC/Operational Vehicle	No.	1		-	2.50					2.500
NETWORKING 10 NODES	LS	1		200,000	0.200					0.200
SERVER FOR NETWORKING	No.	1		400,000	0.400					0.400
TOTAL B:		33			16.535					16.535
TOTAL A+B					18.535	2.200	2.420	2.662	2.928	28.745

Mass Awareness Programme/ Training

TRAINING/CAPACITY BUILDING	LS				0.500	0.500	0.500	0.500	0.500	2.500
ADVERTISEMENT & PUBLICITY	LS				1,000	1,000	1,000	1,000	1,000	5,000
TOTAL					1,500	1,500	1,500	1,500	1,500	7,500

Federal Project Management Unit (FPMU)

ITEMS	Unit	Quantity	PPS	Unit Price Rs.	Year 1 Million Rs	Year 2 Million Rs	Year 3 Million Rs	Year 4 Million Rs	Year 5 Million Rs	Total
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Project Consultants/Monitoring, Evaluation, TPV & Impact Evaluation Consultants and Specialist/Advisory Consultant

Project Consultant; Monitoring, Evaluation, TPV & PIES Consultant; and Specialist/Advisory Consultant	LS				48.755	63.335	57.455	57.404	65.962	292.913
TOTAL:					48.755	63.335	57.455	57.404	65.962	292.913

Federal Share (40% of the intervention cost)

					650.073	844.473	766.073	765.393	879.489	3,905.500
GRAND TOTAL					748.254	938.308	855.615	856.889	981.702	4,380.768

CONTINGENCIES

PHYSICAL					22.083	27.766	25.267	25.287	29.013	129.415
FINANCIAL						56.632	107.805	164.365	251.446	580.248
TOTAL					22.083	84.398	133.072	189.652	280.459	709.664
TOTAL COST					770.336	1,022.706	988.687	1,046.541	1,262.161	5,090.431

* The vehicles mentioned will be purchased in observance of rules and regulations in vogue. However, if procurement of vehicles is are not allowed, then the funds allocated for purchase of vehicles will be utilized for hiring of vehicles on rental basis from the market in accordance with PPIA Rules.

Recruitment Rules and Terms of References of Project Staff
(Federal Project Management Unit)

Position/Post	Qualification	Experience	Job Description
Deputy Project Coordinator (FPMU)	M.Sc. (Agricultural Engineering/Water Resources Engg), M.A Economics, MBA Finance	<ul style="list-style-type: none"> • 12 years' experience of working in the Public/Private sector dealing with water and agriculture sector including 5 years' experience of management of large-scale public-sector development projects relating to water and agriculture. • Knowledge of rules & regulations of preparation, financing, procurement and implementation of public sector development project. • Preparation of public sectors project proposal (PC-I, PC-II) relating to water and agriculture. • Excellent communication skills and good presentation • Knowledge of basic IT tools to communicate with stakeholders • Having leadership qualities to manage public sector development projects and ability to manage a multi-disciplinary team of professionals. • Having analytical approach to design specialized project management tools to ensure the desired feedback at various stages of project implementation. • Capable of providing a wide range of services relating to monitoring and evaluation of the project to ensure efficient and effective use of available resources. • Preference will be given to candidate having experience of implementing public sector development projects. <p>Pay Package: PPS-9 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 35-50 Years Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis.</p>	<p>Job description includes the following, but not limited to;</p> <ul style="list-style-type: none"> • Work under overall supervision of National Projects Coordinator (NPSC) • Assist NPSC in disposal of administrative and financial matters related to FPMU and in implementation of FSC decisions • Assist NPSC in timely transfer of matching federal grants to the participating agencies • Work closely with provincial PMUs for effective implementation of the project. • Assist NPSC in compilation of periodic project monitoring reports, progress reports, working papers for FSC and FCC • Any other duties assigned by the NPSC

Deputy Director (Coord)-FPMU	M.Sc in Agri. Engg. MS Project Management, M.A Economics	<ul style="list-style-type: none"> • 07 years' experience of working in the Public/Private sector development projects. • Capability to coordinate project activities with the provincial government and other stakeholders. • Excellent communication skills and good presentation. • Knowledge of IT tools to communicate with stakeholders. • Knowledge of rules & regulations of preparation, financing, procurement and implementation of public sector development project. • Capable of providing a wide range of services relating to monitoring and evaluation of the project to ensure efficient and effective use of available resources. • Preference will be given to candidate having experience of implementing public sector development projects 	<ul style="list-style-type: none"> • Act as the Deputy Director (Coord) of Federal Project Management Unit (FPMU) for the Project titled "Water Conservation in Barani Areas of Kyber Pakhtunkhwa" • Overall Supervision of the Staff of the FPMU • Coordination with provincial stakeholders to ensure effective implementation of the project. • Facilitation to project consultant and monitoring evaluation Third party Validation (TPV) & Impact Evaluation Consultants. • Holding of meetings of FSC and annual, mid-year and quarterly meetings with the consultants. • Any other duties assigned by the higher authorities.
Assistant Director (Coord) - FPMU	M.Sc in Agri. Engg. MS Project Management, M.A Economics	<p>Pay Package: PPS-8 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 30-40 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p> <ul style="list-style-type: none"> • 03 years' experience of working in the Public/Private sector development projects. • Capability to coordinate project activities with the provincial government and other stakeholders. • Excellent communication skills and good presentation. • Knowledge of IT tools to communicate with stakeholders. • Knowledge of rules & regulations of preparation, financing, procurement and implementation of public sector development project. <p>Pay Package: PPS-7 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 25-35 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • Act as the Assistant Director (Coord) of Federal Project Management Unit (FPMU) for the Project titled "Water Conservation in Barani Areas of Kyber Pakhtunkhwa" • Coordination with provincial stakeholders to ensure effective implementation of the project. • Facilitation to project consultant and monitoring evaluation Third party Validation (TPV) & Impact Evaluation Consultants. • Facilitate in holding of meetings of FSC and annual, mid-year and quarterly meetings with the consultants. • Any other duties assigned by the higher authorities.

Assistant Director (Admin & Finance.)	Master Finance Management, MBA (Finance)/ACA/ACMA	<ul style="list-style-type: none"> • 03 years' experience of working in an organization dealing with AGPR for budgeting and accounting, financial disbursement, budget preparation, expenditure records. • Having computer skills for using M.S Office, data management and computerizing the accounting system of the project. • Experience of working with government organization will be preferred. <p>Pay Package: PPS-7 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017.</p> <p>Age: 25-35 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • Initiate administrative matters for consideration and approval of senior management • Preparation of financial requirements (quarterly) for project entity. • Establish and maintain project records, control system, work with external auditors. • Prepare annual budgets and expenditure records. • Work with AGPR for the matters related to project expenditure, reconciliation and other such matters. • Assist in preparing and maintaining all financial records, scrutinizing the cost elements and computerizing the accounting system of the project. • Assist in the purchase of consumable items, furniture/fixture and its maintenance. • Processing of utility bills for the approval of competent authority and follow up with the concerned offices. • Any other assignment assigned by the higher authorities.
Specialist/ Advisory Consultant, FPMU	M.Sc, M. Engg. (Agri. Engg./ Water Resources Engg) registered with PEC	<p>Private/Government sector with at least 5 years' experience of implementation of large development projects/programs in addition to overall service experience of 25 years in federal government water resources project planning. Having leadership quality to manage and monitor mega projects. Ability to manage a multi-disciplinary team of professionals and an analytical approach to design specialized monitoring and evaluation tools to ensure the desired feedback at various stages of project implementation. Capable of providing a wide range of services relating to monitoring and evaluation of the project to ensure efficient and effective use of available resources. Training in large scale enterprises sector and national management course or its equivalent from NDU will be an added advantage</p> <p>Pay Package: PPS-10 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017.</p> <p>Age: 55-62 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<p>Job description includes the following:</p> <ul style="list-style-type: none"> • Act as Specialist/Consultant Advisor to Federal Project Management Unit (FPMU) of the project and NPSC in smooth implementation of project activities • Advise on matter related to monitoring activities, coordination with Provincial components, TPV and PIES Consultants • Facilitate in establishing contact with international donor agencies • Any other duties assigned by the NPSC

Assistant	B.A./B.Sc./B.Com	<ul style="list-style-type: none"> 03 years' experience in administrative and procurement matters Preference will be given to computer literates <p>Pay Package: PPS-6 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 25-35 Years Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> Maintenance of files/record. Accounts keeping of the project. Procurement under the project and maintaining the stock register/inventory etc. Personnel and administrative matters of employees under the project. Causal typing Any other responsibility assigned.
Computer Operator	B.A / B.Sc. / B.Com/Post Graduate Diploma/ Diploma in MS Office	<ul style="list-style-type: none"> Minimum 03 year of experience in working with public/private organization <p>Pay Package: PPS-6 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 25-35 Years Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> Data Entry / Typing Work Assist DPC/DD/ AD Any other assigned responsibility
Driver	Matric with valid driving license	<p>02 years' experience of driving in Government/ Semi Government or Private Organization</p> <p>Pay Package: PPS-2 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 25-35 Years Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	As assigned

Dispatch Rider	Matric	<p>01 years' experience of working as dispatch rider in Government/ Semi Government or Private Organization.</p> <p>Pay Package: PPS- 01 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 20-30 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • Diary and Dispatch. • Maintenance of files/ record. • Any other responsibility assigned by DPC
Office Boy	Matric	<p>01 years' experience of working in Government/ Semi Government or Private Organization.</p> <p>Pay Package: PPS- 01 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 20-30 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • As Assigned
Security Guard	Matric	<p>01 years' experience of working as security guard in Government/ Semi Government or Private Organization.</p> <p>Pay Package: PPS- 01 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 25-35 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • Physically fit • Exemplary character • Medical category "A"
Sweeper	Primary	<p>01 years' experience of working as sweeper in Government/ Semi Government or Private Organization.</p> <p>Pay Package: PPS- 01 as per notification of Ministry of Finance vide: O.M. No.F.4 (9) R-14/2008 dated 19th July, 2017. Age: 20-30 Years</p> <p>Duration of Contract: Initially for a period of two years extendable further till the completion of the project on yearly basis</p>	<ul style="list-style-type: none"> • As assigned

ANNEX-II

Soil & water Conservation Component

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

SUMMARY (Soil & Water Conservation)

(Million Rupees)

S. No.	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Cost of Physical Activities	1,339.250	1,825.250	1,625.250	1,619.000	1,899.000	8,307.750
2	Establishment Charges	91.068	91.091	91.115	91.138	91.161	455.573
3	Purchase of Physical Assets	163.590	-	-	-	-	163.590
4	Operational Expenses	26.200	23.200	22.200	22.200	20.200	114.000
5	Beneficiary Share	321.650	428.750	380.000	378.750	448.750	1,957.900
	Sub-Total	1,941.758	2,368.291	2,118.565	2,111.088	2,459.111	10,998.813

Summary of the Financial Cost

Million Rupees

	Federal Govt. Share (40% of Intervention Cost / Physical Activities)	535.700	730.100	650.100	647.600	759.600	3,323.100
	Govt of Khyber Pakhtunkhwa Share (60% Intervention Cost + S. No. 2, 3 & 4)	1,084.408	1,209.441	1,088.465	1,084.738	1,250.761	5,717.813
	Beneficiary Share	321.650	428.750	380.000	378.750	448.750	1,957.900
	Total	1,941.758	2,368.291	2,118.565	2,111.088	2,459.111	10,998.813

Table 1-A: SWC Component (Overall Year-Wise Financial Breakup.

Rs. in million

S#	Activity	Unit	Average Unit Cost				2019-20			2020-21			2021-22		
			Project Share	Beneficiary Share	Total Cost	Range	Project Share	Beneficiary Share	Total Cost	Project Share	Beneficiary Share	Total Cost	Project Share	Beneficiary Share	Total Cost
1	Water Ponds	No.	0.600	0.250	0.750	0.300-1.500	480,000	120,000	600,000	630,000	157,500	787,500	630,000	157,500	787,500
2	Checkdams	No.	0.700	0.275	0.975	0.300-1.500	280,000	70,000	350,000	455,000	113,750	568,750	455,000	113,750	568,750
3	Water Reservoir	No.	2.500	0.500	2.500	1.000-4.000	100,000	20,000	120,000	200,000	40,000	240,000	175,000	35,000	210,000
4	Streambank stabilization	No.	0.250	0.075	0.375	0.200-0.900	175,000	37,500	212,500	175,000	37,500	212,500	175,000	37,500	212,500
5	Gated field Inlet Outlet/Spillway	Acres	0.200	0.050	0.250	0.050-0.400	40,000	10,000	50,000	40,000	10,000	50,000	40,000	10,000	50,000
6	Terracing	Acres	0.200	0.075	0.375	0.150-0.500	15,000	3,750	18,750	24,000	6,000	30,000	24,000	6,000	30,000
7	Micro-Watershed Development	No.	5.000	1.250	6.250	2.000-9.000	175,000	43,750	218,750	210,000	43,750	253,750	35,000	0.000	35,000
8	Water Seepage harvesting Galleries	No.	0.800	0.200	1.000	0.400-1.200	50,000	14,000	64,000	60,000	15,000	75,000	60,000	15,000	75,000
9	Agro-nomic low-cost interventions	No.	0.125	0.025	0.125	0.020-0.300	12,500	2,500	15,000	25,000	5,000	30,000	25,000	5,000	30,000
10	Sand Dunes stabilization	Acres	0.025	0.005	0.025	0.010-0.050	0.750	0.150	0.900	1,250	0.250	1,500	1,250	0.250	1,500
11	Capacity Building	No.	0.050	0.000	0.050	0.020-0.100	5,000	0.000	5,000	5,000	0.000	5,000	5,000	0.000	5,000
12	Operation Expenses	Lumpsum	-	-	-		117,250	0.000	117,250	114,291	0.000	114,291	113,315	0.000	113,315
13	Physical Assets Expenses	Lumpsum	-	-	-		163,590	0.000	163,590	0.000	0.000	0.000	0.000	0.000	0.000
	Grand Total						1820,100	321,150	2141,250	1998,541	438,750	2337,291	1738,545	380,000	2118,545

Table 1-B: Continued

Rs. in million

S#	Activity	2022-23			2023-24			Total		
		Project Share	Beneficiary Share	Total Cost	Project Share	Beneficiary Share	Total Cost	Project Share	Beneficiary Share	Total Cost
1	Water Ponds	630,000	157,500	787,500	630,000	157,500	787,500	3000,000	750,000	3750,000
2	Checkdams	455,000	113,750	568,750	735,000	183,750	918,750	2380,000	595,000	2975,000
3	Water Reservoir	175,000	35,000	210,000	175,000	35,000	210,000	825,000	165,000	990,000
4	Streambank stabilization	175,000	37,500	212,500	175,000	37,500	212,500	875,000	187,500	1062,500
5	Gated field Inlet Outlet/Spillway	40,000	10,000	50,000	40,000	10,000	50,000	200,000	50,000	250,000
6	Terracing	24,000	6,000	30,000	24,000	6,000	30,000	111,000	27,750	138,750
7	Micro-Watershed Development	35,000	0.000	35,000	35,000	0.000	35,000	490,000	87,500	577,500
8	Water Seepage harvesting Galleries	60,000	15,000	75,000	60,000	15,000	75,000	296,000	74,000	370,000
9	Agro-nomic low-cost interventions	18,750	3,750	22,500	18,750	3,750	22,500	100,000	20,000	120,000
10	Sand Dunes stabilization	1,250	0.250	1,500	1,250	0.250	1,500	5,750	1,125	6,875
11	Capacity Building	5,000	0.000	5,000	5,000	0.000	5,000	25,000	0.000	25,000
12	Operation Expenses	113,338	0.000	113,338	113,361	0.000	113,361	569,573	0.000	569,573
13	Physical Assets Expenses	0.000	0.000	0.000	0.000	0.000	0.000	163,590	0.000	163,590
	Grand Total	17,12,338	378,750	21,11,088	20,10,361	448,750	24,59,111	9040,913	1,957,900	20,998,813

Table 2: Establishment costs

PKRs. In millions

S. No.	Name of post	Number of posts	Duration months	Fix Salary per month	Annual increase (5%)	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	Project Director (BS-19, Allowance only)	1	6	0.012	0.00000	0.072	0.072	0.072	0.072	0.072	0.360
2	GIS Specialist (BS-18)	1	12	0.125	0.00625	1.500	1.506	1.513	1.519	1.525	7.563
3	Soil Conservation Officers (Field; BS-17)	34	12	0.090	0.00450	36.720	36.725	36.729	36.734	36.738	183.645
4	Horticulturist (BS-17)	2	12	0.090	0.00450	2.160	2.165	2.169	2.174	2.178	10.845
5	Internees	34	12	0.030	0.00150	12.240	12.242	12.243	12.245	12.246	61.215
6	Computer Operator/Assistant	4	12	0.060	0.00300	2.880	2.883	2.886	2.889	2.892	14.430
7	Sub-Engineer (Civil, BS-11)	34	12	0.030	0.00150	12.240	12.242	12.243	12.245	12.246	61.215
8	Field Assistant (BS-09)	34	12	0.025	0.00125	10.200	10.201	10.203	10.204	10.205	51.013
9	Field Watcher (BS-03)	68	12	0.016	0.00080	13.056	13.057	13.058	13.058	13.059	65.288
Totals		212	-	-	0.023	91.068	91.091	91.115	91.138	91.161	455.573

Table 3: Operational Cost

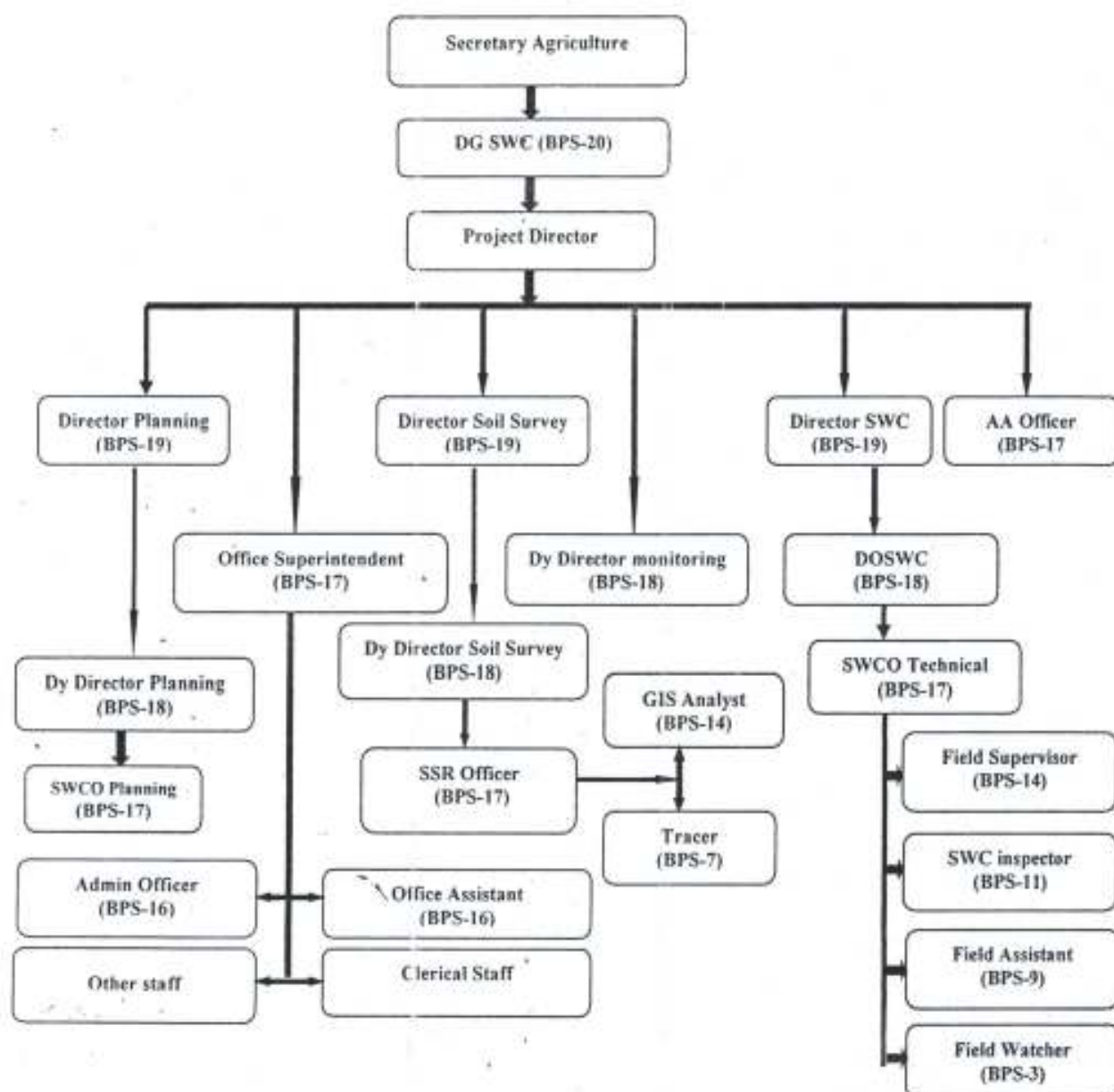
PKRs. In millions

Operational	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Establishment Cost	91.068	91.091	91.115	91.138	91.161	455.573
POL	6.000	6.000	6.000	6.000	6.000	30.000
TA/DA	8.000	8.000	7.000	7.000	7.000	37.000
Repair & Maintenance	3.000	3.000	3.000	3.000	3.000	15.000
Stationery & Printing	3.000	3.000	3.000	3.000	3.000	15.000
Registration of Vehicle	2.000	0.000	0.000	0.000	0.000	2.000
Publicity & Advertisement	4.000	3.000	3.000	3.000	1.000	14.000
Miscellaneous	0.200	0.200	0.200	0.200	0.200	1.000
Total	117.268	114.291	113.315	113.338	111.361	569.573

Table 4: Physical Assets

Rs. in million

Item	Office	Description	Quantity (No.)	Funds allocation (Rs. In million)						
				Unit rate	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Transport	PD Office/	Double Cabin Pickup	1	5.000	5.000	0	0	0	0	5.000
	Prov. HQ	Jeeps	1	2.800	2.800	0	0	0	0	2.800
	District	Jeeps	33	2.800	92.400	0	0	0	0	92.400
	Offices	Motorcycles	68	0.200	13.600	0	0	0	0	13.600
	Sub-total				113.800	0.000	0.000	0.000	0.000	113.800
Equipments	PD Office / Prov. HQ	Computer (Desktop)	4	0.150	0.600	0	0	0	0	0.600
		Computer (Laptop)	3	0.150	0.450	0	0	0	0	0.450
		Multimedia Projector	1	0.350	0.350	0	0	0	0	0.350
		Water Dispenser	4	0.025	0.100	0	0	0	0	0.100
		Photocopiers	2	0.200	0.400	0	0	0	0	0.400
		Air Conditioners	4	0.080	0.320	0	0	0	0	0.320
		Solar Panels	1	1.500	1.500	0	0	0	0	1.500
		Security Camera System	1	0.500	0.500	0	0	0	0	0.500
		Soil Survey Lab	1	20.000	20.000	0	0	0	0	20.000
		District Offices	Desktop computer with accessories	34	0.150	5.100	0	0	0	0
	GPS device		9	0.030	0.270	0	0	0	0	0.270
	Photocopiers		34	0.300	10.200	0	0	0	0	10.200
	Sub-total				39.790	0.000	0.000	0.000	0.000	39.790
Furniture	PD Office	Furnishing, Office Table + Chairs, Almirahs, sofas etc	Lumpsum	10.000	10.000	0	0	0	0	10.000
	District Offices									
Sub-total				10.000	0.000	0.000	0.000	0.000	0.000	10.000
Grand Total				163.590	0.000	0.000	0.000	0.000	0.000	163.590



Abbreviations:

SWC: Soil and Water Conservation

DG SWC: Director General Soil and

DOSWC: District Officer Soil and Water Conservation

AA Officer: Assistant Account Officer

**ORGANOGRAM OF THE PIU-I SETUP OF
SOIL AND WATER CONSERVATION KHYBER PAKHTUNKHWA**

TORs (Age, Qualification, Experience etc.) as per project policy and as per existing rules of Directorate General Soil & Water Conservation Khyber Pakhtunkhwa.

S. No.	Establishment	Age (years)	Qualification	Job Description*
1.	Project Director (BPS-19/20)	35-60	B.Sc. (Hons)/ M.Sc. Soil Sciences with minimum 12-15 years* experience	<ul style="list-style-type: none"> Overall supervision of the project. Dealing all financial matters of the project. Management of physical and financial progress throughout the province. All main responsibilities of the post of Project Director.
2.	GIS Specialist (BS-18)	28-50	Masters in GIS or Master in IT/CS/ Geography or BS (IT)/CS/Geography (Hons) or Equivalent with 1 year postgraduate diploma in GIS and at least 5 year post qualification experience.	<ul style="list-style-type: none"> Identification of sites for Water Reservoirs and other soil and water Conservation structures through GIS/RS. GIS specialist will analyze spatial data through mapping software and designing digital maps with geographic data and various other data sets.
3.	Soil Conservation Field Officer (BS-17)	22-35	B.Sc. (Hons) in soil and environmental sciences or B.Sc. Agricultural Engineering from HEC Recognized University/ Institution	<ul style="list-style-type: none"> Through field visits, identification of sites for soil & water conservation, checking of revenue record for ownership of the land. Preparation of layout, sketches and rough cost estimates according to engineering designs for sanction of the competent forum. Frequent visits to field Maintaining completion report of each soil conservation work. Any other task assigned by the DG SWC/PD.
4.	Horticulturist (BS-17)	22-35	B.Sc. (Hons) in Horticulture from HEC Recognized University/ Institution	<ul style="list-style-type: none"> Recommendation of site specific fruit and vegetables for plantation according to the climate of the project area. Recommendation of soil binder plants and trees for the water shed/ project area. Any other task assigned by the DG SWC/PD.
5.	Sub-Engineer (Civil, BS-11)	22-35	DAE (civil) from HEC Recognized University/ Institution with at least 02 year post qualification experience.	<ul style="list-style-type: none"> Supervise and assist in technical matters to other field teams. Preparation of construction activities according to project objectives, time frame and design. Preparation of DCEs, Sketch etc. Supervise the unloading of the material on site as well as quality and quantity of the items.
6.	Field Assistant (BS-09)	18-35	Diploma in agriculture from agriculture training institute Peshawar	<ul style="list-style-type: none"> Preparation of estimates and sketches. Supervision of soil and water conservation works. Selection of feasible sites for construction of soil and water conservation works.
7.	Field Watcher (BS-03)	18-35	Literate.	<ul style="list-style-type: none"> Watching soil and water conservation structures in field area.
8.	Internees	20-35	16 Years Education with minimum qualification having 29 years upper age limit.	Assist Director/District Officer/Deputy Director in office and field activities.

* The project staff can be assigned any other task by the DG/PD for successful implementation of the project/ realization of the project activities.

TERMS OF PARTNERSHIP (TOP)

Between District Officer Soil & Water Conservation _____ (hereinafter called Party 1) and Soil & Water Conservation Association/Beneficiary Village _____ Tehsil _____ District _____ (hereinafter called Party 2).

This term of partnership is signed between District Director/ Officer Soil & Water Conservation _____ and Soil & Water Conservation Association/ Beneficiary Village _____ Tehsil _____ District _____ today on ____ day of _____ with the following roles and responsibilities of both the parties that:

1. Party 1 will provide financial and technical assistance for the construction of Check dams/ water retaining facility according to approved design and detailed cost estimate to Party 2.
2. Party 2 will provide dispute free site to Party 1 for the construction of check dam/ water retention facility.
3. Party 1 will pay 10% advance as mobilization advance to Party 2 for the start of work on the site to Party 2.
4. The Party 2 will start the physical work on the site according to approved design, estimate and specifications.
5. The remaining installments will be paid in three equal installments to Party 2.
6. The payment will be made according to actual work done (Completion report) and not on cost estimate.
7. In case of inferior quality of work done, the payment will be subject to economic cut, accordingly.
8. Operation and maintenance will be the responsibility of Party 2.
9. Party 2 will also be responsible to provide water for irrigation, livestock and drinking to the local community.
10. Party 2 will also be responsible to prepare a detailed list of local community alongwith contact numbers lying below the dam, so that in case of emergency (dam damage, maximum number of community can be informed timely.
11. The income of fishing will equally be distributed among the land owners.
12. Local dispute will be resolved by Party 2.

DISTRICT WISE DISTRIBUTION

#	District	Water Ponds	Checkdams	Water Reservoir	SBS	Inlet/Outlet	Terracing	Watershed	Seepage Galleries	Agronomic	Sand Dunes	Trainings	Total
1	HO	0	0	0	0	0	0	0	0	0	0	200	200
2	Abbottabad	60	100	5	80	0	40	3	30	40	0	12	350
3	Bannu	200	150	25	80	0	0	3	10	20	60	12	590
4	Batagram	200	100	15	80	0	40	2	15	15	0	12	479
5	Buner	200	100	11	80	0	30	2	10	15	0	12	460
6	Charsada	20	50	1	80	0	0	1	5	15	0	12	184
7	Chitral	100	100	3	80	0	30	2	10	15	0	12	352
8	D.I. Khan	200	100	15	80	450	0	1	15	15	50	12	939
9	Dir Lower	200	150	15	80	0	30	3	15	40	0	12	545
10	Dir Upper	200	100	10	80	0	20	3	15	40	0	12	490
11	Haripur	200	140	15	80	0	30	2	10	30	0	12	479
12	Haripur	150	140	15	80	0	20	3	10	40	0	12	430
13	Karak	200	140	20	80	0	0	2	10	40	30	12	544
14	Kohat	250	140	15	80	0	0	2	10	40	0	12	509
15	Lakki Marwat	250	140	20	80	150	0	2	10	40	50	12	764
16	Malakand	200	140	15	80	0	0	3	15	40	0	12	465
17	Manshera	200	140	10	80	0	20	3	15	40	0	12	480
18	Mardan	170	100	15	80	0	0	2	10	40	0	12	419
19	Nowshera	200	100	20	80	0	0	3	10	15	0	12	440
20	Peshawar	100	100	15	80	0	0	3	10	40	0	12	350
21	Shangla	150	100	15	80	0	30	2	15	40	0	12	444
22	Swabi	200	100	15	80	0	0	3	10	40	0	12	450
23	Swat	150	100	15	80	0	30	3	10	40	0	12	440
24	Tank	200	100	20	80	250	0	2	10	30	0	12	704
25	Torghar	100	100	5	80	0	0	2	10	20	0	12	329
26	erstwhile Fata District	900	450	40	580	150	50	12	100	50	40	12	2384
Total		5000	3000	370	2500	2000	370	70	370	800	230	500	14210

This is a tentative distribution of targets. Any social dispute, farmer demand, timely completion of targets, security situation etc necessitating the change in number of targets assigned to a district or the change in nature of activity shall be made by the authority of the Director General Soil & Water Conservation/ Project Director to ensure smooth running of the project.

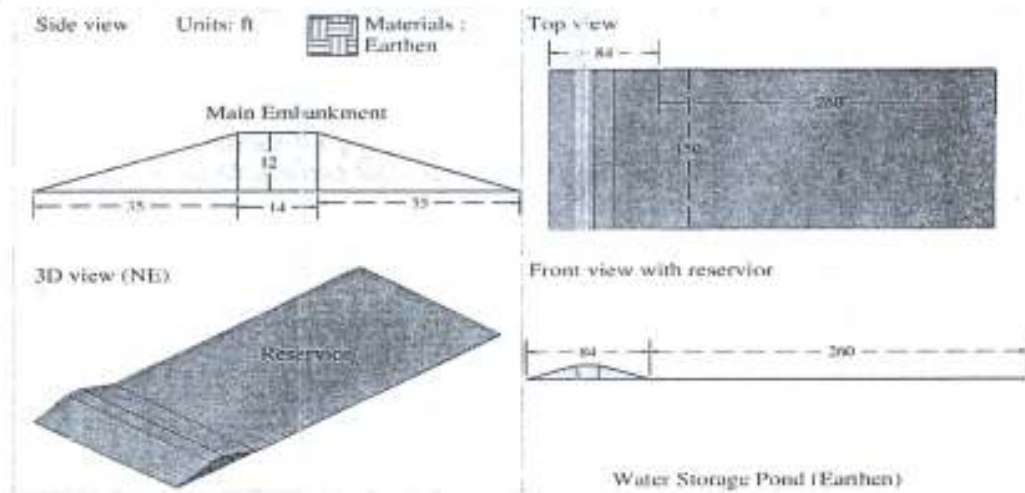
**EXISTING STRENGTH OF DIRECTORATE GENERAL SOIL &
WATER CONSERVATION KHYBER PAKHTUNKHWA**

S. No.	Station	STRENGTH OF STAFF		
		Officers	Officials	Total
1.	Headquarter	24	42	66
2.	Peshawar	2	12	14
3.	Charsadda	2	11	13
4.	Nowshera	2	18	20
5.	Mardan	2	7	9
6.	Swabi	2	14	16
7.	Malakand	2	16	18
8.	Swat	2	12	14
9.	Shangla	2	6	8
10.	Dir upper	2	10	12
11.	Dir lower	3	17	20
12.	Chitral	2	8	10
13.	Kohat	2	14	16
14.	Karak	2	21	23
15.	Hangu	2	9	11
16.	Lakki Marwat	2	17	19
17.	Bannu	2	8	10
18.	D I Khan	2	16	18
19.	Haripur	2	16	18
20.	Abbottabad	2	13	15
21.	Mansehra	2	17	19
22.	Battagram	2	10	12
23.	Torghar	2	11	13
24.	Buner	2	9	11
25.	Tank	2	16	18
	Total	73	350	423

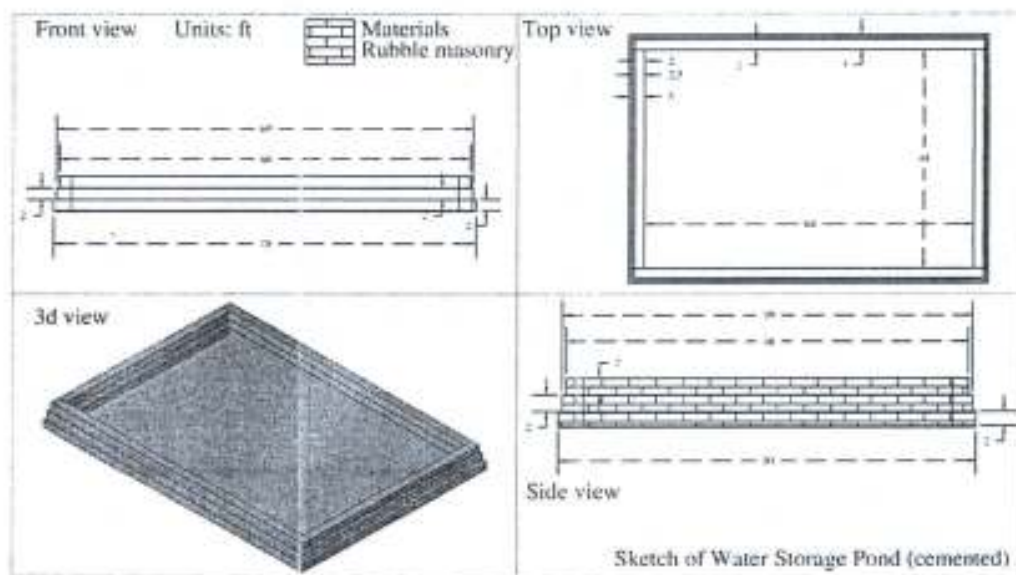
SAMPLE COST ESTIMATE OF WATER POND (CEMENTED)						
1. Foundation Excavation						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Excavation of Foundation	1	70	50	2	7000
Total Cft						7000
MRS-2017 (3-23-b) * Rs.		6075	per 1000 Cft	Total (Rs.)		42525
2. Cement Concrete work in Foundation (Ration 1:3:6)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Cement Concrete Work in Bed	1	70	50	0.5	1750
Total Cft						1750
MRS-2017 (06-03-d) * Rs.		10295.75	Per 100 Cft	Total (Rs.) =		180176
3. Random rubble masonry in foundation & plinth: In cement, sand mortar: Ratio 1:6						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Super structure 1st step L. Wall	2	70	3	2	840
ii	Super structure 1st step S. Wall	2	44	3	2	528
iii	Super structure 2nd step L. Wall	2	69	2.5	2	690
iv	Super structure 1st step S. Wall	2	44	2.5	2	440
v	Super structure 3rd step L. Wall	2	68	2	2	544
vi	Super structure 3rd step S. Wall	2	44	2	2	352
Total(Cft)						3394
MRS-2017 (08-03-d-03) * Rs		15894.8	Per 100 Cft	Total (Rs.) =		539470
4. Stone Cement Masonry Work in Foundation and Super Structure (Ration 1:8)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	Total.Cft	
i	Long wall outside 1st Step	2	70	2	280	
ii	Short wall outside 1st Step	2	44	2	176	
iii	Long wall outside 2nd Step	2	69	2	276	
iv	short wall outside 2nd Step	2	44	2	176	
v	Long wall outside 3rd Step	2	68	2	272	
vi	short wall outside 3rd Step	2	44	2	176	
vii	Long wall Top	2	68	2	272	
viii	Short Wall Top	2	44	2	176	
ix	Long wall Inner Side	2	66	6	792	
x	Short Wall Inner Side	2	44	6	528	
xi	Pond Floor	1	66	44	2904	
Total						6028
MRS-2017 (11-09-b) * Rs		2024.19	Per 100 Cft	Total (Rs.) =		122018
5. Total Rs. of S. No. 1, 2, 3 and 4 =		42525	180175.625	539469.5	122018.2	884188
6. 10% (Contractor Profit) (to be subtracted from Total Rs)						88419
7. Net Total Cost						795769
8. Government Subsidy		80 %				636616

SAMPLE COST ESTIMATE OF WATER POND (EARTHEN)						
1. Foundation Excavation						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Excavation of Foundation	1	260	150	4	156000
Total Cft						156000
MRS-2017 (03-04-a) * Rs.		3937.5	per 1000 Cft	Total (Rs.)		614250
2. Compaction by Rolling with animal driven roller or hand rammed: Ordinary Soil						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Main Embankment	1	260	42	12	131040
Total Cft						131040
MRS-2017 (03-26-b-02) * Rs.		1406.25	Per 1000 Cft	Total (Rs.) =		184275
3. Providing and Laying cut, joint, test & disinfect GI pipe line Using light quality GI Pipe: 3" i/d						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total. ft
i	Providing Pipe Line	1	75	N/A	N/A	75
Total(ft)						75
MRS-2017 (24-16-c-09) * Rs		550.86	Per 1 ft	Total (Rs.) =		41315
4.Providing and Fixing sluice valve of BSS quality weight line using light quality GI Pipe: 3" i/d						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	Total.Cft	
i	Providing Valve	1	N/A	N/A	N/A	
					Total	1
MRS-2017 (11-09-b) * Rs		2024.19	Per 1 each	Total (Rs.) =		2024
5. Total Rs. of S. No. 1, 2, 3 and 4 =		614250	184275	41315	2024	841864
6. 10% (Contractor Profit) (to be subtracted from Total Rs)					=	84186
7. Net Total Cost					=	757677
8. Government Subsidy 80 %					=	606142

Designs of water ponds



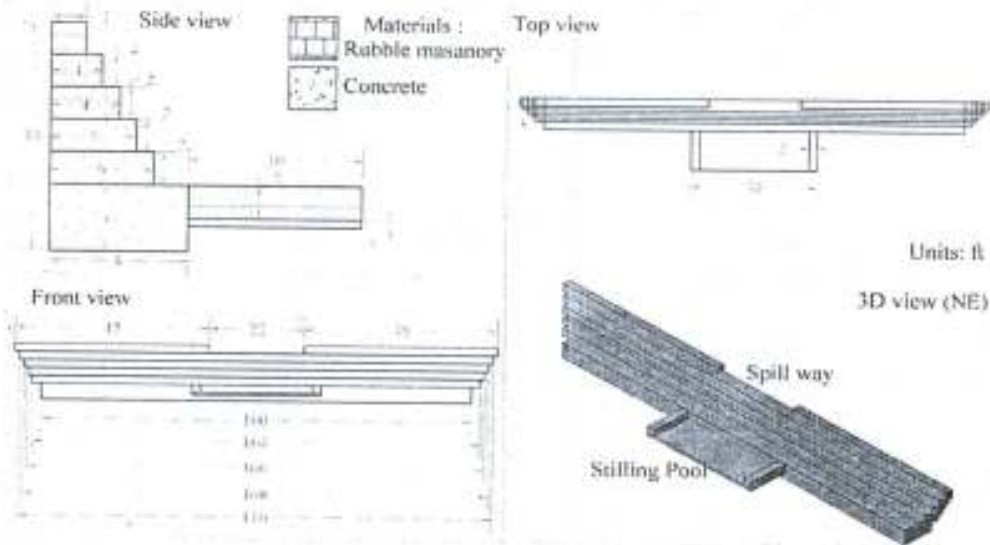
Earthen water pond



Cemented water pond

SAMPLE COST ESTIMATE OF CHECK DAM (CEMENTED)						
1. Foundation Excavation						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Check Dam	1	100	8	4	3200
ii	Floor (stilling pool)	1	30	10	1	300
Total Cft						3500
MRS-2017	(03-23-b)	*	Rs.	6075	Per 1000 Cft	Total (Rs.) 21263
2. Cement Concrete (brick/stone ballast, 1.5" to 2") in foundation & plinth (Ratio 1:6:12)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Foundation	1	100	8	4	3200
ii	Floor (stilling pool)	1	30	10	0.5	150
Total Cft						3350
MRS-2017	(06-03-d)	*	Rs.	10295.75	Per 100 Cft	Total (Rs.) 344908
3. Random rubble masonry in foundn. & plinth in cement, sand mortar : Ratio 1:4						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Super structure 1st Step	1	104	6	2	1248
ii	Super structure 2nd Step	1	106	5	2	1060
iii	Super structure 3rd Step	1	108	4	2	864
iv	Super structure 4th Step	1	110	3	2	660
vi	Stilling pool walls	2	10	2	2	80
Total Cft						3912
MRS-2017	(08-01-d-02)	*	Rs.	16489	Per 100 Cft	Total (Rs.) = 645048
3.Total Rs. of S. No. 1, 2 and 3 =			21262.5	344908	645047.7	= 1011218
4. 10% (Contractor Profit) on S. No 3 (to be subtracted from Total Rs)						= 101122
5. Net Total Cost =						= 910096
6. Government Subsidy =						80 % = 728077

Design of cemented checkdam

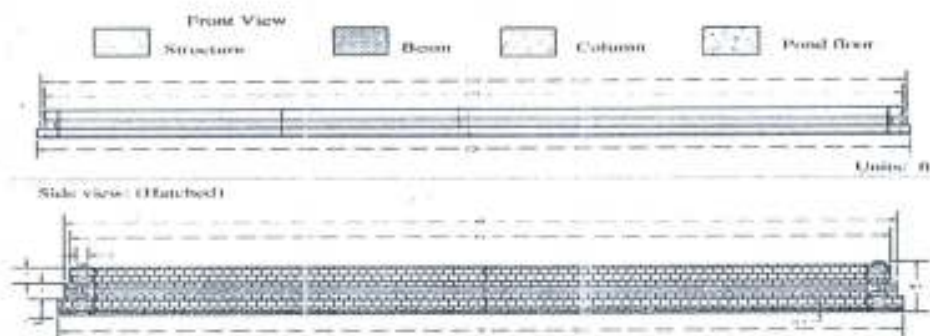


Cemented checkdam

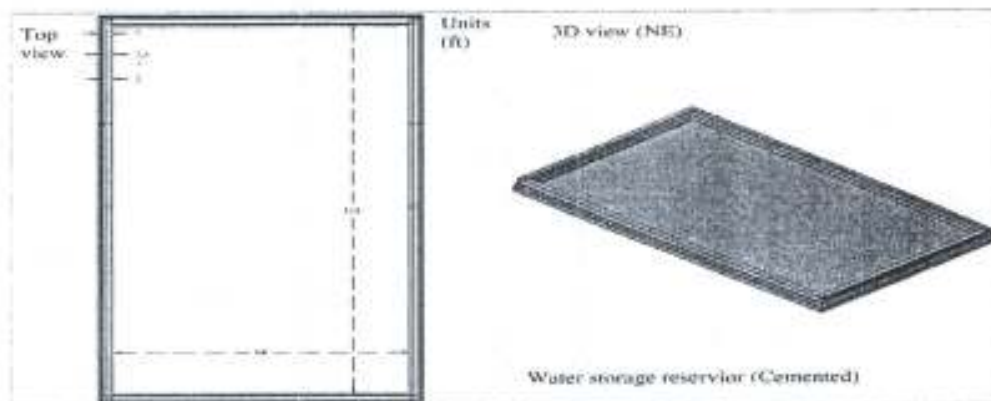
SAMPLE COST ESTIMATE OF WATER RESERVOIRS (CEMENTED)						
1. Foundation Excavation						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total Cft
i	Excavation of Foundation	1	120	70	2	16800
Total Cft						16800
MRS-2017 (13-23-b) * Rs.		6075	per 1000 Cft	Total (Rs.)		102060
2. Cement Concrete (brick/stone ballast, 1.5" to 2"/nullah shingle well graded and cleaned) 1:3:6						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total Cft
i	Cement Concrete Work in Bed	1	120	70	0.5	4200
Total Cft						4200
MRS-2017 (06-03-a) * Rs.		14780.57	Per 100 Cft	Total (Rs.) =		620784
3. RCC in roof slab, beam, column & ret wall etc. not including in 06-06 type C (1:2:4)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total Cft
i	Super structure 1st step L. Wall	2	120	3	2	1440
ii	Super structure 1st step S. Wall	2	64	3	2	768
iii	Super structure 2nd step L. Wall	2	119	2.5	2	1190
iv	Super structure 1st step S. Wall	2	64	2.5	2	640
v	Super structure 3rd step L. Wall	2	118	2	2	944
vi	Super structure 3rd step S. Wall	2	64	2	2	512
Total(Cft)						5494
MRS-2017 (08-03-d-03) * Rs		15894.8	Per 100 Cft	Total (Rs.) =		873260
4. Stone Cement Masonry Work in Foundation and Super Structure (Ration 1:8)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	Total Sft	
i	Long wall outside 1st Step	2	120	2	480	
ii	Short wall outside 1st Step	2	64	2	256	
iii	Long wall outside 2nd Step	2	119	2	476	
iv	short wall outside 2nd Step	2	64	2	256	
v	Long wall outside 3rd Step	2	118	2	472	
vi	short wall outside 3rd Step	2	64	2	256	
vii	Long wall Top	2	118	2	472	
viii	Short Wall Top	2	64	2	256	
ix	Long wall Inner Side	2	114	6	1368	
x	Short Wall Inner Side	2	58	6	696	
xi	Pond Floor	1	114	58	6612	
Total						11600
MRS-2017 (11-09-b) * Rs		2024.19	Per 100 Sft	Total (Rs.) =		234806
5. RCC in roof slab, beam, column & other structural member, insitu or precast, type C (1:2:4)						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	H/D (ft)	Total Sft
i	Long wall Beams	2	120	2	2	960
ii	Short wall Beams	2	64	2	2	512
iii	Columns	6	1.5	1	6	54
Total						1526
MRS-2017 (06-06-a-03) * Rs		27009.37	Per 100 Sft	Total (Rs.) =		412163
6. Supply and Fabricate MS reinforcement for cement concrete (Hot rolled deformed bars Grade 40)						
S. No.	Brief Description	CFT	Beam Factor	B (ft)	divided by 2249	Total.(ton)
i	Formula = (CFT *4.9*1.5)/2240	1526	4.9	1.5	2240	5.0
Total Cft						5.0
MRS-2017 (06-07-c) * Rs.		107564.4	Per 1 ton	Total (Rs.) =		538595
7. Sluice Valve 3 Nos. dia 3" for Irrigation at downstream (24-21-s)				8367	Rs.	25101
8. HDPE Pipe Connected to the Source (24-30-a-05) Rs. 82.60/RFT (1000 RFT					Rs.	82600
9. Total Rs. of S. No. 1, 2, 3, 4, 5, 6, 7 and 8 =						2889369
10. 10% (Contractor Profit) (to be subtracted from Total Rs)						= 288937
11. Net Total Cost						= 2600432
12. Government Subsidy 80 %						= 2080346

SAMPLE COST ESTIMATE OF WATER RESERVOIR (EARTHEN)						
1. Bed Clearance and dressing slopes of drains to required sections including the removal of weeds						
S. No.	Brief Description	Quantity	L (ft)	B (ft)	D/H (ft)	Total Cft
i	Center of Earthen Bund	1	60	90	2	10800
ii	Sides of Earthen Bund	2	28	60	2	6720
iii	Side Embankment	1	80	25	2	4000
Total Cft						21520
MRS-2017 (02-02-a) * Rs.		3937.5	per 1000 Cft	Total (Rs.) =		84735
2. Excavation in foundation of building, bridges etc complete: In ordinary soil						
i	Excavation of Key Trench	1	60	15	4	3600
ii	Cut off Wall U/S and D/S	2	15	2	2	120
iii	Stilling Pool with Side Wall	1	21	12	2	504
iv	Toe Wall	1	15	2	2	60
v	Wing Wall U/S	2	15	3	2	180
vi	Protection Toe Wall D/S	1	60	2	2	840
vii	Spillway along with Side Wall	1	21	8	2	336
Total Cft						5640
MRS-2017 (02-02-a) * Rs.		4162.5	Per 1000 Cft	Total (Rs.) =		23477
3. Earthwork in ordinary soil for embankment lead upto 100 ft, including ploughing and mixing with blade grade and compaction by mechanical means at optimum moisture maximum modified dry density contents 85%						
i	Center of Earthen Bund	1	60	90	2	10800
ii	Sides of Earthen Bund	2	28	60	2	6720
iii	Side Embankment	1	80	25	2	4000
iv	Making and Compaction Earthen Embankment Super Structure	1	82	60	28	137760
v	Making and Compaction Earthen side Embankment	1	80	25	6	12000
vi	Trench of Water Reservoir	1	60	15	4	3600
Total						174880
MRS-2017 (03-05-c) * Rs.		9562.4	Per 1000 Sft	Total (Rs.) =		1672273
4. Providing and Laying stone or spawl filling : On slope						
i	Spawl filling on U/S slope	1	82	58	0.75	1189
Total(Cft)						1189
MRS-2017 (08-03-d-03) * Rs.		15894.8	Per 100 Cft	Total (Rs.) =		188089
5. Providing and Laying stone pitching with hammer dressed stones on surface, laid in courses						
i	Stone Pitching on U/S slope	1	82	58	0.75	3567
Total(Cft)						3567
MRS-2017 (19-27) * Rs.		7372.5	Per 100 Cft	Total (Rs.) =		262977
6. Cement Concrete Brick Stone Blast 1 1/2" to 2" in foundation (1:2:6)						
i	Cut off Wall U/S and D/S	2	15	3	0.3	30
ii	Stilling Pool with Side Wall	2	12	3	0.5	36
iii	Side Wall Spillway	2	8	3	0.5	24
iv	Toe Wall	1	15	2	0.5	15
v	Wing Wall U/S	2	15	3	0.5	45
vi	Stilling Pool Beg	1	15	12	0.5	90
Total						240
MRS-2017 (06-02-a) * Rs.		14780.37	Per 100 Sft	Total (Rs.) =		35473
7. Rubble Masonry (Uncoursed) in ground floor or 20' height, building/other than building (1:4)						
i	Cut off Wall U/S and D/S	2	15	3	1.5	126
ii	Stilling Pool with Side Wall	2	12	2.5	5	300
iii	Side Wall Spillway	2	8	2.5	7	210
iv	Toe Wall	1	15	2	2.5	75
v	Wing Wall U/S	2	15	2.5	5	375
vi	Spillway	1	20	6	10	1200
Total						2286
MRS-2017 (08-02-d-02) * Rs.		17135.82	Per 100 Sft	Total (Rs.) =		391725
8. Rubble Masonry (Uncoursed) in ground floor or 20' height, building/other than building (Dry)						
i	Protection Wall D/S	1	60	6	7	2520
Total Cft						2520
MRS-2017 (06-07-a) * Rs.		5464.51	Per 1000 Cft	Total (Rs.) =		137706
9. Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:2:4)						
i	Cut off Wall U/S and D/S	1	60	4	0.25	60
ii	Wing Wall Top U/S	2	15	2	0.25	15
iii	Side Wall Spillway	2	12	2	0.25	12
iv	Stilling Pool Side Wall Top	2	12	2	0.25	12
v	Toe Wall Stilling Pool Top	1	15	2	0.25	7.5
vi	Spillway Steps	8	20	0.5	0.25	20
Total						126.5
MRS-2017 (06-05-f) * Rs.		20551.96	Per 100 Sft	Total (Rs.) =		25998
9. Total Rs. of S. No. 1, 2, 3 and 4 =						2823352
10. 10% (Contractor Profit) (to be subtracted from Total Rs)						282335
11. Net Total Cost						2541017
12. Government Subsidy						2032814
RD %						

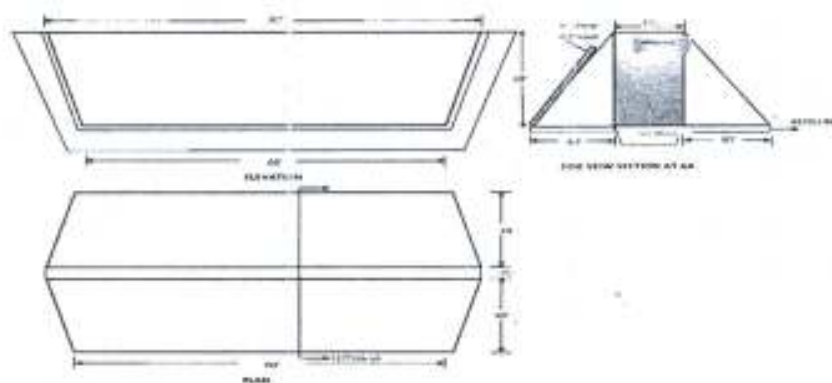
Designs of water reservoirs



Cemented water reservoir (side view)



Cemented water reservoir (top view)



Earthen water reservoir

**SAMPLE COST ESTIMATE OF STREAM BANK STABILAZATION STRUCTURE
(G.I.WIRE)**

1. Foundation Excavation

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Excavation of Foundation	1	160	5	3	2400

MRS - 2017 (3-23-b) *Rs. 6075 Per 1000 Cft Total (Rs.) 14580

2. Supply of Stone/Bolder & Filling in G.I Wire Crates Excluding Cost of Crates(19-26)

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Foundation	1	160	5	3	2400
ii	Super structure 1st step	1	160	4	2.5	1600
iii	Super structure 2nd step	1	160	3	2	960
iv	Super structure 3rd step	0	0	0	0	0
Total(Cft)						4960

MRS-2017 (19-26) * Rs 4737.5 Per 100 Cft Total (Rs.) = 234980

3. Providing and Weaving G.I Wire Netting for Wire Crates (6*9) Mesh of 8 SWG

A. Foundation

T/B	2	160	5	1600
F/B	2	160	3	960
Sides	2	5	3	30
Total Sft				2590

B. Super Structure 1st Step

T/B	1	160	4	640
F/B	2	160	2.5	800
Sides	2	4	2.5	20
Total Sft				1460

C. Super Structure 2nd Step

T/B	1	160	3	480
F/B	2	160	2	640
Sides	2	3	2	12
Total Sft				1132

D. Super Structure 3rd Step

T/B	0	0	0	0
F/B	0	0	0	0
Sides	0	0	0	0
Total Sft				0

Total Sft.A+B+C+D = 2590 1460 1132 0 = 5182

MRS-2017 (19-13-A-03) * Rs 3434.2 Per 100 Cft Total (Rs.) = 177961

4.Total Rs. of S. No. 1, 2 and 3 = 14580 + 234980 + 177961.3 = 427521

5. 10% (Contractor Profit) on S. No 4 (to be subtracted from Total Rs) = 42752

6. Net Total Cost = 384769

7. Government Subsidy 80 % = 307815

**SAMPLE COST ESTIMATE OF STREAMBANK STABILAZATION STRUCTURE
(PROTECTION BUND)**

1. Foundation Excavation

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Excavation of Foundation	1	140	4	3	1680

MRS - 2017 (3-23-b) *Rs. Per 1000 Cft Total (Rs.)

2. PCC 1:3:6 in mass concrete less formwork using 40% boulders

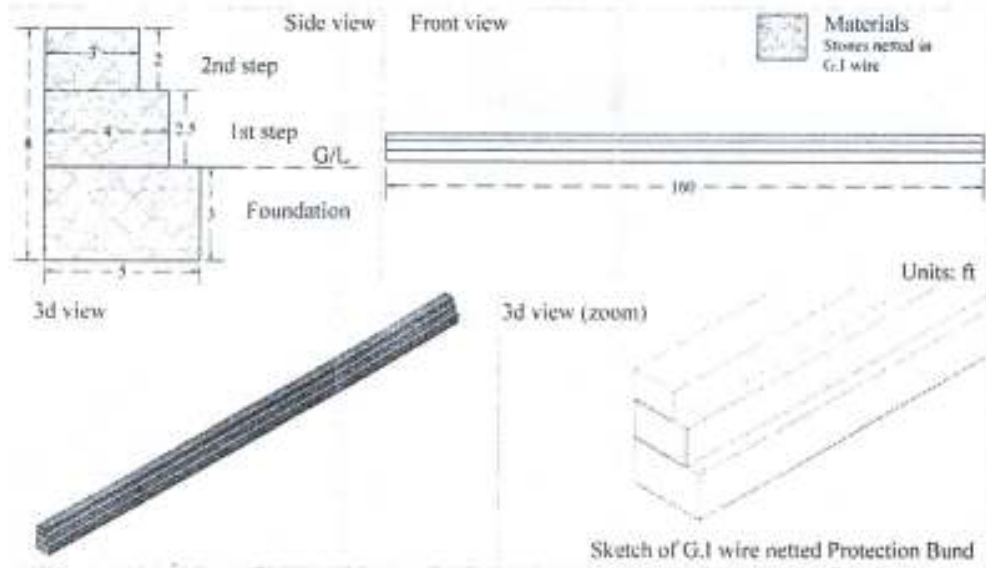
S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Foundation	1	140	4	3	1680
ii	Super structure 1st step	1	140	3	2.5	1050
iii	Super structure 2nd step	1	140	2	2	560
iv	Super structure 3rd step	1	0	0	0	0
Total(Cft)						3290

MRS-2017 (06-36-b) * Rs Per 100 Cft Total (Rs.) =

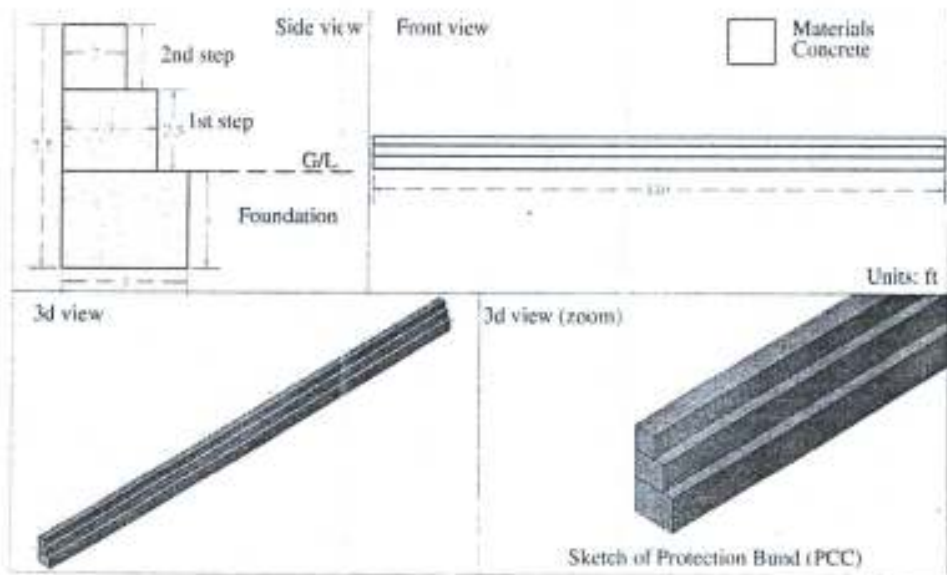
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5. 10% (Contractor Profit) on S. No 4 (to be subtracted from Total Rs)				=	<input type="text" value="42838"/>
6. Net Total Cost				=	<input type="text" value="385543"/>
7. Government Subsidy	80 %			=	<input type="text" value="308435"/>



Designs of streambank stabilization



G.I. wire protection bund



Cemented protection bund

SAMPLE COST ESTIMATE OF GATED FIELD INLET/OUTLET

1. Foundation Excavation

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Inlet/Outlet	1	40	6	5	1200
ii	Side Walls	2	10	2	5	200
iii	Wing Walls (U/S)	2	5	2	5	100
iv	Wing Walls (D/S)	2	5	2	5	100
Total(Cft)						1600

MRS - 2017 (3-23-b) *Rs. 6075 Per 1000 Cft Total (Rs.) 9720

2. Cement Concrete (brick/stone ballast, 1.5" to 2") in foundation & plinth (Ratio 1:6:12)

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Inlet/Outlet	1	40	6	5	1200
ii	Side Walls	2	10	2	5	200
iii	Wing Walls (U/S)	2	5	2	5	100
iv	Wing Walls (D/S)	2	5	2	5	100
Total(Cft)						1600

MRS-2017 (06-03-d) * Rs 10295.8 Per 100 Cft Total (Rs.) = 164732

3. Pucca brick work other than building upto 10 ft height: Cement, sand mortar 1:6

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Side Walls	2	10	2	5	200
ii	Wing Walls (U/S)	2	5	2	5	100
iii	Wing Walls (D/S)	2	5	2	5	100
iv	Pillar	1	5	2	5	50
Total(Cft)						450

MRS-2017 (07-07-a-05) * Rs 23092.3 Per 100 Cft Total (Rs.) = 103915.2

4. Cement plaster 1:4 upto 20' height 1/2" thick

A. Wing Walls (U/S)

Sides	2	4	4	32
T/B	2	4	2	16
F/B	2	4	2	16
Total Sft				64

C. Pillar

Sides	2	5	4	40
T/B	1	5	2	10
F/B	2	4	2	16
Total Sft				66

B. Wing Walls (D/S)

Sides	2	4	4	32
T/B	2	4	2	16
F/B	2	4	2	16
Total Sft				64

D. Side walls and Bed

Sides	2	5	4	40
F/B	2	5	2	20
Bed	1	28	6	168
Total Sft				228

Total Sft. A+B+C+D = 64 64 66 228 = 422

MRS-2017 (11-09-b) * Rs 2024.19 Per 100 Cft Total (Rs.) = 8542

4. Total Rs. of S. No. 1, 2 and 3 = 9720 164732 103915 8542 = 286909

5. 10% (Contractor Profit) on S. No 4 (to be subtracted from Total Rs) = 28691

6. Net Total Cost = 258218

7. Government Subsidy 80 % = 206575

SAMPLE COST ESTIMATE OF SPILLWAY

1. Foundation Excavation

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Spillway	1	55	6	3	990
ii	Side Walls	2	6	1.5	3	54
iii	Wing Walls (U/S)	2	6	1.5	3	54
iv	Stilling Pool	1	55	7	1	385
v	Stilling Pool Side Walls	2	7	1.5	3	63
vi	Toe Wall	1	55	1.5	3	247.5
Total(Cft)						1793.5

MRS - 2017 (3-23-b) *Rs. 6075 Per 1000 Cft Total (Rs.) **10896**

2. Cement Concrete (brick/stone ballast, 1.5" to 2") in foundation & plinth (Ratio 1:6:12)

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Spillway	1	55	6	3	990
ii	Side Walls	2	6	1.5	3	54
iii	Wing Walls (U/S)	2	6	1.5	3	54
iv	Stilling Pool	1	55	7	1	385
v	Stilling Pool Side Walls	2	7	1.5	3	63
vi	Toe Wall	1	55	1.5	3	247.5
Total(Cft)						1793.5

MRS-2017 (06-03-d) * Rs 10296 Per 100 Cft Total (Rs.) = **184654.3**

3. Random rubble masonry in foundation & plinth: In cement, sand mortar: Ratio 1:6

S. No.	Brief Description	No.	L (ft)	B (ft)	D/H (ft)	Total.Cft
i	Spillway Step 1	1	55	4	1	220
ii	Spillway Step 2	1	55	3	1	165
iii	Spillway Step 3	1	55	2	1	110
iv	Side Walls	2	6	1.5	5	90
v	Wing Walls (U/S)	2	6	1.5	5	90
vi	Stilling Pool Side Walls	2	7	1.5	2	42
Total(Cft)						717

MRS-2017 (08-01-d-03) * Rs 15248 Per 100 Cft Total (Rs.) = **109327.7**

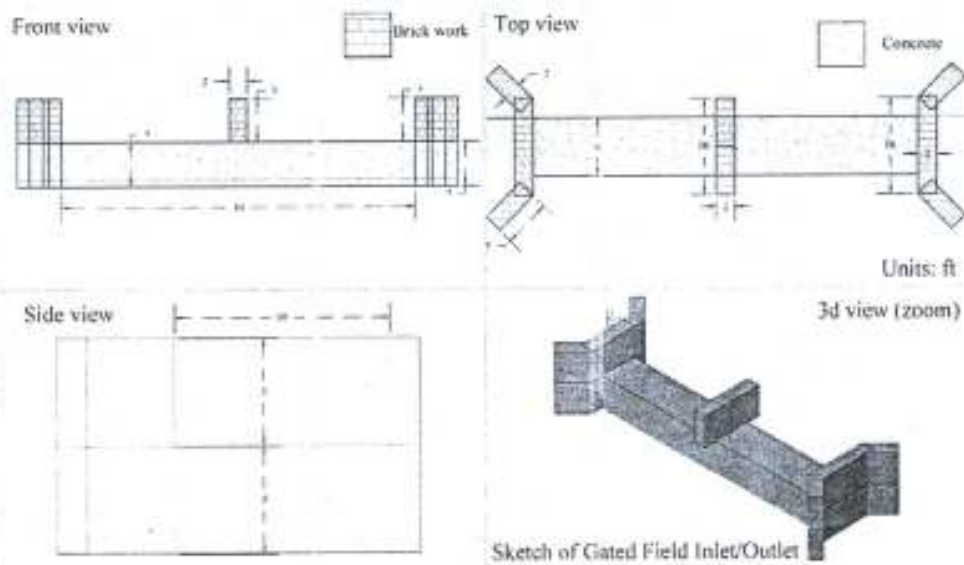
4.Total Rs. of S. No. 1, 2 and 3 = 10896 184654.3 109328 = **304877**

5. 10% (Contractor Profit) on S. No 4 (to be subtracted from Total Rs) = **30488**

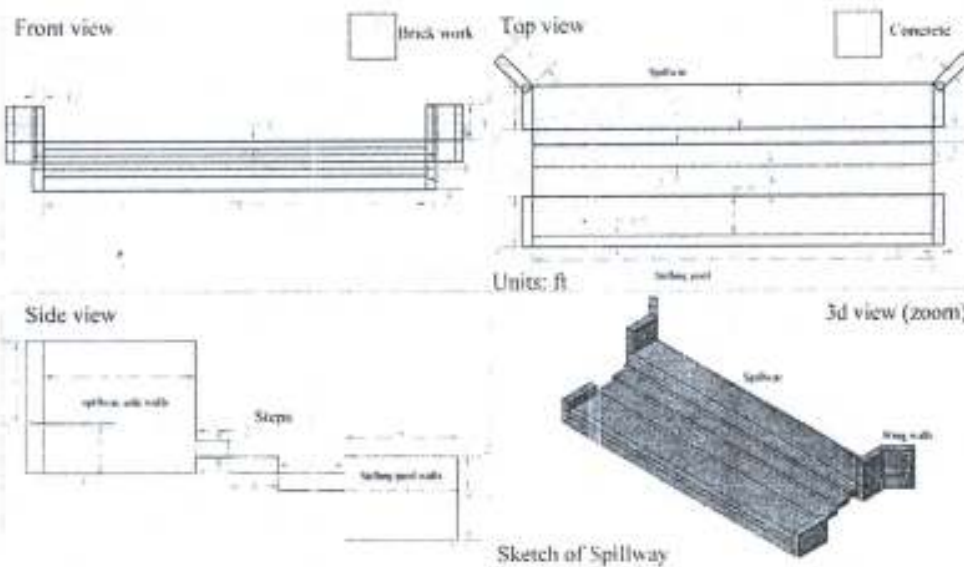
6. Net Total Cost = **274390**

7. Government Subsidy 80 % = **219512**

Designs of gated field inlet/ outlet/ spillway



Inlet/ outlet



Spillway

SAMPLE COST ESTIMATE OF TERRACING (1.00 ACERS)

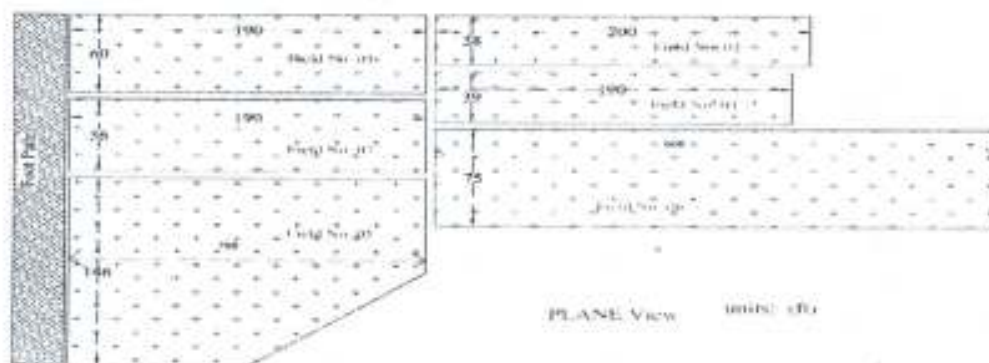
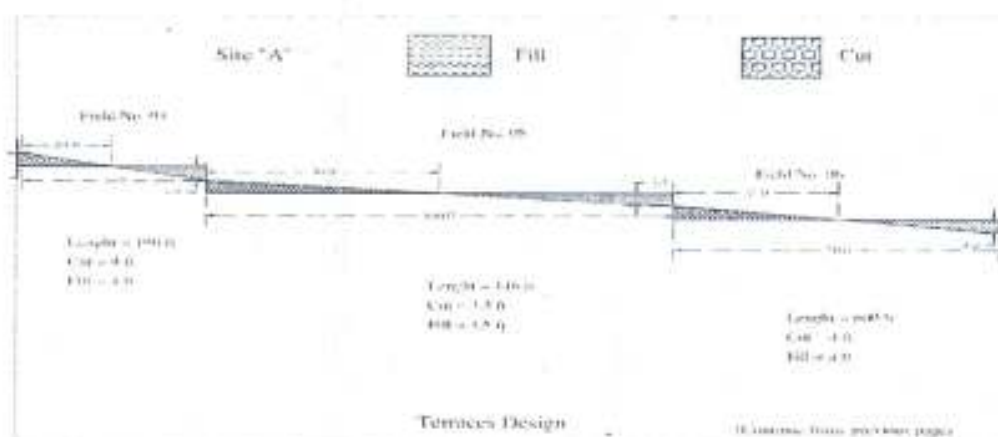
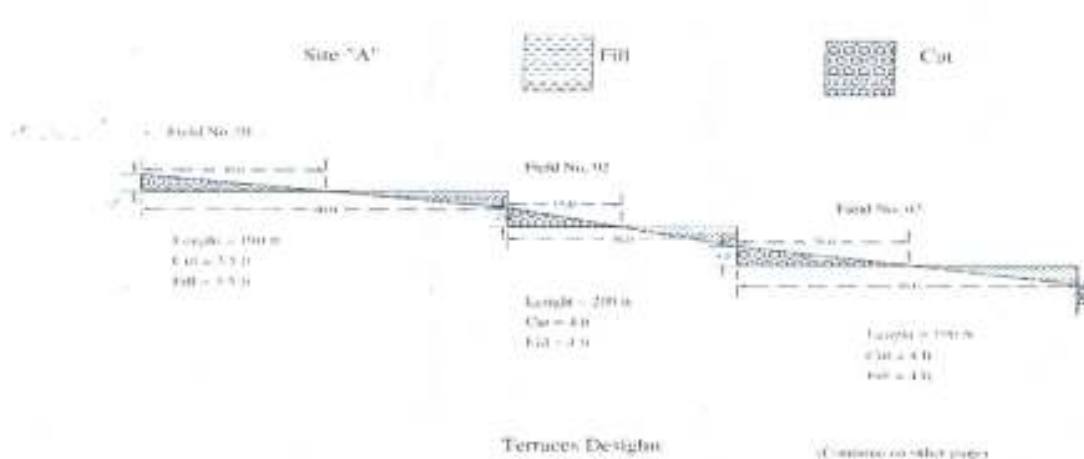
1. Earth excavation in irrigation channels/drains & disposal upto 25m. & dressing : in Ordinary Soil

Site	Field No	Quantity	L (ft)	B (ft)	Depth of cut/ fill (ft)	Total Volume of cut/Fill = L*(B*D)/2
i	1	1	190	30	3.5	9975
ii	2	1	200	19	4	7600
iii	3	1	190	28	4	10640
iv	4	1	190	20	4	7600
v	5	1	146	50	3.5	12775
vi	6	1	600	35	4	42000
Total(Cft)						90590

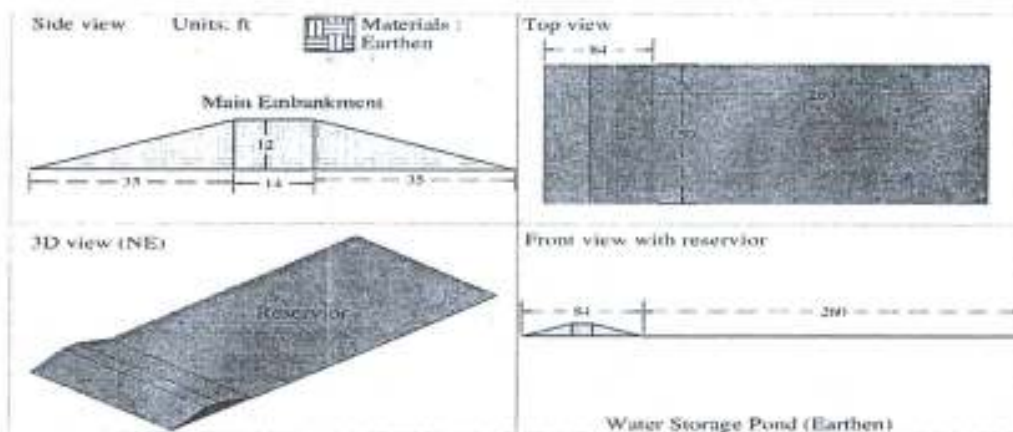
MRS - 2017 (03-10-a) *Rs.	4612.5	Per 1000 Cf	Total (Rs.)	417846
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2. Total cost estimate Rs.	=	417846
3. 10% (Contractor Profit) on S. No 4 (to be subtracted from Total Rs)	=	41785
4. Net Total Cost	=	376062
5. Government Subsidy	80 %	= 300849

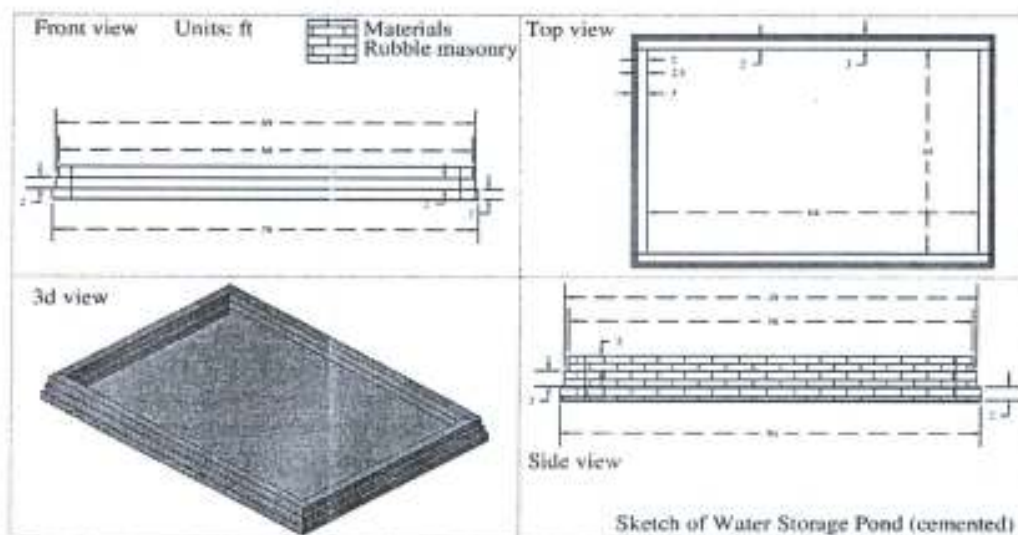
Design of terraces



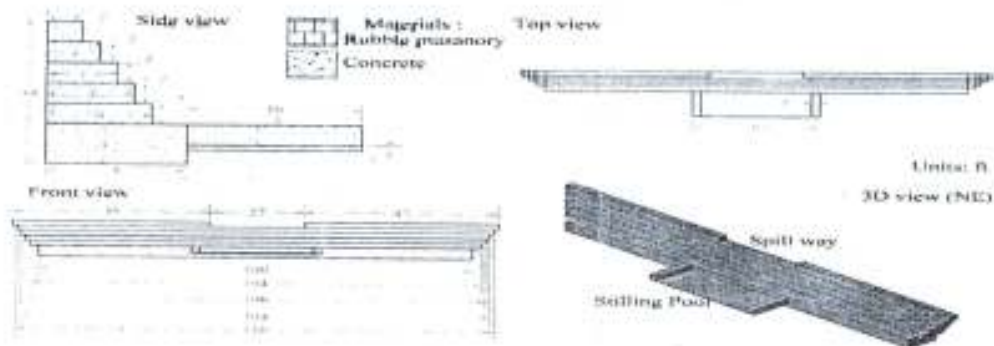
MICRO-WATERSHED DEVELOPMENT DESIGN



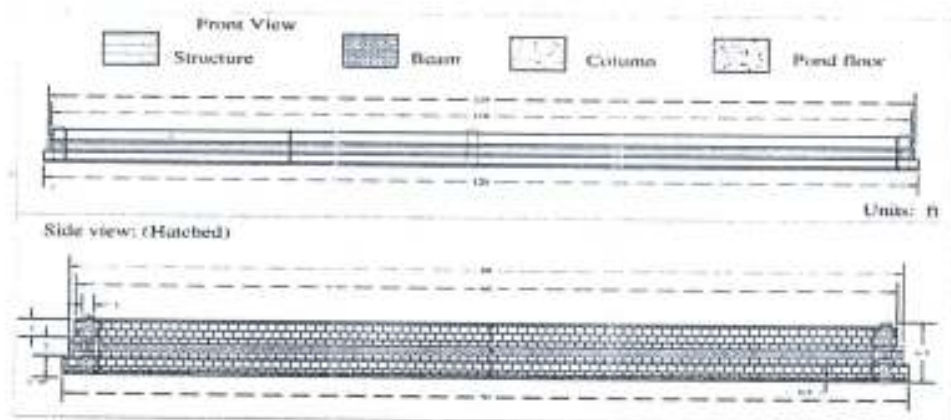
Earthen water pond



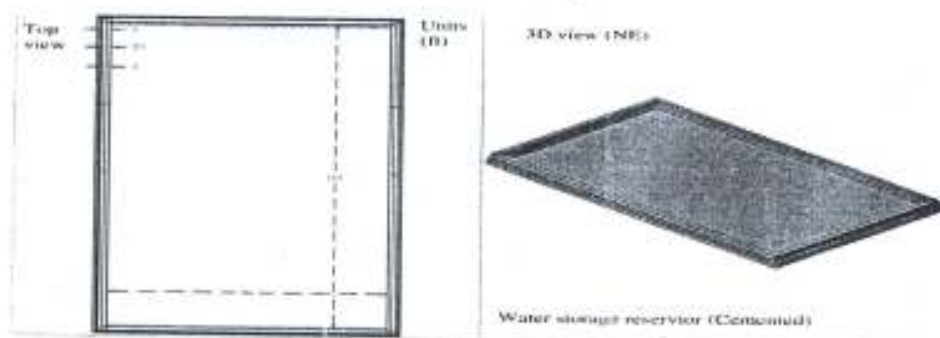
Cemented water pond



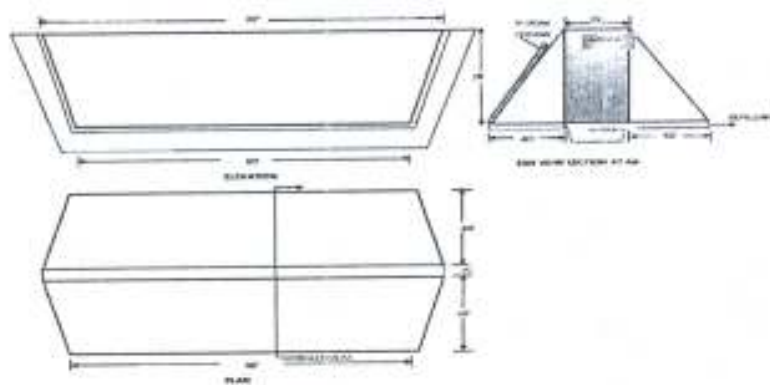
Cemented checkdam



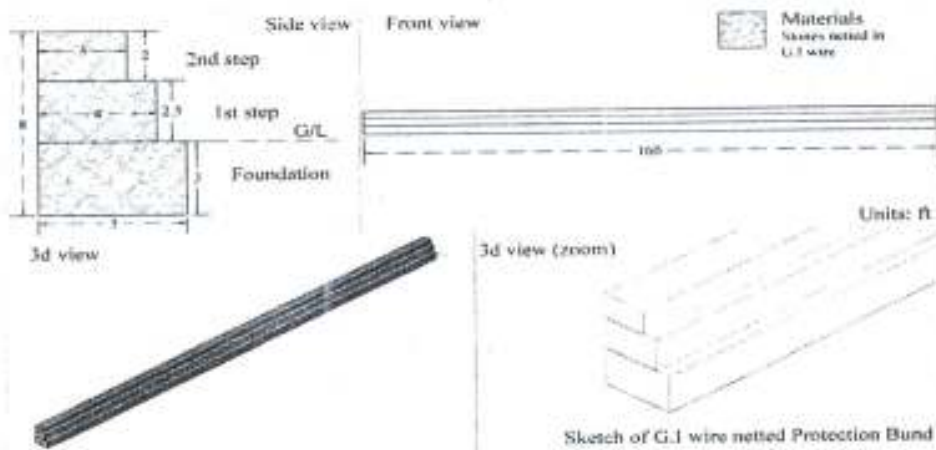
Cemented water reservoir (side view)



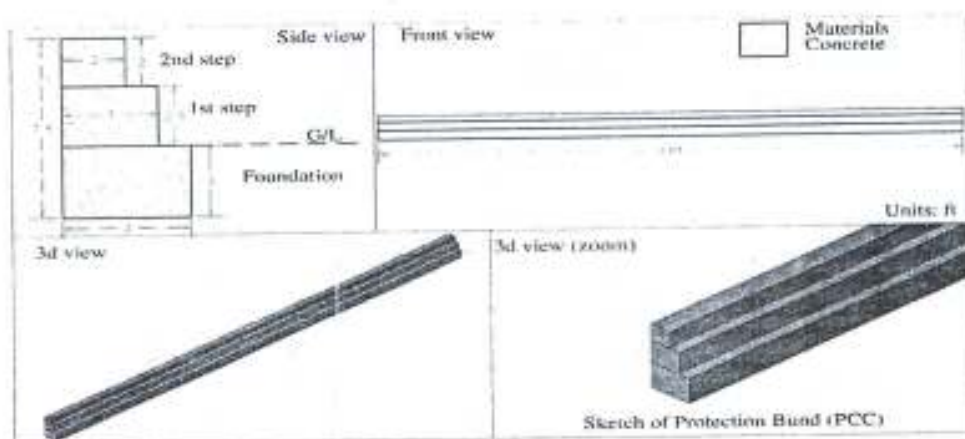
Cemented water reservoir (top view) Annexure- (g)



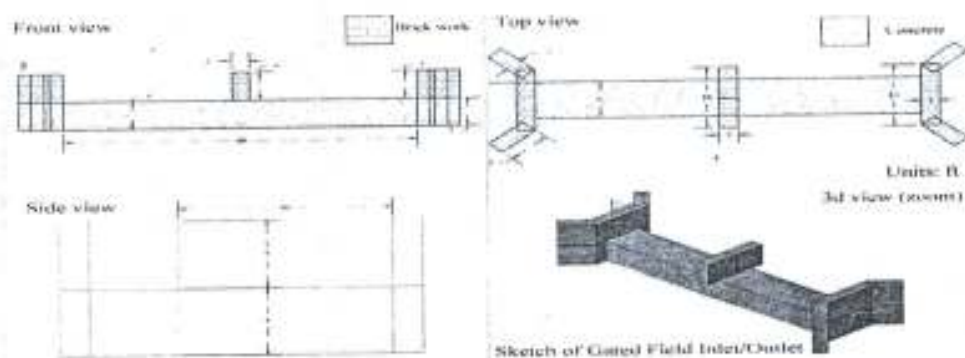
Earthen water reservoir



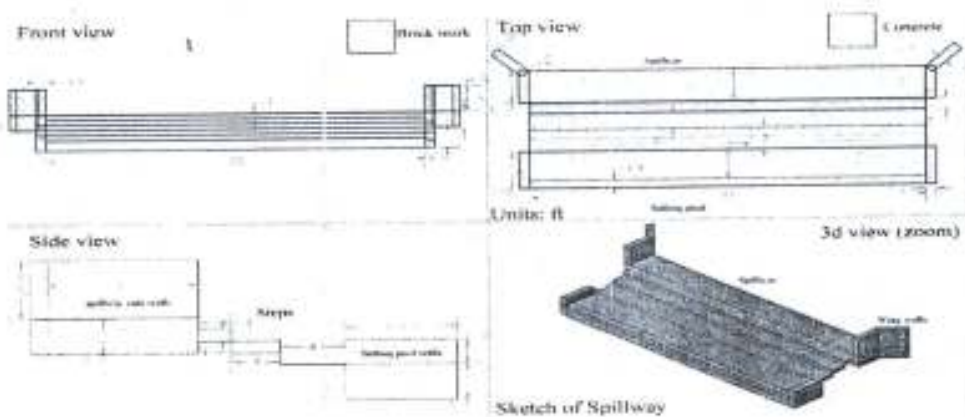
G.I wire protection bund



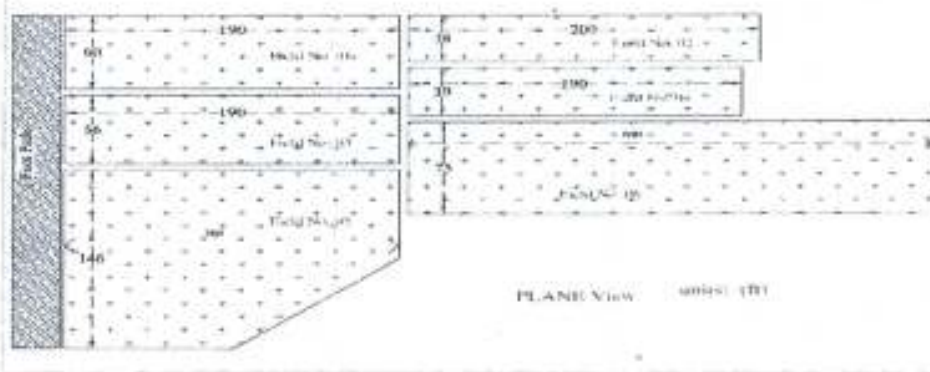
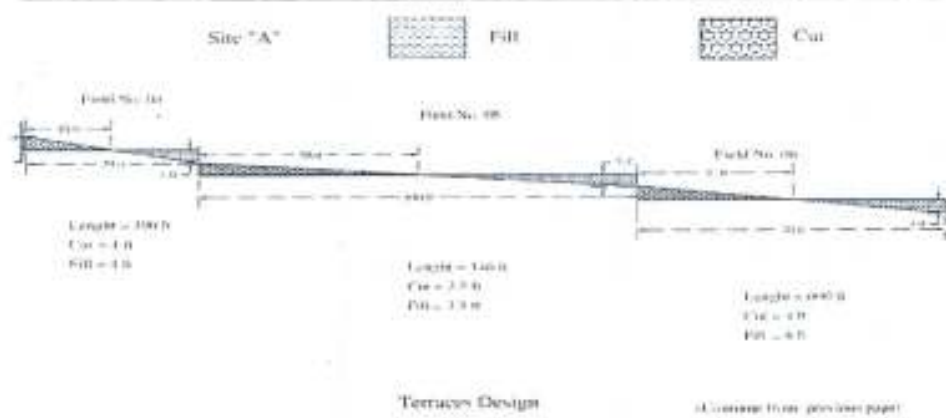
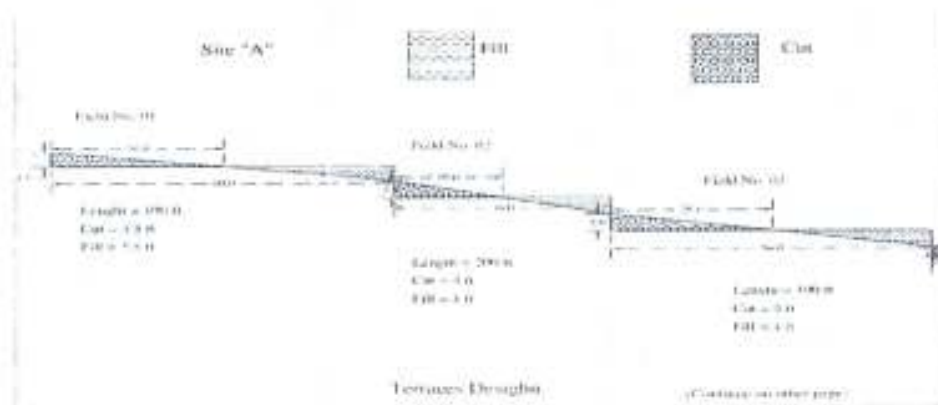
Cemented protection bund



Inlet/ outlet

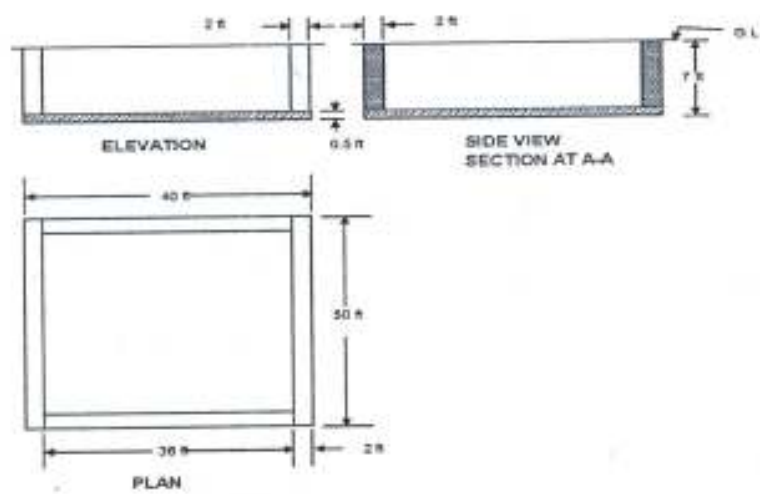


Spillway



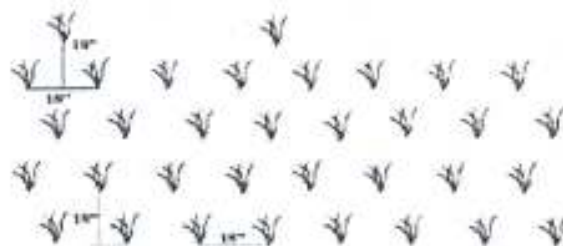
SAMPLE COST ESTIMATE OF WATER SEEPAGE HARVESTING GALLERIES						
S.No.	DESCRIPTION OF WORK	No.	LENGTH (ft)	WIDTH (ft)	HEIGHT /DEPTH	VOLUME R ³
1	Excavation in foundation of building, bridges etc complete: in ordinary soil					
	i Reservoir and foundation	1	50	40	7	14000
	Total					14000
	To convert from ft ³ into m ³ multiply by		0.028317			396.44
	MRS Item No. (03-23-b) @ Rs. 214.54 per cubic meter					Rs. 85051.81
2	Plain Cement Concrete including placing, compacting, finishing & curing (Ratio 1:4:8)					
	Bed	1	50	40	0.5	1000
	Long Wall	2	50	0.75	7	525
	Short Wall	2	36	0.75	7	378
	Total					1903
	To convert from ft ³ into m ³ multiply by		0.028317			53.89
	MRS Item No. (06-05-i) @ Rs. 5481.08 per cubic meter					Rs. 295360.33
3	Pacca brick work other than building upto 10 ft. height : Cement, sand mortar 1:4					
	i Long Walls	2	50	0.75	7	525
	ii Short Walls	2	36	0.75	7	378
	Total					903
	To convert from ft ³ into m ³ multiply by		0.028317			25.57
	MRS Item No. (07-07-a-03) @Rs. 8,444.27 per cubic meter					Rs. 215922.10
4	RCC in roof slab, beam, column & other structural members, insitu or precast. Type C (1:2:4)					
	Pond roof slab	1	50	36	0.33	594
	Total					594
	To convert from ft ³ into m ³ multiply by		0.028317			16.820298
	MRS Item No. (08-06-a-3) @Rs. 9,538.28 per cubic meter					Rs. 160436.71
5	Cement plaster 1:4 upto 20' height 1/2" thick					
	i Bed	1	50	36		1800
	ii Long Walls	2	50		7	700
	iii Short Walls	2		36	7	504
	Total Surface Area (ft ²)					3004.00
	To convert from ft ² into m ² multiply by		0.092903			279.08
	MRS Item No. (11-09-b) @ Rs. 217.8 per square meter					Rs. 60783.76
5	Total of S.No. 1, 2, 3, 4 & 5					Rs. 817554.71
6	Deduct Contractor profit @ 10%					Rs. 81755.47
7	Net Cost (5-6)					Rs. 735799.24
8	Government Share (80% of Net Cost)					Rs. 588639.39
						Rs. 600000.00

Design of water seepage harvesting galleries



**COST ESTIMATE OF RAISING ONE ACRE KANA SUCKER FOR
SAND DUNES STABILIZATION.**

S. No.	Particulars	Rate	Amount
1.	Cost and Carriage of 435 Nos. of Kana Plant	Rs. 30 per plant	13050/-
2.	Digging of 435 Pits and plants of 435 Nos.	2 work days One day rates per 800/-	1600/-
3.	Watch Ward	One year per one acre Rs.5350/-	5350/-
4.	Plantation form the plant 10x10		
		Total	Rs. 20000/-



**LIST OF AVAILABLE FACILITIES
OF DIRECTORATE GENERAL SOIL & WATER CONSERVATION
KHYBER PAKHTUNKHWA**

S. No.	Station	Vehicle (Model)	Motor-cycle	Computer/laptop	Printer/ scanner/ Projector/ Photostat/fax Machine	Camera	Survey kit/ GPS
1.	Headquarter	Honda Jeep (2018) Suzuki Jimny (2013) Suzuki Cultus (2 No.,2009) Total Vehicles: 5	3	7	7	1	
2.	Peshawar	Suzuki Cultus (2010)	2	2	1	1	2
3.	Charsadda	Suzuki jeep (1998)	1	2	2	0	2
4.	Nowshera	Toyota Avenza (2009)	1	1	2	1	2
5.	Mardan	Toyota pickup (1997)	1	2	1	0	1
6.	Swabi	Car (2010)	1	2	4	1	2
7.	Malakand	Toyota Pickup (2010)	2	2	2	0	2
8.	Swat	Jeep (1989)	1	2	1	0	2
9.	Shangla	Suzuki jeep (1989)	1	1	1	0	1
10.	Dir upper	Pickup (1994)	1	3	3	1	1
11.	Dir lower	1 pickup (1994)	1	4	3	0	2
12.	Chitral	No Vehicle	1	1	1	0	
13.	Kohat	Pickup (2008)	1	0	0	0	2
14.	Karak	Honda jeep (2018)	1	1	2	1	2
15.	Hangu	No vehicle	1	1	0	0	
16.	Lakki Marwat	Pickup (1994)	0	2	1	0	1
17.	Bannu	Suzuki Cultus (2009)	1	0	0	0	2
18.	D I khan	Pickup (2009)	1	1	1	0	2
19.	Haripur	Suzuki jeep (1984)	0	1	2	0	2
20.	Abbottabad	Suzuki jeep (1984)	1	1	1	0	2
21.	Mansehra	Pickup (1995)	1	2	4	1	1
22.	Bartagram	Suzuki jeep (1987)	1	1	4	0	2
23.	Torghar	Suzuki jeep (1992)	1	2	1	1	1
24.	Buner	Suzuki jeep (1987)	1	1	1	0	1
25.	Tank	Car (2010)	1	1	0	0	2
	Total	28	27	43	45	8	37

TORs (Age, Qualification, Experience etc.) as per project policy and as per existing rules of Directorate General Soil & Water Conservation Khyber Pakhtunkhwa.

S. No.	Establishment	Age (years)	Qualification	Job Description*
1.	Project Director (BPS-19/20)	35-60	B.Sc. (Hons)/ M.Sc. Soil Sciences with minimum 12-15 years' experience	<ul style="list-style-type: none"> Overall supervision of the project. Dealing all financial matters of the project. Management of physical and financial progress throughout the province. All main responsibilities of the post of Project Director.
2.	GIS Specialist (BS-18)	28-50	Masters in GIS or Master in IT/CS/ Geography or BS (IT)/CS/Geography (Hons) or Equivalent with 1 year postgraduate diploma in GIS and at least 5 year post qualification experience.	<ul style="list-style-type: none"> Identification of sites for Water Reservoirs and other soil and water Conservation structures through GIS/RS. GIS specialist will analyze spatial data through mapping software and designing digital maps with geographic data and various other data sets.
3.	Soil Conservation Field Officer (BS-17)	22-35	B.Sc. (Hons) in soil and environmental sciences or B.Sc. Agricultural Engineering from HEC Recognized University/ Institution	<ul style="list-style-type: none"> Through field visits, identification of sites for soil & water conservation, checking of revenue record for ownership of the land. Preparation of layout, sketches and rough cost estimates according to engineering designs for sanction of the competent forum. Frequent visits to field Maintaining completion report of each soil conservation work. Any other task assigned by the DG SWC/PD.
4.	Horticulturist (BS-17)	22-35	B.Sc. (Hons) in Horticulture from HEC Recognized University/ Institution	<ul style="list-style-type: none"> Recommendation of site specific fruit and vegetables for plantation according to the climate of the project area. Recommendation of soil binder plants and trees for the water shed/ project area. Any other task assigned by the DG SWC/PD.
5.	Sub-Engineer (Civil, BS-11)	22-35	DAE (civil) from HEC Recognized University/ Institution with at least 02 year post qualification experience.	<ul style="list-style-type: none"> Supervise and assist in technical matters to other field teams. Preparation of construction activities according to project objectives, time frame and design. Preparation of DCEs, Sketch etc. Supervise the unloading of the material on site as well as quality and quantity of the items.
6.	Field Assistant (BS-09)	18-35	Diploma in agriculture from agriculture training institute Peshawar	<ul style="list-style-type: none"> Preparation of estimates and sketches. Supervision of soil and water conservation works. Selection of feasible sites for construction of soil and water conservation works.
7.	Field Watcher (BS-03)	18-35	Literate.	<ul style="list-style-type: none"> Watching soil and water conservation structures in field area.
8.	Internees	20-35	16 Years Education with minimum qualification having 29 years upper age limit.	Assist Director/District Officer/Deputy Director in office and field activities.

* The project staff can be assigned any other task by the DG/PD for successful implementation of the project/ realization of the project activities.

IMPACT ASSESSMENT STUDY REPORT
OF
SOIL AND WATER CONSERVATION
INTERVENTIONS
(2008-2017)



DIRECTORATE GENERAL SOIL & WATER
CONSERVATION
AGRICULTURE, LIVESTOCK AND COOPERATIVES
GOVERNMENT OF KHYBER PAKHTUNKHWA

JANUARY 2019

INTRODUCTION

Soil is essential to human survival. We rely on it for the production of food, fibre, timber and energy crops. Together with climate, the soil determines which crops can be grown, where, and how much they will yield. In addition to supporting our agricultural needs, we rely on the soil to regulate the flow of rainwater and to act as a filter for drinking water. With such a tremendously important role, it is imperative that we manage our soils for their long-term productivity, sustainability and health.

The first step in sustainable soil management is ensuring that the soil will support the land use activity. For example, only the better agricultural soils in Khyber Pakhtunkhwa will support grain and vegetable production, while more marginal agricultural soils will support forage and pasture-based production. For this reason, agricultural development should only occur in areas where the soil resource will support the agricultural activity. The only way to do this is to understand the soil resource that is available. Soil survey information is the key to understanding the soil resource.

Soil survey is an inventory of the properties of the soil (such as texture, internal drainage, parent material, depth to groundwater, topography, degree of erosion, stoniness, pH, and salinity) and their spatial distribution over a landscape. Soils are grouped into similar types and their boundaries are delineated on a map. Each soil type has a unique set of physical, chemical and mineralogical characteristics and has similar reactions to use and management. The information assembled in a soil survey can be used to predict or estimate the potentials and limitations of the soils' behaviour under different uses. As such, soil surveys can be used to plan the development of new lands or to evaluate the conversion of land to new uses. Soil surveys also provide insight into the kind and intensity of land management that will be needed.

Mandate of Soil Conservation and Soil Survey of KPK

Protection/ conservation of Agriculture lands and water harvesting.

- Soil Survey, comprehensive inventory of soil resources of the Province of Khyber Pakhtunkhwa and their proper utilization.
- To evaluate the land resources for various kinds of Agriculture and Non Agriculture Development.
- To assist the Government and Semi-Government/ Non-Governmental Organizations in feasibility studies and preparation or execution of agriculture development projects.
- To promote sustainable land use and land management for increasing Agriculture production and ensuring conservation of the provincial land resources and environmental protection.
- Prevention of non -agriculture use of prime Agriculture Land.
- Prevention of encroachments of natural water ways (Khwaras and Nullahs)

Impact assessment study report:

The Directorate General Soil and Water Conservation has conducted an impact study of the soil and water conservation intervention constructed by the directorate in the whole province of Khyber Pakhtunkhwa in November 2018. The aim of the study was to evaluate the socio-economic impacts of the activities in the province. Officers of the soil and water conservation visited farmers at their fields and recorded data on prescribed proforma asking different questions regarding the benefits of the intervention.

The following table shows the actual number of interventions constructed in the province in previous 10 years. The data was taken on limited numbers of interventions in each districts and then correlated according to the total numbers of interventions mentioned in the table.

S. No.	Name of Intervention	Achievement 2008 to 2012	Achievement 2013-2017	Total Last 10 years
1.	Water Ponds	493	651	1,144
2.	Water Storage Reservoirs	0	195	195
3.	Checkdams	379	875	1,254
4.	Field Inlets for Sailaba Water	295	650	945
5.	Field Spillways for Sailaba Water	30	250	330
Total (Figures in numbers)		1,247	2,621	3,868
Percent increase		210 % increase in achievement.		
Cost (Rs. In million)		120.048	480.429	600.477
Rain water harvested (in Acre feet)		62,350	131,050	193,400

OUTCOMES OF THE STRUCTURES COMPLETED

The possible outcomes of the completed conservation structures in last 10 years throughout KP are as follows:

1. 15,033 Acres of prime agricultural land has been reclaimed/ benefited.
2. 31,788 farmers were benefited directly and indirectly.
3. About 193,400 acres feet of water have been saved for agricultural and other purposes in mini dams, check dams and ponds etc.
4. The harvested water are being used to irrigate 15,032 acres of culturable waste land to produce agriculture crops.

5. About 90,066 numbers of labors were provided short term employment during construction process of the above conservation practices.
6. Climate of the area is positively affected.
7. These practices are likely to have increased the number of livestock in the province.
8. In many areas, farmers' community has grown orchards near the water retaining facilities. Thus increased their income. Overall livelihood of the farmers has improved.
9. Many of the jobless agricultural graduates have started growing horticultural nurseries and fisheries.
10. Crop production of the rain fed areas of the province has increased.
11. These practices also increased ground water recharge.
12. Recreational value of the areas has improved.

Table-1 Soil and water conservation activities in district Charsada

Kind of intervention		Check Dam	SBS Bund	Water pond	Total
Area reclaimed/ protected (ha)		5.8	2.49	-	8.3
Livestock benefited (No's)		1000	5	25	1030
Area irrigated (ha)		20	-	3.3	23.3
Cost of land (lac/kanal)	Before	1.88	1.31	0.88	4.06
	After	2.50	3.69	4.38	10.56
Land use	Before	Non-cultivable	Only crops	Only crops	
	After	Crops, Trees (Eucalyptus)	Crops, Vegetables, Fodders.	Crops, Vegetables, Fodder	
Groundwater recharge	Before	-	-	-	
	After	Improved	-	-	

Table-2 Soil and water conservation activities in district Mardan

Kind of intervention		Check Dam	Water pond	Total
Area reclaimed/ protected (ha)		2.8	14.3	17.1
Livestock benefited (No's)		3	-	3
Area irrigated (ha)		-	14.3	14.3
Cost of land (lac/kanal)	Before	0.78	0.93	1.71
	After	5.50	4.00	9.50
Land use	Before	Non-cultivable	Crops (wheat, Brassica)	-
	After	Crops (wheat, Maize, sugarcane, Tobacco)	Crops, fruit trees (Peach, oranges)	-
Ground water recharge	Before	-	-	-
	After	Improved	-	-

Table-3 Soil and water conservation activity in district Swabi

Kind of intervention		Check dam	SBS	Water pond	Total
Area protected/ reclaimed (ha)		5.8	0.96	2.6	9.4
Livestock benefited (No's)		60	5	5	70
Area irrigated (ha)		1		2.6	3.6
Cost of land in Pakistani Rupees per Kanal)	Before	2.12	1.75	0.88	4.8
	After	6.25	4.60	2.63	13.5
Land use	Before	Crops (wheat)	Crops (wheat)	Crops (wheat)	
	After	Crops (Maize), vegetables (lady finger), Trees	Maize, vegetables, Orange orchard, Trees (eucalyptus)	Crops (maize, sugarcane) Vegetables(turnip)	
Groundwater Recharge	Before	-	-	-	
	After	Improved	-	improved	

Table-4 Soil and water conservation activity in district Nowshera

Kind of intervention		Check dam	SBS	Water pond	Total
Area protected/ reclaimed (ha)		4.34	3.4	2.02	9.73
Livestock benefited (No's)		1	14	2	17
Area irrigated (ha)				2	2
Cost of land in Million Pakistani Rupees per/ Kanal)	Before	1	1.33	1.3	3.63
	After	1.5	1.94	2.5	5.94
Land use	Before	Non-cultivated	Non-cultivated	Crops, Fruit orchards	
	After	Crops , vegetables, Fruit orchard	Crop (wheat, Maize) vegetables (onions), Orange orchard	Crops, fruit orchards, Vegetables onions)	
Ground water Recharge	Before	-	-	-	
	After	Improved	-	-	

Table-5 Soil and water conservation activity in district Peshawar

Kind of intervention		Check dam	SBS	Water pond	Total
Area protected/ reclaimed (ha)		3	1.6	5.5	10.05
Livestock benefited (No's)		5	2	4.75	11.75
Area irrigated (ha)		0.6	-	9.25	9.85
Cost of land in Million PkRs/Kanal)	Before	1.75	6.25	0.91	8.91
	After	3.75	11.25	2.44	17.44
Land use	Before	Non-cultivated	Crops(Wheat)	Crops (wheat)	
	After	Crops (wheat, maize, Sunflower), Orchards	Crop (wheat, barasica, Maize) vegetables (chillies, tomatoes)	Orchard (citrus), Vegetables (onions, tomato, potato)	
Ground water Recharge	Before	-	-	-	
	After	-	-	improved	

ANNEX-III

Agri Engineering Component

WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA

SUMMARY (Agricultural Engineering Component)

(Million Rupees)

S. No.	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Total
1	Cost of Physical Activities	285.932	285.932	289.932	294.482	299.722	1,456.000
2	Establishment Charges	16.200	17.820	19.602	21.563	23.718	98.903
3	Purchase of Physical Assets	29.500	0.000	0.000	0.000	0.000	29.500
4	Operational Expenses	10.520	8.800	8.800	8.800	8.800	45.720
5	Beneficiary Share	71.483	71.483	72.483	73.621	74.931	364.001
	Sub-Total	413.635	384.035	390.817	398.466	407.171	1,994.124

Summary of the Financial Cost

Million Rupees

	Federal Govt. Share (40% of Intervention Cost / Physical Activities)	114.373	114.373	115.973	117.793	119.889	582.400
	Govt of Khyber Pakhtunkhwa Share (60% Intervention Cost + S. No. 2, 3 & 4)	227.779	198.179	202.361	207.052	212.351	1,047.723
	Beneficiary Share	71.483	71.483	72.483	73.621	74.931	364.001
	Total	413.635	384.035	390.817	398.466	407.171	1,994.124

Agricultural Engineering Component

Table 11-a. AE Component Overall Year-Wise Financial Breakup*.

Rs. in million

Activities	Average Unit Cost					2019-20			2020-21		
	Unit	Govt Share	Farmer Share	Total Cost	Range (Govt Share)	Govt Share	Farmer Share	Total Cost	Govt Share	Farmer Share	Total Cost
Installation of Tube Wells	No	0.632	0.158	0.790	0.464-0.742	37.932	9.483	47.415	37.932	9.483	47.415
Solarization of Tube Wells	No	1.771	0.443	2.214	1.280-2.000	248.000	62.000	310.000	248.000	62.000	310.000
Establishment Charges	Lump Sum					16.200	0.000	16.200	17.820	0.000	17.820
Operational Expenses	Lump Sum					10.520	0.000	10.520	8.800	0.000	8.800
Physical Assets	Lump Sum					29.500	0.000	29.500	0.000	0.000	0.000
Grand Total						342.152	71.483	413.635	312.552	71.483	384.035

Table 11-b. AE Component Overall Year-Wise Financial Breakup*.

(Rs. in Millions)

Activities	2021-22			2022-23			2023-24			Total Five Years Cost (Rs. in Millions)		
	Govt Share	Farmer Share	Total Cost	Govt Share	Farmer Share	Total Cost	Govt Share	Farmer Share	Total Cost	Govt Share	Farmer Share	Total Cost
Installation of Tube Wells	37.932	9.483	47.415	37.932	9.483	47.415	37.932	9.483	47.415	189.660	47.415	237.075
Solarization of Tube Wells	252.000	62.000	315.000	256.550	64.138	320.688	261.750	65.448	327.238	1266.340	316.585	1582.925
Establishment Charges	16.200	0.000	16.200	21.952	0.000	21.952	23.718	0.000	23.718	98.900	0.000	98.900
Operational Expenses	8.800	0.000	8.800	8.800	0.000	8.800	8.800	0.000	8.800	45.720	0.000	45.720
Physical Assets	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.500	0.000	29.500
Grand Total	318.334	72.483	390.817	334.844	73.621	398.465	332.240	74.931	407.171	1638.123	364.000	1994.123

* The price of solarization component has been kept at a constant increase foreseeing inflation and exchange rate.

Table 12: Detail of Establishment Charges

(Rs. in Millions)

S.No	Description	Salary/Allowance/ Stipend/Month	No of Posts	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	Assistant Engineer (BPS-17)	0.090	10	10.800	11.880	13.068	14.375	15.812	65.935
2	Unit Supervisor (BPS-12)	0.030	10	3.600	3.960	4.356	4.792	5.271	21.978
3	Internees (5 engineers each year)	0.030	25	1.800	1.980	2.178	2.396	2.635	10.989
Grand Total				16.200	17.820	19.602	21.562	23.718	98.903

Table 13: Operational Cost

Rs. in Millions

S. No.	Description	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	POL	3.600	3.600	3.600	3.600	3.600	18.000
2	TA/DA	3.000	3.000	3.000	3.000	3.000	15.000
3	Repair & Maintenance	0.600	0.600	0.600	0.600	0.600	3.000
4	Stationery & Printing	0.300	0.300	0.300	0.300	0.300	1.500
5	Registration of Vehicle	0.720	0.000	0.000	0.000	0.000	0.720
6	Publicity & Advertisement	2.000	1.000	1.000	1.000	1.000	6.000
7	Miscellaneous/Others	0.300	0.300	0.300	0.300	0.300	1.500
Grand Total		10.520	8.800	8.800	8.800	8.800	45.720

Table 14: Physical Assets Detail

(Rs. in Millions)

Item	Description	Unit Rate	Quantity	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Office Equipment	Laptops with Printer and other accessories	0.15	12	1.800	0.000	0.000	0.000	0.000	1.800
	Photostate Machine	0.2	10	2.000	0.000	0.000	0.000	0.000	2.000
Transport	Jimmy Jeep 1300 C.C	2.8	8	22.400	0.000	0.000	0.000	0.000	22.400
	Single Cabin Pick-Up with Canopy	3.3	1	3.300	0.000	0.000	0.000	0.000	3.300
Total				29.500	0.000	0.000	0.000	0.000	29.500

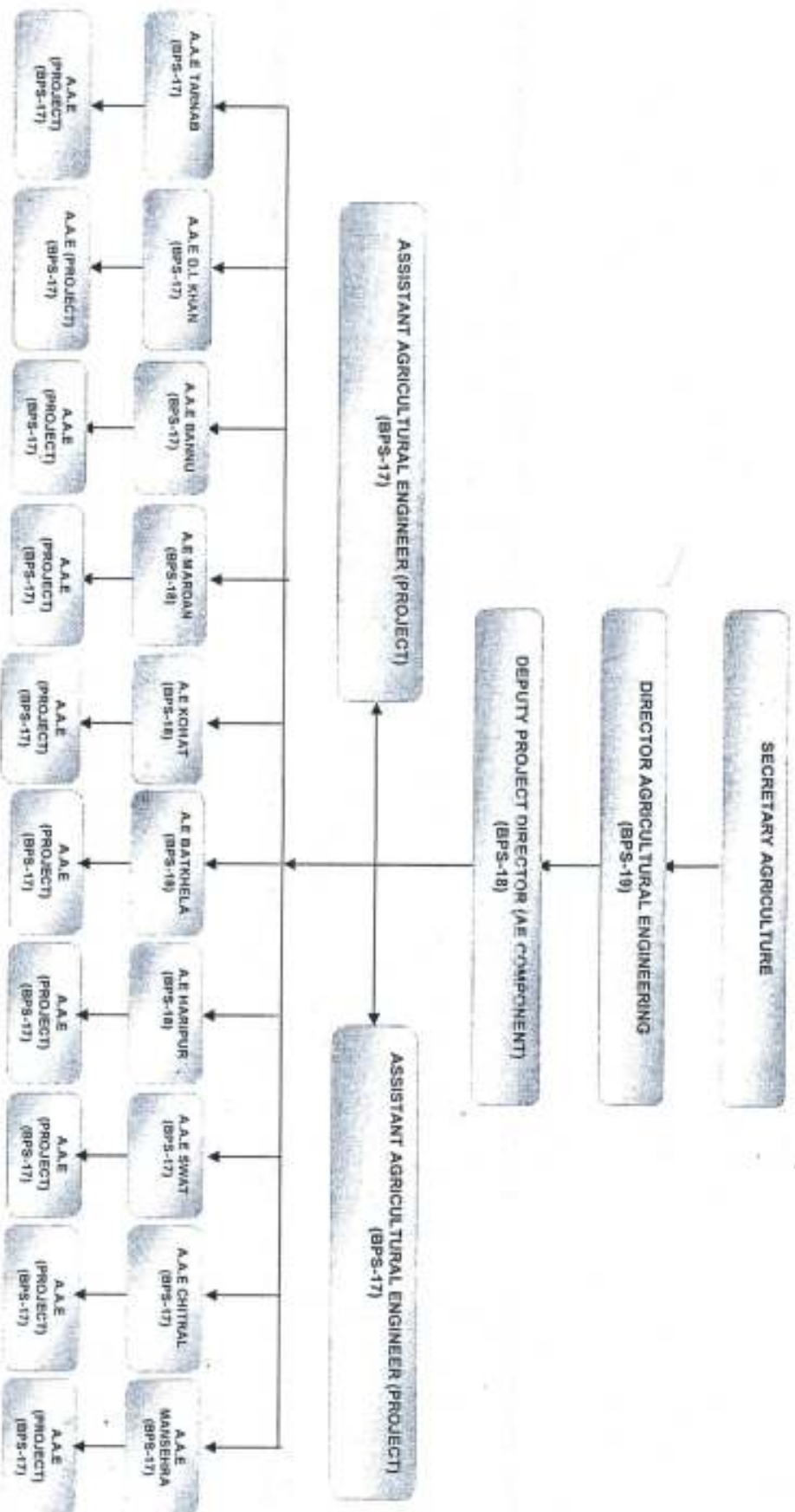
TERMS OF PARTNERSHIP (TOP)

Between Agricultural Engineer/Assistant Agricultural Engineer _____
(hereinafter called as Party 1) and Beneficiary/Beneficiaries of the Tube Well/Solar Pumping
System Village _____ Tehsil _____ District _____
(hereinafter called as Party 2).

This term of partnership is signed between Agricultural Engineer/Assistant Agricultural
Engineer _____ and Beneficiary/Beneficiaries Village _____
Tehsil _____ District _____ today on _____ day of _____
with the following roles and responsibilities of both the parties that:

1. Party 1 will provide financial and technical assistance for the installation of Tube Wells/Solar Pumping System according to approved design to Party 2.
2. Party 2 will provide dispute free site to Party 1 for the installation of Tube Wells/Solar Pumping System.
3. a). Party 2 will deposit his/their share @ 20% of the total cost of solar pumping system in advance in the designated PLS account opened for the purpose.
b). In case of installation of Tube Well, 80% cost of installation of Tube Well of the relevant category will be paid to the Party 2 after successful completion of Tube Well.
4. a). The Party 1 will start installation of Solar Pumping System on Tube Wells according to approved design, estimate and specifications.
b). In case of Tube Well, if the departmental drilling machinery cannot be spared from installation of tube wells, drilling work through private drilling agencies shall be carried out under close supervision of Party 1 and on the approval of competent authority.
5. Operation, maintenance and security of Tube Well/Solar Pumping System will be the responsibility of Party 2.

PROJECT IMPLEMENTATION UNIT (PIU-2) SET UP OF AGRICULTURAL ENGINEERING DEPARTMENT KHYBER PAKHTUNKHWA:



ESTIMATED COST OF INSTALLATION OF TUBE WELL

(Depth: 320 feet)

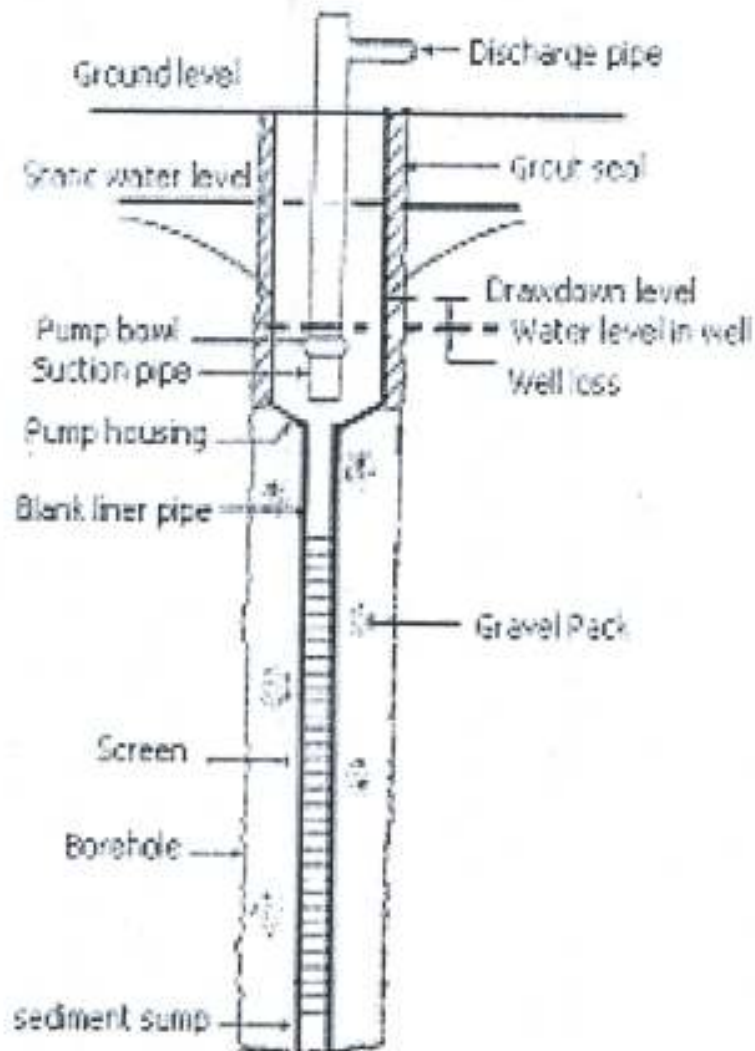
S.NO	PARTICULARS	COST IN RUPEES
1.	Shifting charges of Drilling Machinery to the site	30,000/-
2.	Cost of Drilling charges @ rate of Rs. 192 per ft. (excluding cost of Diesel) 192*320	61,440/-
3.	Cost of 120 ft. Length of filter 8 inches dia, PVC Class D, wall thickness 10.3-11.9 mm size of slots 0.75mm @ rate of Rs. 800/ft (120x800)	96,000/-
4.	Cost of 200 ft Blind pipe 8 inches dia, PVC Class D Wall thickness 10.3-11.9 mm @ rate of Rs. 800 per ft.	1,60,000/-
5.	Cost of Bail plug	6000/-
6.	Cost of shrouding material @ rate of Rs 5000 per 100 ft ³ for a total of 600 ft ³	30,000/-
7.	Cost of development charges by compressor	60,000/-
8.	Cost of Diesel @ rate of 7 litres per running ft. Approximately (subject to nature of strata) 7*320*120	2,68,800/-
9.	Transportation charges of Diesel to site (approximately)	35,000/-
10.	Bentonite clay approximately 3 tons @ rate of Rs. 40,000/ton	1,20,000/-
11.	Unforeseen expenditure (sudden repairs, faults / labour cost etc)	60,000/-
Grand Total		Rs. 9,27,240/-

- The above mentioned rough cost estimate is submitted for the purpose of calculation of total cost involved in drilling of tube well.
- As per S.O.P of Agricultural Engineering Department, the Department is responsible for providing free advisory/technical services for drilling process.
- Construction of pumping house is considered optional and responsibility of concerned beneficiary.

NOTE:

The estimated cost of installation of Tube Well is worked out as Rs 9,27,240/- as such the per foot cost (including drilling charges, lowering material etc... except pumping system) comes to be $9,27,240/320 = \text{Rs } 2897.63/-$ say Rs. 2900 per foot.

COMPONENTS OF A TYPICAL TUBE WELL



**DETAIL OF AVAILABLE FACILITIES IN AGRICULTURAL ENGINEERING DEPARTMENT
KHYBER PAKHTUNKHWA:**

S.No	Station	Vehicle (Make and Model)	Desktop/Laptop	Printer/Scanner /Projector/ Photostate/Fax Machine	Tube Well Drilling Machinery
1	Directorate	1. Suzuki Liana (2014) 2. Suzuki Cultus (2009) 3. Suzuki Baleno (2003)	5	9	--
2	Swat	1. Toyota Hilux (2011)	3	4	--
3	Tarnab	1. Mazda Pick-up (1996) 2. Toyota Pick-up (2000)	1	1	6
4	Kohat	Toyota Pick-up(2014)	1	1	--
5	Haripur	Toyota Pick-up(1996)	1	3	1
6	Mansehra	Mitsubishi,Pick-up (1996)	1	1	--
7	Chitral	Toyota Jeep (1982)	1	1	--
8	Batkhela	Toyota pick-up (2014)	4	4	--
9	Mardan	1. Suzuki Cultus (2014) 2. Mitsubishi Pick-up (1996)	1	1	2
10	Bannu	Mitsubisi Pick-up (1996)	1	2	--
11	DI Khan	1. Mitsubishi Pick-up (1996) 2. Toyota Pick-up (2014)	2	4	--
Grand Total		16	21	31	9

Note: Existing field vehicles are too old and in poor condition for carrying out even the existing departmental activities including field/official visits, shifting of fuel, spare parts, equipments. Accordingly, new vehicles including 10 No. Jeep and 02 No. single cabin pick-ups with canopy are proposed for smooth implementation of project activities.

EXISTING STRENGTH OF
DIRECTORATE OF AGRICULTURAL ENGINEERING

S.No	Station	Strength of Staff		
		Officers (BPS-17 and above)	Officials	Total
1	Directorate	7	21	28
2	Swat	1	56	57
3	Tarnab	1	97	98
4	Kohat	3	60	63
5	Haripur	3	50	53
6	Mansehra	1	42	43
7	Chitral	1	36	37
8	Barkhela	3	47	50
9	Mardan	2	33	35
10	Bannu	1	63	64
11	DI Khan	1	104	105
Grand Total		24	609	633

DISTRICT WISE DISTRIBUTION OF SOLAR PUMPING SYSTEM/TUBE WELLS IN KHYBER PAKHTUNKHWA DURING PROJECT PERIOD (2019-24):

S/NO	NAME OF DISTRICT	TUBE WELLS	SOLAR PUMPS
1	Peshawar	15	30
2	Charsadda	10	25
3	Nowshera	15	30
4	Mardan	10	25
5	Swabi	15	30
6	Kohat	15	25
7	Karak	15	30
8	Hangu	5	15
9	Bannu	15	30
10	Lakki	15	30
11	D.I.Khan	15	40
12	Tank	10	25
13	Mansehra	5	15
14	Tor Ghar	5	10
15	Abbatabad	5	20
16	Haripur	15	30
17	Kohistan	5	10
18	Malakand	15	30
19	Lower Dir	15	30
20	Upper Dir	5	10
21	Chitral	5	10
22	Swat	15	30
23	Buner	5	10
24	Shangla	5	10
25	Battagram	5	10
26	Erstwhile Fata Districts	40	140
Total		300	700

Note: The distribution of Solar Pumping System/Tube Wells among the districts can be changed in accordance with demand of the farmers in the respective district, on approval of Director Agricultural Engineering Khyber Pakhtunkhwa, Tarnab Peshawar.

A. List of Laboratory Equipments for GIS Laboratory

S.No	Equipment	Quantity	S.No	Equipment	Quantity
1	Kjeldhal apparatus	1	15	Hydrometer	1
2	Spectrophotometer	1	16	Water distillation Unit	1
3	Flame photometer	1	17	Air Conditioners 2 Tons	2
4	Mechanical shaker	1	18	Laboratory incubator	1
5	Ph meter	1	19	Soil Grinder	1
6	Ec meter	1	20	Hygrometer	1
7	Laboratory Oven 100liter	1	21	Soil moisture meter	1
8	Furnace	1	22	Weather Station	1
9	Weighing balance	1	23	Centrifuge machine 14000rpm	1
10	Titration apparatus	1	24	DSLR Camera D 5300	1
11	Chamber for Evacuated	1	25	Laboratory Refrigerator 16cft	1
12	Fume hood	1	26	Water quality test kit	1
13	Water bath	1	27	Motorized Soil Auger Set	1
14	Caring Trolley S.S	1	28	Gas Chromatography	1

B. List of laboratory Glassware

S.No.	Name	Quantity	S.No.	Name	Quantity
1	Beaker (50 to 1000ml)	120	7	Vol. Flask (50 to 1000ml)	53
2	Burettes graduated 50ml	04	8	China dish 50mm	12
3	Conical flask (100 to 1000ml)	60	9	Cylinder (25 to 100ml)	36
4	Density Flask (25 to 50ml)	18	10	Micro Burette 10 ml	12
5	Dropper	24	11	Petri dish 90mm glass	50
6	Mortar & Pestle	6	12	Crucible (25 to 50ml)	44

C. List of laboratory Chemicals

S.No.	Name	S.No.	Name
1	Sulphuric Acid (H_2SO_4)	11	ADTA
2	Hydrochloric Acid (HCL)	12	O- Phenthroline Monohydrate
3	Sodium hydroxide (NaOH)	13	Potassium dichromate ($K_2Cr_2O_7$)
4	Potassium chloride (KCl)	14	Iron Sulphate ($FeSO_4$)
5	Boric Acid	15	Magnesium Sulphate ($MgSO_4$)
6	Phenolphthalein Indicator	16	Davord Alloy
7	Methyl orange	17	Selenium
8	Perchloric Acid	18	Copper Sulphate ($CuSO_4$)
9	ABDTPA	19	K_2SO_4
10	DTPA	20	Zinc iodide

D. List of various Essential requirements for GIS Laboratory

S. No	Item Name	Specifications	Quantity
1.	Heavy Duty Machine (Workstation) with 28 Inch LED	Z440, Hard Disk: 3 TB, RAM: 64 GB, Processor: Intel (R) Xeon 3.60 GHz With GCU	1
2.	PCs with 24 Inch LEDs	DELL Core i7, RAM: 16 GB, Processor: 3.00 GHz Hard Disk: 1000 GB With GCU	5
3.	Printer	HP Color inkjet Printer, A4, A3 Size Printer and Scanner.	2
4.	Plotter	A0 Size HP, Dell	2
5.	Handheld GPS Receiver	Garmin eTrex 20	4
6.	Hand held Mobile GIS	Stonex S4II	1
7.	Uninterrupted Power Supply (UPS)	10KVA Long Backup min 1 Hour	1
8.	Camera.	Canon DSLR	1
9.	56 Inches LED	Samsung LED	1
10.	Multi Media	Samsung	1
11.	Total Station	SOKKIA	1
12.	Professional Series Laptop	HP	2
13.	Air Condition (Invertor)	Orient AC (Inverter) 2 Tonn	1
14.	Drones	eBeeSensfly	2
15.	Networking	Networking Switch with Cable roll, clips and laying	1
16.	Chairs	Revolving Chairs	7
17.	Resistivity Meter	Water Resistivity Meter	

Note: The above mentioned chemicals and specification of equipments have been acquired from various institutions. Chemical and equipments of better specification and market availability will be checked for at the time of purchase within the approved cost in the PC-I. Any other requirement for laboratory establishment, i.e. furniture, cupboards, sinks etc, will be managed within the approved cost.

TORs (Age, Qualification, Experience etc. as per project policy and as per existing rules of Directorate of Agricultural Engineering

S. No.	Establishment	Age (Years)	Qualification	Job Description
1.	Assistant Agricultural Engineer (BPS-17)	22-35	At least B.Sc. Degree in Agricultural Engineering from HEC Recognized University	<ul style="list-style-type: none"> To visit the site of the farmer at different interval during and after completion of the scheme. To verify the Solar Pumping System/Tube well in accordance with the approved specifications. To check and verify the performance of the Solar pumping system/ Tube Well. Checking and submission of the feasibility report/progress report to the concerned DDO regarding installation of Tube Wells/Solar Pumping System. Control/ supervision of the concerned project staff and activities.
2.	Unit Supervisor (BPS-12)	20-35	Three Years Diploma in Civil Engineering from a recognized Institute or higher qualification in the relevant stream i.e. B.Sc. Degree in Agricultural Engineering. from HEC recognized University	<ul style="list-style-type: none"> Supervision of the concerned field staff. To process the applications received from the farmers before start of work and maintenance of priority register. Preparation of Feasibility and progress report regarding installation of Tube Wells/ Solarization of Agricultural Tube Wells. To visit the site of the farmer at different interval during and after completion of the scheme. Maintenance of all the relevant record.
3	Internees	20-35	Enrolled in/ completed B.Sc. Degree in Agricultural Engineering	Students belonging to Agricultural Engineering Department will be given opportunities to conduct their research on Agricultural Engineering interventions in the project areas.




GOVERNMENT OF KHYBER PAKHTUNKHWA
COMMUNICATION & WORKS DEPARTMENT
NO.SO(B)II-10/Standardization/Solar Panels/PBC/2018-19/C&WD
Dated Peshawar the: 29/01/2019

To

1. Additional Secretary (Admn / Coord), FATA Secretariat Warsak Road Peshawar.
2. Director General M&E P&D Department, Peshawar.
3. Director Agriculture Engineering Tarnab Farm Peshawar.
4. Superintending Engineer, PHE Division Mardan, PHE Department.
5. Superintending Engineer PBC, C&W Department, Peshawar.
6. Director General PDA.
7. Chairman Electrical Engineering Department, University of Engineering & Technology Peshawar.
8. Executive Engineer Warsak Canal Division Peshawar, Irrigation Department.
9. Executive Engineer, Peshawar Division, PHE Department.
10. Deputy Director (PHA), ATI Campus Jamrod road Peshawar.
11. Executive Engineer PBC-II C&W Department.
12. Planning Officer, LG&RD Department.
13. Assistant Engr. CSR / MRS (Cell) C&W Department.
14. Manager Energy & Power Department Peshawar.
15. Deputy Secretary (Technical), Public Health Engineering Department, Peshawar.

Subject: REVISED TECHNICAL SPECIFICATIONS FOR SOLAR PANELS AND ALLIED EQUIPMENT (REV 2018)

I am directed to refer to the subject noted above and to enclose herewith approved Minutes of the standardization of revised technical specification for solar panels and allied equipment's (Rev 2018) meeting held on 11/01/2019 at 10:30 AM under the Chairmanship of Secretary C&W Department along with approved "Revised specifications for supply and installations of 1).Solar Based Pumping System 2).Solar Buildings / Home Systems 3).Solar Street Lights", duly approved by Standardization Committee of Khyber Pakhtunkhwa and approved pre-qualification proforma of solar panels for information and necessary action at your end, please.


(Engr. Muhammad Imran)
Section Officer (Buildings)

Encls: No. & Date Even:

Copy is forwarded for information to the:-

1. Chairman Pakistan Engineering Council (PEC) Building, Attaturk Avenue (East) G-5/2 P.O Box 1296, Islamabad.
2. Director Solar, Alternative Energy Development Board, Ministry of Energy / Power Division, Government of Pakistan, 2nd Floor, OPF Building, Shahrah e Jamhuriat, G5/2, Islamabad.
3. Manager Technical, National Energy Efficiency & Conservation Authority (NEECA), Near State Bank of Pakistan, NEECA Building, Sector G5/2, Islamabad.
4. Director Standards, Pakistan Standards & quality Control Authority, PSQCA Complex, Plot No. ST-7/A, Block No. 3 Scheme No. 36, Near Kamran Chowrangi, Gulistan E Jauhar, Karachi.
5. Member Custom Policy, Federal Board of Revenue (FBR), FBR House / Building, Opposite Supreme Court of Pakistan, Islamabad.
6. PS to Secretary C&W Department Peshawar.


Section Officer (Buildings)

Note: "Revised specifications for supply and installations of 1).Solar Based Pumping System 2).Solar Buildings / Home Systems 3).Solar Street Lights" is uploaded on C&W Department official website i.e c&w.gov.pk for easy receipt of the same.

MINUTES OF THE STANDARDIZATION OF REVISED TECHNICAL SPECIFICATION FOR SOLAR PANELS AND ALLIED EQUIPMENT'S (REV 2018).

A meeting of the committee regarding Standardization of Solar Panels & other allied works for the use in public infrastructure was held on 11/01/2019 at 10:30 AM under the chairmanship of Secretary C&W Department in the committee room of this Department (*List of participants attached*).

The meeting started with the recitation from the Holy Quran. While opening of discussion the Secretary C&W Department welcomed the participants and the Deputy Secretary (Technical) was asked to inform the forum regarding solar specifications.

The forum was briefed regarding the specification prepared by the sub-committee in its meeting held on 08/01/2019 under the chairmanship of Deputy Secretary (Technical) Public Health Engineering Department. Each and every item of Solar Panel with the allied equipment's have been discussed in detail certain changes proposed by the member were incorporated in the specification presented by the Chairman of the sub-committee. After detail deliberation the specification were approved unanimously and it was further decided to notify these specification in the best interest of public work keeping in view the works already approved or in the process of tendering which has been based on the previous specification notified vide No. SO(B)/II-10/Standardization/PBC/2016-17/C&WD dated 23/06/2017 to facilitate the executing agency in a right direction, therefore a gap of 3 months be kept in the implementation process. Hence these specification would be applicable which are to be tendered on are after 01/04/2019.

Meeting ended with vote of thanks.

PS

LIST OF PARTICIPANTS

**UP GRADATION IN APPROVED SPECIFICATIONS OF SOLAR PANELS COMMITTEE
MEETING SCHEDULED TO BE HELD ON 11/12/2018 AT 10:30 AM.**

**SUB HEAD: REVISED TECHNICAL SPECIFICATION FOR SOLAR PANELS AND
ALLIED EQUIPMENT'S (REV 2018).**

S.No.	Name of Officer/Official	Designation	Department	Signature
1.	Engr. Shahab Knattak	Secretary	C&W	
2.	Ishtiaq Ahmad	Assistant Engineer C&W/MS Cell	C&W	
3.	Amin- Zeb	Director	Housing	
4.	Sami-ullah Kundi	Xen	Irrigation	
5.	Jehanzeb Khan	SDO	Irrigat.	
6.	Engr. Nasir Zaman Khan	SO (Tech)	PH&D Dept	
7.	Engr. M. Anjool Khan	DST (P&W)	PH&D	
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**REVISED
SPECIFICATIONS
FOR
SUPPLY AND INSTALLATIONS OF**

1. SOLAR BASED PUMPING SYSTEMS,
2. SOLAR BUILDINGS / HOME SYSTEMS.
3. SOLAR STREET LIGHTS



2019
Version-01

**APPROVED BY STANDARIZATION COMMITTEE OF
KHYBER PAKHTUNKHWA**

[Handwritten signatures and stamps]

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Agril. Engineering
Tarnab, Peshawar

Deputy Secretary (Tech.)
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SE (HE)
CE (MA)

16/11/2019

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PO L&D

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1. SOLAR PANELS:

- Working temperature range of PV Module.

The PV Module should have at least 17.50 % Module efficiency with Positive Power Tolerance.

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- l. The PV modules offered should not be more than 12 months old from the date of issue of work order.
- m. PV Module should have a Snow Load bearing of 5400 Pa and Wind Load Bearing of at least 2400 pa however if Department deem appropriate may go for 3800 pa wind load depending upon their requirement.
- n. The Solar Module should be free from visual and cosmetics defects.
- o. The department/consultant on the expense of contractor/supplier shall verify Flash test reports with serial numbers from manufacturer for each panel (at the time of supply).
- p. All information regarding solar panel with above mentioned featured data should be accessible and verifiable online on the manufacturer website.
- q. IEC accredited lab test for solar panels is mandatory.
- r. EL (Electro-luminous) test will be performed randomly for each individual project at the cost of contractor/supplier.

2. CABLE & WIRING:

- a. The AC / DC cables should be made of 99.9% copper strands and Flexible.
- b. From PV Panel to Junction Box, XLPE or XLPO Insulated & XLPE/PVC Sheathed, UV stabilized single core, Double Insulated. Stranded /flexible cables (Conforming preferably to EN 50618 or IEC 60227) be used.
- c. From JB to Inverter, the DC cable must have Single-Core, double insulated and suitable for minimum 1000 V_{DC} transmission.
- d. From Inverter to batteries, the DC cable can be single insulated, Single Core and suitable for minimum 300 V_{DC} transmission.
- e. DC circuit breakers (not fuse) of \geq Voc of String Voltage and suitable ampere rating (1.25 to 1.50 Times of Rated Current of all strings connected) must be installed between PV modules and controller / inverter.
- f. AC Circuit Breaker (s) of suitable rating (1.25 to 1.50 Times of connected Load) must be installed between Controller / inverter to Load and Gnd to Controller / Inverter.
- g. AC / DC breakers should be marked with the manufacturer model number, rated voltage, ampere rating and batch/serial number.
- h. DC / AC breakers rating should be approved from Engineer In-charge before installation at site. To prevent solar panels from damage an appropriate size of DC Breaker / Fuse should be installed for each PV string and Surge Protection should be installed for combined Array (before Main DC Breaker / Inverter).
- i. DC Breaker, AC Breaker & Change overs should be placed in an enclosure. All Enclosures / Junction boxes should be made from Hot Dipped Galvanized Sheets of minimum 16 SWG.
- j. Cables shall be clearly labelled with essential electrical parameters including manufacturer name, Voltage Range, standards etc.
- k. All DC Wiring shall be aesthetically neat and clean, over all wiring/connection losses shall not exceed 1% of the total rated output power.
- l. All connections/ socket outlet among array, controller, inverters, batteries, and pumping set etc must be made in junction boxes of adequate protection level.
- m. All wires/cables should be in standard flexible UV-Resistant conduits / HDPE of PN12, SDR 13.6, PE100 for outdoor installation & (2-3 feet deep) for underground wiring / Cabling and PVC ducts for indoor installation.
- n. The DC Combiner Junction Box should be properly earthed including earthing of door as well.
- o. The DC Combiner should contain proper bus bars of adequate size each for Positive, Negative and Earthing.

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Director
Agri. Engineering
PK Tarnao, Peshawar

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- q. The Inverter Junction Box should be properly earthed as well as per vetted design of the Engineer in charge.
- r. All wiring should be in proper conduit of capping casing. Wire should not be hanging loose.
- s. All wires should be terminated properly by using lugs / thimble connectors / sleeves.
- t. Distribution board must be installed with proper screws.
- u. Electrical Hazards Safety Labels should be pasted on DC Combiner / VFD Enclosure / Charge Controller / Battery Enclosures.
- v. Following lab tests are mandatory.
Conductor resistance test, Insulation resistance test, Pressure test, Spark test.
- w. DC Cable from PV Module to Junction Box / Inverter for each string should be minimum size 6 mm².
- x. DC Cable sizing (For Pumping Schemes) from Junction Box to Inverter as per details below;

S. No	Nos of Strings	Cable Size ((mm ²))	Remarks
1	1	6	If Cable length is >200 ft (One Sided) than cable size should also be increased accordingly.
2	2	10	
3	3	16	
4	4-5	25	
5	6-8	35	

3. PANEL MOUNTING & STRUCTURE:

- a. The panel mounting and structure should be made of hot dipped (80 microns Average) galvanized steel of minimum thickness of **12 SWG / 2.64 mm Channel / Pipe or 8 SWG / 4.06 mm Angle** (Profile of channel and Sketch Attached for Reference).
- b. A sketch of the mounting frame (As per Actual Site Requirements) showing dimensions of the frame parts should be provided at the time of supply.
- c. PV to ground clearance must not be less than 1.5 feet. The height of the upper edge of the structure should not exceed 10 feet above the ground and 6 Feet for Roof Top Installations.
- d. To avoid Shading, Distance between two rows of PV panels and from walls should be maintained at a minimum of 1.6 times the height of structure/walls.
The pit size for concrete works should be minimum 1.5x1.5x2 feet for each individual leg or 1.5x2.5x2 for double leg and the concrete should be extended at least 1 foot above the ground. The concrete ratio should be 1:2:4.
- e. The Surface azimuth angle of PV Module 180° and the Tilt angle (slope) of PV Module should be 33°.
- f. The PV modules will be mounted on metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour.
- g. Due to land Non-availability or any other problem, Structure design can be modified as per site requirement. Pole Mounted or manual Tracker Structure can be provided with the approval of Engineer In-charge.
- h. Array fasteners (nut/bolts/washers) between PV Module and Structure shall be stainless steel Washers should be installed on both sides of Module frame.
- i. The minimum space between two PV Modules should be 2.54 cm (1 inch), to avoid air push over PV Modules.
- j. Mechanism / arrangement for cleaning of PV Panels should be provided. i.e. Space and ladder between panels or at the back side of structure, so that the operator can safely climb and clean the panels.
- k. All other array fasteners Structure shall be stainless steel or galvanized steel that provides the required mechanical strength.

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Public Health Engg. Department
Khyber Pakhtunkhwa

- m. The PV modules will be mounted on metallic structures at the inner holes for cantilevered installation, which will evenly distribute the load of the panel around the support structure on both sides and in the middle.

4. EARTHING/ GROUNDING:

- The PV Panel frame and structure should be connected by the shortest practical route to an adequate earth contact (of less than 5 Ohms Resistance) as per requirement of equipment manufacturer and site earth conditions, using an uninterrupted conductor. Grounding can reduce the risks of damage from lightning-induced surges.
- The Sizing of Earthing conductor will be done as per NEC Table 250.122
- The grounding conductor should be 99% Copper and PVC insulated / Bare Copper if installed underground along a defined path where size & Design shall be approved from Engineer In-charge before installation at site.
- Motor, inverter, Battery / Battery Box (if required), Main Distribution Board should be connected to an adequate earth contact / Grounding.
- Ground enhancement material (GEM) shall be used below and above the Earthing plate for proper grounding. Gravel or coarse sand shall be pour along with soil in the pit.
- Grounding / Earthing plate should be made of Copper plate of 4mm thickness & Size minimum 1.0 x 1.0 Ft.
- Grounding / Earthing conductor should be connected to the plate / Rod / GI Pipe by proper connector of minimum depth of 6 feet.
- Alternatively Earthing Rod of suitable size and length can be installed. (Instead of Plate). If given / mentioned in the BOQ/Design and Engineer In-Charge Approval.
- All nut / bolt and Earthing clamp shall be stainless steel or galvanized steel.

5. BATTERIES:

- The battery should be Deep Cycle, GEL, OPzV/OPzS, Lithium LiFePO4, Lead Carbon Type or equivalent. (Note: Battery type shall be specified in the bidding documents.)
 - The battery must ensure safe and reliable operation in the whole range of ambient temperatures from -5° C to + 50° C.
 - The maximum permissible self-discharge rate should not be more than 5 percent of rated capacity per month at 25° C.
 - The battery shall have a certificate of compliances, issued by a recognized laboratory.
 - The Batteries should have three years Comprehensive replacement warranty.
 - The battery shall meet the requirements and recommendations given in IEC 61427, IEC 60896-2:22 (For VRLA) or equivalent. Lab Test Reports for battery cycle life should be provided.
 - The Battery must support parallel connection to increase capacity in case of future expansion.
 - Each Battery should have following minimum information printed on battery:
 - Model Number, Serial Number and Type of battery.
 - Rated Voltage and Capacity (Ah) at discharge rate of 10 Hours.
 - Origin of made.
 - Manufacturer Name with distinct logo.
 - The following information must be provided in the data sheet while submitting technical bid.
 - Certification/Test Standard(s) of the battery.
 - Information regarding cycles & self-discharge rate.
 - In case of rechargeable battery bank (having more than one battery), the interconnection shall be made using lead plated copper bus bars or properly insulated flexible copper conductors.
 - Battery disconnect switch / breaker of suitable size should be installed between batteries and inverter / charge controller.
- The Battery must have Low self-discharge rate, No memory effect and No gassing.

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5.1 GEL BATTERIES:

- 5.1.1 Cycle life of the GEL battery (12V) before 80% capacity of Initial Capacity must be minimum **1000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours
- 5.1.2 Cycle life of the GEL battery (2V Cell) before 80% capacity of Initial Capacity must be minimum **1300** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours

5.2 LEAD CARBON:

- 5.2.1 Cycle life of the Lead Carbon battery (12V) before 80% capacity of Initial Capacity must be minimum **2000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.
- 5.2.2 Cycle life of the Lead Carbon battery (2V) before 80% capacity of Initial Capacity must be minimum **2500** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.

5.3 OPzV / OPzS BATTERIES:

- 5.3.1 Cycle life of the OPzV / OPzS battery (12V) before 80% capacity of Initial Capacity must be minimum **2000** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours
- 5.3.2 Cycle life of the OPzV / OPzS battery (2V Cell) before 80% capacity of Initial Capacity must be minimum **2500** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours

5.4 LITHIUM BATTERIES (LiFePO4):

- 5.4.1 Cycle life of the Lithium LiFePO4 battery before 80% capacity of Initial Capacity must be minimum **5750** cycles @ 50% depth of discharge (DOD) at discharge rate of 10 Hours.
- 5.4.2 The battery must have Integrated Battery Management System (BMS) to ensure battery safety and reliability.
- 5.4.3 The BMS of the battery must have the following specifications:
- Temperature protection
 - Over charge protection
 - Low voltage disconnect
 - High Voltage Disconnect
 - Short circuit alarm function
 - Self-balancing function
- 5.4.4 The LiFePO4 Battery must have LED status and alarm indication.
- 5.4.5 The charge and discharge rate of the battery must be designed at 0.2C minimum but capable of handling 0.5C charge and discharge currents.

Notes:

- Product brochure, catalogue and certificates must be attached with the Technical Bid.

6. BOX / STAND FOR BATTERIES, SHS-INVERTER & CHARGE CONTROLLER:

- a. The batteries should be housed in a vented compartment/stand that prevents users from coming in contact with battery terminals. This compartment/stand should be strong enough to accommodate the weight of the battery.
- b. A mechanism to prevent opening and entry of the battery should be provided.
- c. This compartment should be manufactured of mild steel of at least **18 SWG**.
- d. The compartment should be powder coated paint.
- e. The entire enclosure/stand must be constructed to last at least twenty years without maintenance and should be protected against corrosion. The enclosure should have a clean

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and neat appearance. Battery Box /stand should be installed at a place in accordance with user's preference

7. LED FLOOD LIGHTS:

- Solar Based LEDs/Light fixtures shall conform to the latest IEC/ISO internationally recognized standards.
- LEDs/Light fixtures should not be Chip-on-board (COB) single chip type due to their poor heat dissipation.
- LEDs/Light fixtures shall be modular type with proper heat sink.
- Solar based lights (LED fixtures etc) should provide at least 100 Lumen/watt.
- The Color rendering Index (CRI) must be equal or greater than 70
- LEDs/Light fixtures should be designed to deliver at least 10 years of service.
- Complete lightening unit shall be weather proof (Protection Class IP65).
- The output from the LEDs/Light fixtures should be constant throughout the duty cycle.

8. AC ENERGY EFFICIENT LED LIGHT BULBS:

Shape	Cap/Fitting/ Base Type	Colour	Lumen s Per Watt	Colour Temperature	Colour rendering index (CRI)	Life Time of Lamp (Hours)	Power Factor & Rated Voltage
Globe	E27	Cool or Warm White	Min 100W	2700K / 6500K	70	10,000	≥ 0.70 & 220 Vac

Note:

- LED Light Bulbs should be marked with the manufacturer model number, rated voltage, Wattage.

9. AC ENERGY EFFICIENT CEILING FANS:

Sweep	Rated Power	Speed		
Inches	Watts	Rpm		
56	1400 50 Max	≥ 320		

- 10% + in Power Consumption is Allowed as per PSQCA Standard
- Rated Voltage: 230 V~ (±10V)
- Rated Frequency: 50 Hz
- Insulation Class: 155 (F) or better
- Motor Core: Electrical Steel Sheet
- Winding Wire: 99.99% Super Enamelled Copper CA Wire or 99.99% Pure Copper Wire.

Note:

- Energy efficient fan should be marked with the manufacturer model number, rated voltage, and wattage.

10. DC ENERGY EFFICIENT LED LIGHT BULBS:

- The LED lamps must have luminous efficacy of at least 80 lm/W (at 25 °C ambient temperature).
- The LED lamp must be protected against reversed polarity of the operation voltage.
- Base shall be an E-27 thread type.
- The emitted light shall be cool or warm white.

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Khyber Pakhtunkhwa

- e. The wide angle shall be between 120° to 125°.
- f. Operating Voltage 12Vdc / 24Vdc
- g. Lamps should be marked with the manufacturer model number, rated voltage, wattage and date of manufacture or batch number.

11. DC CEILING FANS:

Sweep	Rated Power	Speed	Service Value	Operating Voltage
Inches	Watts	Rpm	Air Delivery/W	V
48 (with Speed Control) Metal Blades	30-36	> =320 RPM	9.54	12 / 24

12. DC PEDISTAL FANS:

Sweep	Rated Power	Speed	Service Value	Operating Voltage
Inches	Watts	Rpm	Air Delivery/W	V
18 Inch (with Speed Control)	18-30 W	1250 RPM (Full Speed)	5.22	12 / 24

13. INVERTER BASED SPLIT AC

Inverter based AC with both heating and cooling option.

S.No	DESCRIPTION	UNIT	DETAILS
1	Compressor	Type	Multistage Rotary
2	Noise Level (Indoor)	Db (Max)	≤ 50
3	Voltage Range	Volts (Min & Max)	180 to 250 Vac

14. PVC CHANNEL DUCTS & PIPES

a. A product of good quality standard material standardized by the provincial standardization committee with suitable size to be provided / used, as per direction/approval of Engineer In-charge.

- b. Ducting must be done with proper steel nails and clips.
- c. All ducting (wiring) must be align.

15. FLEXIBLE PVC PIPE

- a. The flexible PVC pipe should be of good quality material standardized by the provincial standardization committee with suitable size to be provided / used, as per direction/approval of Engineer In-charge.

16. CIVIL WORK:

The following Civil Works should be carried out for ground installation of SPV Modules/mounting structures.

- a. Minor Cutting and clearing of trees/plantation to avoid shadows.
- b. Civil work for earthing system as per the statutory requirements.

17. REFLECTIVE / INSULATING PAINT

The Roof Paint should be ultra-white, high reflective, 100% acrylic, elastomeric roof sealer designed for fixing leaks in roofs the paint should contain heat reflective pigments and additives that provide an excellent, highly protective barrier which reflects the sun's heat and destructive UV rays leaves a brilliant ultra-white finish, reducing surface heat adsorption up 20°F.

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Peshawar

The Reflective paint should comply with ASTM D6083, Fiber Reinforced for more protection, strength and durability which allows for contraction and expansion, Resists surface fungal growth.

18. **WARRANTY/AFTER SALE SERVICE:**

Three years Comprehensive Free Replacement, Repair and maintenance Warranty at site (Free of Cost) should be provided for all the components of Solar System, (if not mentioned separately otherwise)

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B - SPECIFICATIONS FOR SOLAR PUMPING SYSTEMS

19. PUMP (SUBERSIBLE):

Pump should be supplied having standard ISO-9906 specifications. The pump must be submersible, made of stainless steel. The characteristic curves (Original from Manufacturer) showing the efficiency at duty point and performance of the pump should be provided in the technical proposal and also at the time of pre-supply testing. The quoted pump should be tested for its performance and certified as per ISO-9906 standard. The pump should be suitable for installation and operation in tube wells/dug wells/open well with clear water discharge. Pump shall comprise of bowl assembly and non-return valve as integral part of pump's parts. Pump and motor shall rigidly couple through NEMA standard coupling. The stage casings of pumps should be connected as per NEMA/ANSI/AWWA /ASTM/BSS standard. Each stage casing must have replaceable wear ring. The impellers shall be secured to the pump shaft with tapered conical sleeves pressed into the taper bore of impeller or impeller secured through chrome plated stainless steel hexagonal sleeves. Suction casing must be between pump and motor with suction strainer as protection of pump against coarse impurities of the liquid handled.

Specification for main components of the Pumps:

S.NO	Components	Specifications
1	Casing/Diffuser	The Casing/Diffuser should be in fabricated stainless steel AISI 304 / 316.
2	Impellers	Stainless steel AISI 304 / 316.
3	Driving Shaft	Stainless steel 304/420 / 316
4	Sleeves	Stainless steel AISI 329/ 304 / 316
5	Gaskets	Rubber Gaskets
6	Bearings	AISI 329 stainless steel
7	Coupling & Screen + Cable Guard	Stainless steel AISI 316/319/304/420
8	Non-Return Valve / Sluice Valve	As per British standard specifications (BSS), Minimum PN16 (16 Bar) or Above (As Per Site Requirements) PN Value / Bar Capacity of Valves must be more than Installed Pump Max/Shut-off Head Minus Static Water Level of Bore. (Leakages in Valves are NOT Acceptable).
9	Pressure Gauge	As per British standard specifications (BSS), having PSI or Bar scale (4 Inch Size), Liquid Filled, minimum 350 PSI Range, Looped Siphon tube Pipe, Stainless Steel/polypropylene Casing.
10	Clamps	Steel - Pressed
11	Pump Efficiency	Minimum efficiency of the pump (For discharge of 3000 GPH and more) should be 70% ensured at duty point. (Duty Point of the Pump be preferably selected at the peak efficiency point or (Within $\pm 10\%$ of discharge) of Pump Peak efficiency Point)

20. MOTOR:

The winding material should be 99.99% copper. The motor should have wet type, water cool rewind-able/repairable stator. The motor should have non-disposable/non-hermetically sealed winding. The insulation class of the winding material should be mentioned. For each model quoted, all the technical parameters such as rated voltage, power factor, efficiency, full load ampere, speed

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and other similar parameters should be provided at the time of pre-supply testing. The testing report with all basic parameters should also be provided at the time of pre-supply testing.

The motor shall be manufactured in compliance with National Electrical Manufacturer Association (NEMA) standards. The motor shall be three-phase submersible and shall be capable of operating at rated voltage of 380 Volts at 50 Hz. The motor should be capable of operating with variable speed through V/F control. Winding of the motor shall of rewind able type with class - IC40 insulation and IP68 protection. The synchronous speed should be 2850-2950 RPM. Motor shall be capable of operating in well water with temperature normally start from 40°C. Motor should be designed for continuous operation. Motor must be filled with water without any chemical additives hazards to health for cooling. The motor must be properly protected against the entry of well water sand etc by double mechanical seal one is rotating and other stationary and must be made of Silicon carbide/ Tungsten carbide and must be protected with sand protection guards. All supports shall be high grade cast iron and stator outer side jacket body should be in stainless steel in AISI 304. The excessive pressure due to heating up of the filled water must be compensated by a pressure equalizing rubber diaphragm in the lower part of the motor. The axial thrust of the pump shall be countered by oscillating sliding block type thrust bearing. The thrust bearing of the motor should be able to bear a downward thrust force from the water pump and the upward thrust force produced while starting the water pump. Motor in open well / water tank should be installed with cooling jacket / shroud / sleeve and when motor is installed in bore then installing of cooling jacket is also required. Motor shall be capable of maximum of 20 starts in an hour. Motor efficiency of motors 7.5 HP and above should not be less than 75% at Full Load and Motor Rated Voltage.

Technical specification of rewind-able wet stators, three phase squirrel cage water filled submersible motor.

S.No	Components	Specification
1.	Winding	Made of pure electrolyte copper and the winding insulation should be suitable for > 1000 Volts and must full fill resistant tests range.
2.	Stator	Energy efficient low-losses electrical magnetic sheet should be fixed in stainless steel casing. M800 or M600 magnetic sheet are preferable to use.
3.	Rotor	Energy efficient low-losses electrical magnetic sheet fixed with high grade copper bars. M800 or M600 magnetic sheets are preferable to use.
4.	Spline Shaft	AISI 420 stainless steel, flange dimension according to NEMA standard, over size design to ensure stiffness in severe condition.
5.	Shaft bearing	Water lubricated guide/general bearings fixed in upper and lower brackets should be made of metal impregnated carbon.
6.	Lower thrust bearing	Thrust sliding block bearings, self-aligning Mitchell type, should be able withstand 20000N axial load
7.	Mechanical Seal (Stationary & Rotary)	Silicon carbide or tungsten carbide mechanical seal.
8.	Cooling filling fluid	Water mixed with non-toxic anti-freeze provide cooling and lubrication also protect and prevent inside parts from corrosion.
	Degree of protection	IP68
	Insulation Class	Insulation Class B (130°C) NEMA Insulation Class F (155°C) NEMA or above Will be given

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		Preference
11.	Voltage Tolerance	+6% to -10%
12.	Mounting position	Capable of both Vertical or horizontal Installation
13.	Class	IC40
14.	Maximum Immersion	150 Meters
15.	Starting per hour	20

21. SUBMERSIBLE FLATE ELECTRIC CABLE (4-Core):

The Submersible cable (4-Core) should be made of 99.9% copper strands with double PVC insulation for **1000Vac**, should be adequately flexible and environment friendly. Stranded and flexible insulated copper wires and cables must be used for all outdoor and indoor installations. The wiring that leads into the building shall be protected in a conduit. The cable must have undergone quality tests as per BSS standards. Cable size should be selected so that the Voltage drop Losses in the drop cable should not be more than 2.5%.

Following lab tests are mandatory:

- Conductor resistance test.
- Insulation resistance test.
- Pressure test.
- Spark test.
- Note: The Supplier should provide the quality tests certificates at the time of pre-supply testing and inspection.

22. COLUMN PIPE:

The column pipe shall be flanged ERW steel pipes confirming to ASTM designation A-53 with a minimum thickness of **3.6 / 4.0 mm (3.6 mm for pipes upto 2.5" dia and 4 mm for pipes above 2.5" dia)** and shall be painted with corrosion resistance paint of suitable thickness. Flanges thickness of 19-20 mm shall have grooves for cable passage. Each column pipe shall be complete with gaskets, bolts/studs, washers and nuts. All nuts, bolts, and washers shall be made of minimum A2 grade stainless steel.

The column pipe shall be supplied in interchangeable section having an approximate length of 10 feet column pipe shall be flanged perpendicular to the axis of pipe.

Column pipe size should be selected so that the Head Losses in the column pipe should not be more than 5%.

For Reference a table-1 is given below.

HDPE Pipe of ≥ 0.75 Inch diameter, SDR 13.6, PE100, conforming to ASTM F-2160 Standard without Joints to be installed/included along with and equal to Column pipe for confirming Water Level testing purpose.

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FEATURES:

- Manufacturer's pipes should meet international standards like BSEN 10255 & ASTM A 53.
- Dimensional accuracy circularity and plan end cut should be observed.
- Weld strength of pipe and mechanical properties or raw material should be tested as per manufacturing standards.
- Pipes should be NDT tested (Non-destructive - Eddy current)
- Pipes should be hydrostatically pressure as per manufacturing standard.
- Pipes should be gone through straightening process to remove bendiness.

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23. **TOPSET:**

Top set shall comprise of Bore covers plate, (covering bore hole completely and securely), installation/suspension clamps (2-Nos), sluice valve (BSS/ASTM), reflex valve (BSS/ASTM), Washout Valve approx. 3-4 feet above the ground (T-Connection For Testing Pump's discharge), connector and cable jointing material (Cable connection from motor to switching device shall be joint free), Liquid Filled Pressure gauge minimum 4 Inch diameter suitable / appropriate for the required head pressure and cable ties. Bore Cover Plate should have provision for water level testing facility (i.e: Hole for Sonic Water Level Meter / HDPE Pipe insertion)

For Cleaning of solar Panels, Plastic pressure pipe should be provided of suitable length to reach the furthest / last Solar Panel.

Every Water Supply Scheme should have a non-removable name plate fitted at suitable place / box having essential information and bearing the name of supplier, Consultant and client.

24. **SOLAR PUMP INVERTER / CONTROLLER:**

- a. The solar pump inverter/controller should have built-in advance version of Auto MPPT controller, over load protection, Soft start/Soft Stop Features and Variable Frequency Drive (VFD) with integrated Gate Bipolar Transistors (IGBTs) of European, USA or Japanese origin or atleast equivalent.
- b. The make and origin of the inverter/controller should be clearly mentioned in the catalog and submitted in the technical proposal.
- c. The inverter offered should comply to or Equivalent standards:
 - i. CE/RoHS
 - ii. Low Voltage Directive 2014/35/EU
 - iii. EMC Directive 2014/30/EU
 - iv. IEC 62109-1 (Safety of Power Converters for use in PV Systems)
- d. The complete datasheet showing all the electrical parameters like input & output voltage ranges should be provided in the technical bid.
- e. All the electrical parameters like input & output voltage ranges, and efficiency should be provided at the time of pre-supply testing and inspection.
- f. Efficiency of inverter should be 95% and above at Rated Capacity.
- g. Efficiency of MPPT should be 98% and above.
- h. The inverter < 25kW ingress protection of inverter must be minimum IP 65 Rating or above and for inverter \geq 25kW ingress protection of inverter / enclosure will be minimum IP 54 Rating or above.
- i. Inverter / Controller having the capability to run both on AC and DC Power would be given preference.
- j. Inverter should have at least three (3) years product and performance warranty.
- k. The Pump Controller/Inverter should have an ON/OFF Switch/Button to Start and Stop the Pump.
- l. Inverter should have active RS232/485 etc communication port available, the Data available through this port can be used for Remote Monitoring.
- m. Inverter circuit must include protection against:
 - i. Over or Low voltages and currents beyond critical level of the inverter's circuits.
 - ii. Protection against accidental short circuits & reverse polarity connections.
 - iii. Protection against lightning induced transients.
 - iv. Over load protection.
 - v. Low RPM Protection (i.e: Frequency < 30 Hz or as per pump characteristic curve) Motor Should Stop.
 - vi. Dry run protection. (PF / Current Based).

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Karnataka Veterinary, Animal and Fisheries Sciences University
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25. **dV/dT or Sine Filters With Inverter (VFD):**

- The use of load reactors increases the reliability, performance, and efficiency of VFD systems, extends the life of both drives and motors, and reduces the amount of energy consumed by the motor/drive system.
- Output dV/dT or Sine Filters (between VFD and Motor) of appropriate size (for 3-phase ≥ 380 Vac Motor of Class B Insulation) should be used where the cable length between motor and inverter is more than Fifty (50) Feet or as advised / recommended by the inverter manufacturer in their Technical Documentation. For Cable lengths of more than 150 meters sine filters should be used.
- Filter should be enclosed in a vented box.
- Filter Efficiency should be minimum 97%.
- Filter should have a current rating of equal or greater than Motor FLA Rated Current.
- Distance between filter and pumping inverter should not be more than 2 meters.
- Motors with Insulation Class F, H or above are exempted from the requirement of dV/dT Filter.

26. **SYSTEM DESIGN FOR PUMPING SYSTEM:**

- Suitable factor of safety should be applied while designing the system in order to have compensations for variations in irradianations.
- For Fix Structure and Auto Tracker, the PV panel **peak power at STC (Wp)** should be **75% more** than the Motor basic input power (**PV Loss Compensation Factor = 1.75**).
- For Auto /Manual Tracker, the PV panel **peak power at STC (Wp)** should be **50% more** than the Motor basic input power (**PV Loss Compensation Factor = 1.5**) as per direction of Engineer Incharge
- If Single Axis Auto Tracker Structure is installed on the above factor, then daily operational timings of pumping can be increased by 10-20%, as compared to fixed structure installation.
- Total PV Power (Wp) (Imperial Gallons) =
$$\frac{Q \text{ (IGPH)} * TDH \text{ (ft)} * 7.46 * \text{PV Loss Factor}}{60 * 3300 * \eta_{\text{pump}} * \eta_{\text{inverter}}}$$
- Total PV Power (Wp) (US-Gallons) =
$$\frac{Q \text{ (US-GPH)} * TDH \text{ (ft)} * 7.46 * \text{PV Loss Factor}}{60 * 3960 * \eta_{\text{pump}} * \eta_{\text{inverter}}}$$
- Total PV Power (Wp) (Metric Units) =
$$\frac{Q \text{ (m}^3\text{/hr)} * TDH \text{ (m)} * 9.81 * 1000 * \text{PV Loss Factor}}{3600 * \eta_{\text{pump}} * \eta_{\text{inverter}}}$$
- Voltage (V_{mp}) of Each String of PV Panels should be as per details given below and String Voltage (V_{no}) should be within the MPPT range of Inverter.
For 380 V_{ac} 3-Phase Motor = $380 * 1.414 * 1.06 = 571$ Vdc String, minimum
For 220 Vac 3-Phase Motor = $220 * 1.414 = 310$ Vdc String.
Small Inverters (i.e: 3-Phase, 220 Vac) with voltage boost function are exempted from the above string voltage requirements. String can made as per boost Inverter Controller recommended String DC Voltage and should not be less than 230Vdc in any case.
- Details of each PV Panel string should be submitted in Technical proposal (i.e: Nos of total strings and Nos of PV panels in each string along with wattage and V_{mp} of each PV panel).
Unjustified Oversizing in PV Panels Wattage is not allowed.
To avoid any oversizing, all commercially available PV Panels should be considered.

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- l. Solar Pump Inverter should have a kW capacity equal or greater than the Motor Rated Input Power.
- m. Solar Pump Inverter / Controller Size (kW) \geq (Motor Rated Power in kW / Motor Efficiency).
- n. Solar Pump Inverter / Controller should have a current rating of 1.15 Times (minimum) of Motor FLA Rated Current.
- o. Motor should not be loaded more than 90%. (i.e. Design / Calculated BHP should not be more than 90% of Motor Rated Horse Power)
- p. Along with this specification, contractors should also follow manufacturer's recommendations for all major components of Solar Pumping System.
- q. Requirement of Efficiency for Motor i.e. 75% will not apply on Motors smaller than or equal to 5.5HP and the requirement of efficiency for pump i.e. 70% will not apply on pumps having discharge equal to or lower than 3000 GPH.

27. PRESSURE PUMPS (UPTO 5.5 HP):

- a. Submersible pump conforming to ISO-9906 Standard.
- b. Pump + AC Motor (3-Phase-220V/380V) or DC Motor and Pump with Display Unit.
- c. Solar pump inverter/controller should be MPPT based and Minimum Ingress Protection of IP65.
- d. In case, where the column pipe diameter is less than or equal to 1.5-inch (For discharge equal or less than 6000 LPH and/or for Motor 4 HP and below), HDPE pipe of at least PN12 / SDR 13.6 / PE100 (For TDH of equal or less than 300 ft) without joint may be used instead of MS pipe for better economics and to avoid hydraulic losses. However stainless steel rope of minimum diameter of 6 mm (28 mm²) for suspension of pump-set must be supplied with HDPE pipe. (Note: For TDH of more than 300 ft, HDPE Pipe type / thickness may be increased/changed accordingly)
- e. Top set shall comprise of Suitable Galvanized stand (Design should be verified from Engineer In-Charge before start of work)
- f. For Pressure Pumps \leq 5.5 HP schemes, Solar Module efficiency requirement is minimum 16%. (Only for Cut Cells PV Modules or Cell Size of 5 Inches PV Modules).
- g. Connection to overhead water storage tank. Top bend, 5.5 Fasteners & Erection clamps.
- h. Civil work to protect borehole i/e foundation.
- i. The pump should operate safely with Sand particles up to (50) gram/m³.

28. DC SOLAR WATER PUMP-SETS (UPTO 5.5 HP)

- a. DC Motor can also be provided for Equal or less than 5.5 HP.
- b. Motor should be capable of both AC and DC operation. There must be auto power source recognition feature.
- c. The motor should be brushless, permanent magnet type.
- d. The Controller must have a display Unit, showing all essential parameters (i.e. Current, Voltage etc).
- e. The Controller must be of MPPT type. MPPT efficiency should be equal or more than 98%.
- f. Pump should have auto and soft start / stop feature.
- g. The pump-set should have following protections
 1. Dry Running Protection
 2. Reverse Polarity Protection
 3. Over phase protection
 4. Over Heat Protection
 5. Lose Phase Protection
 6. Electronic Protection
 7. Over Current/ Overload Protection

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29. SOLAR AUTO TRACKER:

- The solar tracker offered should be fully automatic and intelligent, and must be capable of Single axis tracking (from east to West) and should have its own power supply (PV Panel, Battery and Charge Controllers) other than PV Panel used for Pumping Setup.
- Individual Auto-Tracker should be ≥ 4 kW each and Tracking Accuracy should be within $\pm 5^\circ$.
- The auto Tracker should also have manual control mode to adjust the tracking angle manually. Structure Material Should be Hot Dipped Galvanized Steel (Minimum 80 Microns).
- All nuts, bolts, washers and other fasteners for mounting structure shall be made of minimum A2 grade stainless steel.
- Foundation and other details will be separately provided.
- Three years Comprehensive Free Replacement, Repair and maintenance Warranty (Free of Cost) should be provided for all the components of auto Tracker (including Batteries).

30. PV MOUNTING FRAME WITH MANUAL TRACKING:

Suitable for 2.5 or 3.5 KW PV Panels easily movable in multi directions having flanges with bearing balls $\frac{1}{4}$ " and having angle adjustment. Base steel cage $\frac{1}{4}$ ", MS rod 3.5 feet length with nut-bolts system for strong anchoring. Pillar pipe 6 mm with 5.5" dia, base plate $15 \times 15 \times \frac{1}{2}$ " size with 04 numbers of supports. Support for PV, 5 mm thickness 4" dia pipe and $24 \times 12 \times \frac{1}{4}$ " side plates. MS Angle side bracing $2 \times 2 \times \frac{1}{4}$ ". MS Angle frame $2 \times 2 \times \frac{1}{4}$ " for panel mounting. Steel structures/frames shall be powder coated. Galvanized nuts, bolts and washers for tracker fitting. Steel frame shall be properly designed and shall withstand wind speed/load of at least 130 km/hr and tough weather condition.

31. PRE-SUPPLY TESTING & INSPECTION:

The firm applying for the tender has to provide the recent test bed reports from the pump/motor manufacturer or any other third party as per ISO-9906 standard. Each of the offered pump set models must undergo these test prior to supply and installation, in order to ensure the quality and standard of the equipment contractor may be asked to provide test result conducted by third party for re-verification.

32. OPERATION AND MAINTENANCE MANUAL:

An Operation and Maintenance Manual, in English and Urdu language, should be prepared and provided by the contractor with the solar PV pumping system. The Manual should have information about solar energy, photovoltaic, modules, DC/AC motor pump set, tracking system (if any), mounting structures, electronics and switches. It should also have clear instructions about mounting of PV module, DO's and DON'T's and on regular maintenance and Trouble Shooting of the pumping system. Name and address of the person or Centre to be contacted in case of failure or complaint should also be provided.

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C- SPECIFICATIONS FOR SOLAR HOMES & BUILDING SYSTEMS.

33. GRID TIE INVERTER (ON-Grid without battery backup / Hybrid with battery backup)

1. UL-1741 Certified or IEC 62109-1 and IEC 62109-2 or Equivalent Certificates.
2. Minimum 95% Conversion Efficiency at Rated Capacity (High Frequency Inverters).
3. Minimum 87% Efficiency for Transformer based inverters (Low frequency Inverters).
4. The inverter should have built-in MPPT controller.
5. The Priority of the inverter should be set that load will be running from the solar energy then Grid and in the end will be running from the Battery Backup.
6. Inverter (Hybrid Only) must be capable of configuring for Charging GEL, Lead Carbon, OPzV/OPzS Batteries and Lithium Iron Phosphate batteries (LiFePO4).
7. Hybrid Inverter (If Quoted along with Lithium Batteries) must be capable of communication with the BMS of Lithium Batteries.
8. Rated output voltage of inverter / Controller shall be pure sine wave AC.
9. Total harmonic distortion (THD) in AC output should not exceed 3% at rated capacity.
10. The degree of protection of the ON-Grid inverter Installation should be IP-65 rated and for indoor Hybrid Inverter installation, the IP rating should be IP-20 or above.
11. Wide input voltage range capability. (i.e. Voltage Range can be adjustable / selectable)
12. Natural convection cooling for maximum reliability
13. Outdoor enclosure for unrestricted use under any environmental conditions
14. Capability to connect external sensors for monitoring environmental conditions.
15. The output of the inverter must synchronize automatically its AC output to the exact AC voltage and frequency of the grid.
16. The Inverter should have the capability of Parallel operation upto three units. (Only For projects, where more than one inverter should be installed).
17. Inverter should have active RS232/485 etc communication port. the Data available through this port can be used for Remote Monitoring.
18. Liquid crystal display should at least be provided on the inverters front panel or on separate data logging/display device to display following
 - a. DC Input Voltage
 - b. DC Input current
 - c. AC Power output (kW)
 - d. Current time and date
 - e. Temperatures (C)
 - f. Converter status
19. Inverter circuit must include protection against:
 - Over or Low voltages and currents beyond critical level of the inverters circuits
 - Protection against accidental short circuits.
 - Protection against lightning induced transients.
 - Over load protection.

34. OFF-GRID / HYBRID INVERTER:

1. The Inverter must be pure sine wave output suitable for 220 Volt, 50 Hz.
2. Inverter must be capable of configuring for Charging GEL, Lead Carbon, OPzV/OPzS Batteries and Lithium Iron Phosphate batteries (LiFePO4).
3. The Inverter / system must have a MPPT Solar Charge Controller.
4. Minimum 92% Conversion Efficiency at Rated Capacity (High Frequency Inverters).
5. Minimum 87% Efficiency for Transformer based inverters (Low frequency Inverters).
6. Total harmonic distortion (THD) in AC output should not exceed 3% at rated capacity.

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7. The inverter must be user programmable for selecting PV, Grid and Battery Priority as well as Built-in programmed and user defined voltage and current settings of the charge controller for GEL, Lead Carbon, OPzV/OPzS batteries and Lithium Iron Phosphate batteries (LiFePO₄).
8. The Inverter must have Protective function limits for:
 - a. AC under voltage protection
 - b. AC over voltage protection
 - c. Battery under voltage Alarm
 - d. Low Voltage Disconnect
 - e. High Voltage Disconnect
 - f. Overload and Short Circuit Protection
 - g. Over Temperature Protection
9. The inverter must be ISO 9001, ISO 14001 and CE Certified.
10. The inverter must have IEC 62109-1 and IEC 62109-2, or Equivalent Certificates.
11. The degree of protection of the outdoor inverter Installation should be IP-55 rated and for indoor Inverter installation, the IP rating should be IP-20 or above.
12. Wide input voltage range capability.
13. Inverter should have active RS232/485 etc communication port, the Data available through this port can be used for Remote Monitoring.
14. Inverter (If Quoted along with Lithium Batteries) must be capable of communication with the BMS of Lithium Batteries.

Note:

- Product Brochure, Catalog and certificates must be attached with the Technical Bid.

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D - SPECIFICATIONS FOR SOLAR STREET LIGHTS

35. SOLAR STREET / ROAD LIGHT SYSTEM DESIGN:

- Assessment of Wattage of the LED Luminaire, Pole Height, Pole thickness, Pole top diameter, Pole base diameter, Base plate size, Base Plate thickness, Stiffener size, Stiffener thickness, Pole arm design, Pole Arm Length, Pole arm thickness, Pole arm diameter, Pole arm Placement / Fixing position, RCC foundation size, Anchor / J-bolt size, Steel Rebars cage (Mesh) and Number of Poles (Pole to Pole distance) should be according to the design provided / approved by the Engineer In-charge.
- Round Conical or Octagonal Hot Dipped Galvanized Pole of average 80 Microns should be installed.
- All Nuts, Bolts and Washers should be stainless steel.
- Pole base plate should be tightened in between two stainless steel nuts and washers (one nut and washer at upper and one nut and washer at lower side of the base plate).
- All Anchor / J-bolt shall be in level and align to each other.
- All Anchor / J-bolt shall be galvanized.
- All Anchor / J-bolt shall have at least 150 mm minimum threads.
- All poles shall be installed on levelling nuts secured to the anchor bolts and with locking nuts on the top of the base flange.
- The concrete ratio should be 1:2:4 for RCC foundation.
- Proper sketches of Pole, base plate, RCC Foundation and Steel Rebars cage (Mesh) should be provided and approved from Engineer In-charge.
- In order to focus on winter sun availability and Easy cleaning of Solar panel from dust etc with Rain water, Solar Panels should be installed at 180° Azimuth Angle and the Tilt angle (slope) of PV Module should be between 45° ± 5° (Only for Solar Street Lights).

36. LED SOLAR ROAD/STREET LIGHT FIXTURE:

- LED Efficacy must be greater than or equal to 130 Lumens/Watt.
- The fixture must be IP-66 Rated or above.
- The Color temperature of the LED should be Pure white in the range of 5000-6000 K.
- The LED Light distribution must be IESNA Type-II
- The LED must be suitable for working Temperature from -40 ~ + 60°C with relative humidity of 15% ~ 90%
- The Color rendering Index (CRI) must be equal or greater than 70.
- The LED Light Fixture must be LM79 and LM80 Tested.
- LEDs/Light fixtures should not be Chip-on-board (COB) single chip type due to their poor heat dissipation.
- LEDs/Light fixtures shall be modular type with proper heat sinks.
- The output from the LEDs/Light fixtures should be constant throughout the duty cycle
- LED Life should be greater or equal to than 50,000 Hours.
- The LED Light Fixture must have the following certification:
 - ISO 9001
 - ISO 14001
 - CE (EMC and LVD) Certified or equivalent.
 - International standard Certifications

Note: Product Brochure, Catalog and certificates must be attached with the Technical Bid

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- a. The charge controller must be suitable for the required battery voltage, auto voltage recognition feature and capable of charging OPzV & Lithium Ferrous Phosphate (LiFePO₄) Batteries
- b. The charge controller must be IP-67 rated or above for outdoor installation
- c. The charge controller must be Remote Controlled for parameter setting. The system must have the following feature:
 - Remote Parameter Setting and Monitoring
 - Remote control of the Lights (on/off, timer setting etc.)
- d. The charge controller must have MPPT Technology
- e. The charge controller must have at-least three stage Flexible dimming function (0-100%).
- f. The Maximum power point tracking (MPPT) efficiency should be minimum 97%.
- g. It must have temperature compensation for charging batteries in higher temperatures.
- h. Charge controller must have the following protections:
 - PV Short circuit
 - PV reverse polarity
 - PV over voltage
 - PV over current
 - Battery over charging
 - Battery over discharging
 - Battery reverse polarity protection
 - Load short circuit
 - Load overload protections
- i. It must have proper heat sink to dissipate excessive heat
- j. The charge controller must have protection for reverse flow of current through the PV modules
- k. Controller should have active port for GSM based communication for Remote Monitoring.
- l. Mid Night based timing controller will be preferred.
- m. The Solar Charge controller must have the following certification:
 - ISO 9001
 - CE Certified

38. Battery and Controller Box

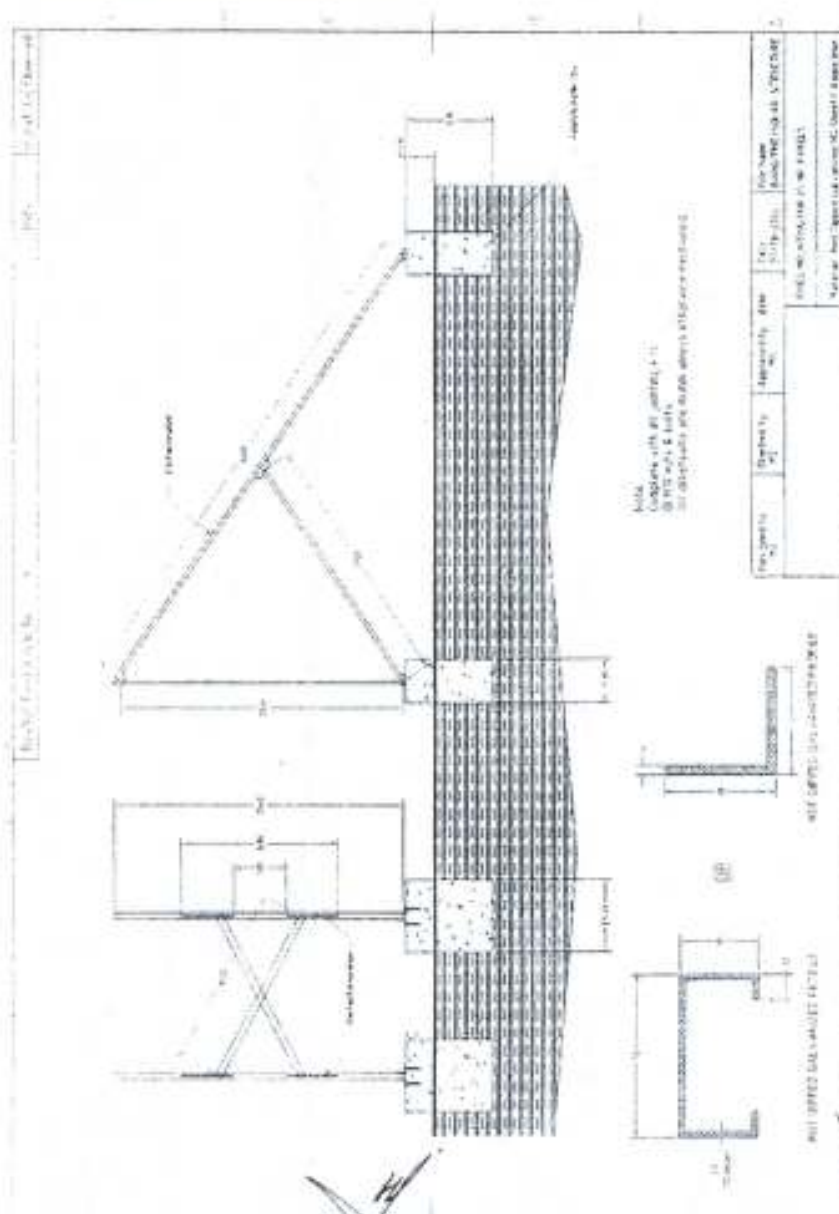
- The battery box should be made of Hot Dipped Galvanized Sheet of average 80 Microns.
- The battery box must have vented compartment having inverted louvers.
- For Pole Mounted batteries Battery boxes must be made of minimum 16 SWG sheet and must have proper locking arrangement for protection against theft.
- For underground battery installation, the battery box should be made of minimum 16 SWG sheet and should be properly sealed to ensure protection against water. Proper cable glands and packing material should be used to ensure water proofing of the box.
- The battery and Controller Box should be at least IP65 ingress protection.

The specifications of Electric cables are as under:

- a. Flexible copper cable of proper size along with MC-4 connectors (TUV Approved) from solar panel to charge controller and charge controller to battery as well as to light fixtures.
- b. The cables should be made of minimum 99.9% Pure copper cable.

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ANNEXURE-1 (STRUCTURE DRAWING)



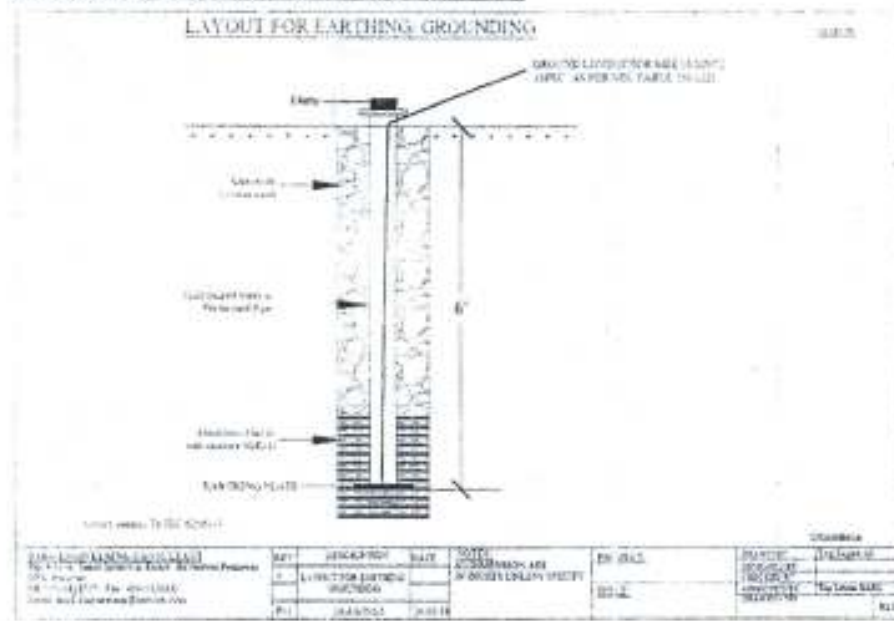
Particulars	Quantity	Rate	Total
1. Cement	1000	100	100000
2. Sand	2000	50	100000
3. Bricks	10000	10	100000
4. Labour	1000	100	100000
5. Transport	1000	100	100000
6. Miscellaneous	1000	100	100000
7. Contingency	1000	100	100000
8. Total			600000

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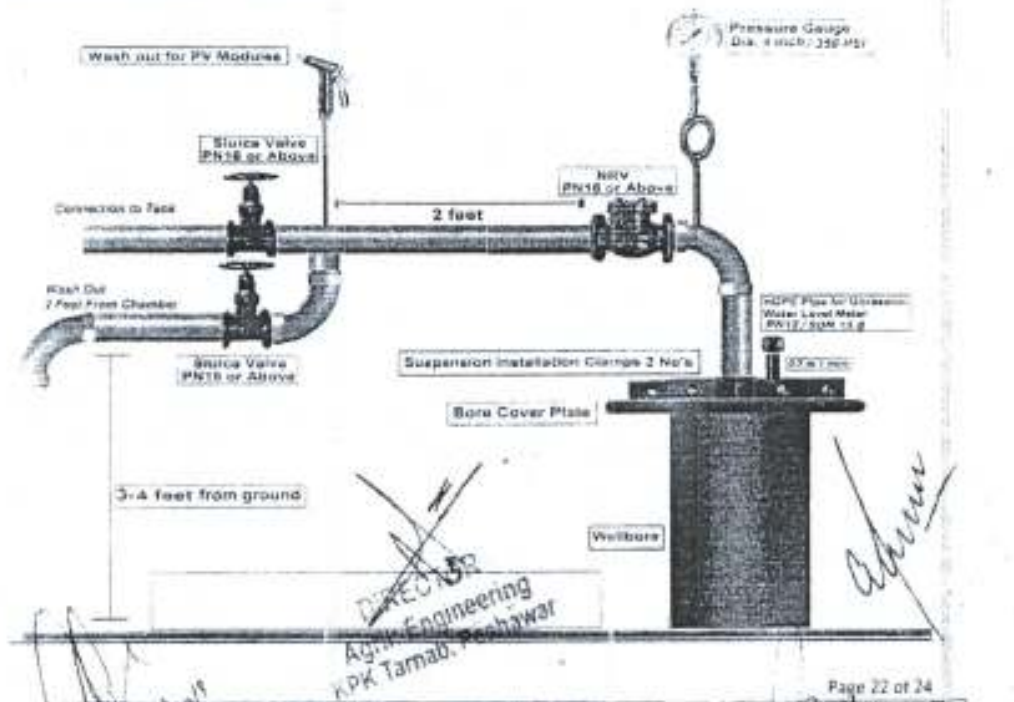
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ANNEXURE-2 (EARTHING / GROUNDING DRAWING)



ANNEXURE-3 TOPSET LAYOUT:



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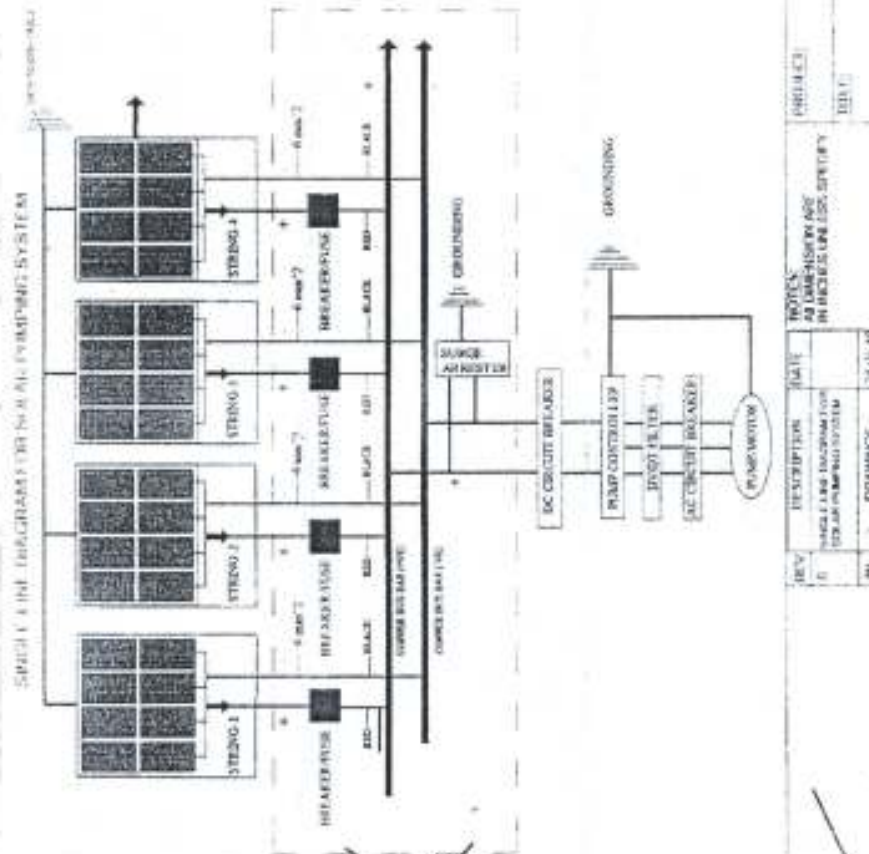
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ANNEXURE-4 (SYSTEM SINGLE LINE DIAGRAM-PUMPING)



CABLE SIZE PANEL TO INVERTER	10 TO 15mm ²
INVERTER TO DC BUSBAR	10 TO 15mm ²
DC BUSBAR TO DC CIRCUIT BREAKER	10 TO 15mm ²
DC CIRCUIT BREAKER TO PUMP CONTROLLER	10 TO 15mm ²
PUMP CONTROLLER TO PUMP MOTOR	10 TO 15mm ²
GROUNDING	10 TO 15mm ²

NOTES	IF LENGTH OF CABLE IS GREATER THAN 50M FOR WAITING OUT OF CABLE WILL BE INCREASED ACCORDINGLY
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DESIGNED BY	DESIGNED BY
CHECKED BY	CHECKED BY
APPROVED BY	APPROVED BY
DATE	DATE

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Health Engg. Department
Faisalabad

Agri. Engineering
Faisalabad, Peshawar

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(Rs. in Millions)

S.No.	Year	Annual cost	Annual Benefit	AF/DF At 20% Discount Rate				AF/DF At 30% Discount Rate			
				D.F.	Discount Cost	Discount Benefit	Cash Flow	D.F.	Discount Cost	Discount Benefit	Cash Flow
1	2019-20	2,080.099	-	0.833	1,732.722	-	(1,732.722)	0.769	1,599.596	-	(1,599.596)
2	2020-21	2,433.417	1,381.405	0.694	1,688.791	958.695	(730.097)	0.592	1,440.583	817.792	(622.791)
3	2021-22	2,280.600	2,762.809	0.579	1,320.467	1,599.667	279.199	0.455	1,037.673	1,257.078	219.405
4	2022-23	2,337.558	4,144.214	0.482	1,126.703	1,997.511	870.808	0.350	818.145	1,450.475	632.330
5	2023-24	2,724.293	5,525.619	0.402	1,095.166	2,221.299	1,126.133	0.269	732.835	1,486.391	753.557
6	2024-25	-	6,907.024	0.335	-	2,313.853	2,313.853	0.207	-	1,429.754	1,429.754
7	2025-26	-	6,907.024	0.279	-	1,927.060	1,927.060	0.159	-	1,098.217	1,098.217
8	2026-27	-	6,907.024	0.233	-	1,609.336	1,609.336	0.123	-	849.564	849.564
9	2027-28	-	6,907.024	0.194	-	1,339.963	1,339.963	0.094	-	649.260	649.260
10	2028-29	-	6,907.024	0.162	-	1,118.938	1,118.938	0.073	-	504.213	504.213
Total		11,855.967	48,349.165		6,963.850	15,086.321			5,628.832	9,542.744	

Discount Rate		20%	30%
NPV		8122.471	3913.912
BCR		2.166	1.695
EIRR		32%	22%

Basis for calculation of Incremental Benefit from One Hectare of Irrigated Land

The Construction of water pond/ minidams/ checkdams would harvest runoff/ spring water in rainfed areas of the province. One water pond would benefit/irrigate on average 10 acres of rainfed land converting it into irrigated land (5,000 water ponds x 10 acres = 50,000 acres irrigated). A single water reservoir/ mini dam would irrigate on average 30 acres of land (330 water reservoirs x 30 acres = 9,900 acres irrigated). A check dam would be used for soil conservation and water harvesting and would irrigate on average 3 acres of land. (3,000 field inlets x 3 acres = 9,000 acres irrigated) a. A field inlet for sailaba irrigation would irrigate on average 6 acres of land (1,000 field inlets x 6 acres = 6,000 acres irrigated). Water Seepage harvesting galleries would irrigate 10 acres of land on average (370 seepage galleries x 10 acres = 3,700 acres irrigated). Similarly, the other small interventions, i.e., terracing, agronomic low-cost structures, sand dunes stabilization etc. would increase per acre yield as per the table given below.

For the DAE component, the installation of tube-well shall enable the landowners to have an assured source of irrigation water and thus to change over from Barani to Irrigated Agriculture. This effect of the project is evaluated in the table below:

S.No.	Crop	%age Share	Yield (kg per hectare)			Incremental Produce (kg)	Value of Incremental Produce (Rs.)	
			without project (un-irrigated)	with project (Irrigated)	Increase due to project		Per kg	Total
1	Maize	25.32	1508.40	2347.99	839.59	212.54	25.00	5313.60
2	Bajra	0.22	517.59	1100.80	583.21	1.26	30.00	37.78
3	Jowar	0.45	516.10	619.61	103.51	0.46	25.00	11.60
4	Oil Seeds	0.01	0.00	1513.76	1513.76	0.18	50.00	8.92
5	Fodder (Kharif)	2.15	0.00	16981.43	16981.43	365.84	12.00	4387.72
6	Sugar Cane	6.09	33656.52	48837.03	15180.51	924.02	35.00	32340.70
7	Wheat	41.73	1466.50	2247.59	781.09	325.94	40.00	13037.52
8	Barley	1.26	769.40	1239.86	470.46	5.91	20.00	118.22
9	Gram	1.78	387.58	710.00	322.42	5.74	30.00	172.12
10	Fodder (Rabbi)	3.23	0.00	24178.78	24178.78	780.92	15.00	11713.78
11	Vegetables (Kharif)	1.27	0.00	9578.55	9578.55	122.02	30.00	3660.46
12	Vegetables (Rabbi)	0.93	0.00	11719.47	11719.47	109.50	30.00	3284.88
13	Fruit (Kharif)	1.98	0.00	9364.33	9364.33	185.37	50.00	9268.54
14	Fruit (Rabbi)	0.44	0.00	8440.37	8440.37	36.94	50.00	1846.97
15	Rape and Mustard	6.63	500.00	648.00	148.00	9.81	80.00	784.99
Total		93.45						85987.77

1. The gross incremental benefit from one hectare of land (Applicable to both SWC & DAE Components), as worked out in the table above, is Rs. 85,987.77 approximately.
2. The estimated annual expenditure on operation and maintenance (O & M) of Solar pumping system providing irrigation water to 25 Hectares (at an average) is about 1% of the cost of

installation (Approx. Rs.2.214 Million). Therefore, the per hectare annual O&M cost, shall be Rs.885/- approximately.

3. The switching over from Barani to Irrigated agriculture shall necessitate additional expenditure on inputs like seed, fertilizer and tractor use etc. The per hectare additional expenditure to that effect is estimated as Rs.20,000/-per annum.
4. Hence the "Net Incremental Benefit" from one hectare, due to the project; shall be the gross benefit (Rs.85,987.77 of Para-1 above) reduced by the expenditure figures (Rs. 885 & 20,000.00 of Para-2 & 3 respectively), i.e. Rs. 65,102.77/- say, Rs.65,000 per hectare.
(Source: Agricultural Statistics for Khyber Pakhtunkhwa for the year 2017-18)
5. Benefit from fish raised in ponded water. 3,000 fish per water pond/water storage, average 1 kg fish and per kg increment Rs.100/kg equals Rs. 0.300 million. $0.3 \times 6,400 =$ Rs.1,920.000 million per annum.
6. Similarly, fruits and farm forestry trees raised around the water ponds would add additional incremental benefits (Rs. 1000.000 million).

APPENDIX-IV

DEVELOPMENT WORKING PARTY APPROVAL



GOVERNMENT OF KHYBER PAKHTUNKHWA
PLANNING & DEVELOPMENT DEPARTMENT
(Agriculture, Food & Environment Section)

PH: 9210432

NO. C/Agr&P&D/PDWP/2018-19/1-1/615-23
Dated: April 24th, 2019 (W-E)

To

- The Secretary to Government of Khyber Pakhtunkhwa,
a. Finance Department
✓ b. Agriculture, Livestock & Cooperative Department
c. Forestry & Environment Department
d. Communication & Works Department
e. LG&RO Department

Subject: MINUTES OF SPECIAL 14TH MEETING OF THE PDWP 22-04-2019.

Dear Sir,

I am directed to enclose herewith a copy of the approved minutes of the PDWP meeting held on 22-04-2019 under the Chairmanship of Additional Chief Secretary, Khyber Pakhtunkhwa for your kind information and further necessary action please.

Sincerely Yours,

S.A.A

(Furqan Shaif)
Research Officer (Agriculture)

Copy forwarded to:

- Chief Coordination P&D Department.
- Chief PSDP, P&D Department.
- PS to Additional Chief Secretary P&D Department.
- PS to Secretary P&D Department.
- PA to Chief Economist P&D Department

DD(M)
DD(P)
P.O

Research Officer (Agriculture)
24/4/19

MINUTES OF PDWP MEETING HELD ON April 22nd, 2019

The subject meeting of PDWP was held under the Chairmanship of Additional Chief Secretary, P&D Department on 22-04-2019 at 1.30 pm in the Committee Room of P&D Department. List of participants is attached.

The following projects of Prime Minister's Agriculture Emergency were presented before the forum and decisions were taken accordingly:-

Agenda Item-1. WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA (ADP/PSDP Funded).

The project was presented before the forum with the following details:-

Cost of Project	Total Cost: Rs. 13125.638 million (PSDP share: 3781.040, ADP share: 7022.698, Beneficiary share: 2321.900)
Project Duration	05 years (from 2019-20 to 2023-24)

S.No	Major Intervention/activities under the project	No.
1	Construction of Water ponds	5000
2	Construction of Check dams	3000
3	Construction of Water Reservoir	330
4	Stream-bank stabilization	2500
5	Gated field inlet Outlet/Spillway	1000
6	Terracing	370 acres
7	Micro-Watershed Development	70
8	Water-Seepage harvesting Galleries	370
9	Agronomic Low-cost interventions	600
10	Sand Dunes stabilization	210 acres
11	Capacity Building (training workshops)	500
12	Installation of Tube Wells	300
13	Salinization of Tube Well	700

Conclusion

- After detailed discussions, the project was cleared by the PDWP for consideration/approval of the Federal Government.
- The cost of project will be fixed up after clearance of revenue component by the Finance Department.

Agenda Item-2. NATIONAL PROGRAM FOR ENHANCING COMMAND AREA OF SMALL AND MINI DAMS IN BARANI AREAS OF PAKISTAN.

The project was presented before the forum with the following details:-

Cost of Project	Total Cost: Rs. 2736.285 million (PSDP share: 697.582, ADP share: 1420.703, Beneficiary share: 420.000)
Project Duration	05 years (from 2019-20 to 2023-24)

S.No	Major Intervention/activities under the project	No.
1	Construction of Earthen water Courses	400
2	Lining of watercourses & related Structures	400
3	Rough Land Leveling	34000 Acres
4	Fruit Orchards	2120 acres
5	Oil Seed	5100 acres
6	Fodder crops	1500 Acres
7	Capacity Building	30
8	Farmer Training @ 2 Nos per Water courses	800

The forum was informed that command area of 17 small dams & 03 irrigation flow schemes will be developed under the project.



GOVERNMENT OF KHYBER PAKHTUNKHWA
FINANCE DEPARTMENT

No.SO(Dev.III)/FD/4-284/2018-19
Dated Peshawar the 02.05.2018

To

The Secretary to Govt. of Khyber Pakhtunkhwa,
Agriculture Department.

Subject:- **DRAFT PC-I OF THE SCHEME TITLED "WATER CONSERVATION IN BARANI AREAS OF KHYBER PAKHTUNKHWA" UNDER PSDP PROGRAM 2019-20**

Dear Sir,

I am directed to refer to your letter No. CPO (AD) V-4/2019/K.C dated 19.04.2019 on the subject noted above and to state that Finance Department agrees to convey concurrence of the following revenue component under the subject Scheme subject to observance of all codal formalities required under the rules:

Soil Conservation Component

S #	Name of Posts/Item/ Particular	Agreed by F.D	
		Quantity	Amount
1	Project Director (BS-19), (Addl. Charge Allowance only)	1	0.360
2	GIS Specialist (BS-18)	1	7.563
3	Soil Conservation Officers (Field; BS-17) (One for each District)	34	183.645
4	Horticulturist (BS-17)	2	5.445
5	Range Officer (BS-17)	0	0.000
6	Internees (One for each District)	34	61.215
7	Computer Operator (BS-16)	4	14.430
8	Sub - Engineer (Civl, BS-11) (One for each District)	34	61.215
9	Field Assistant (BS-09) (2 for each District)	68	102.013
10	Field Watcher (BS-03) (2 for each District)	68	65.288
Sub Total			501.174
Operational Cost			
1	POL		30.000
2	TA/DA		37.000
3	Repair & Maintenance		15.000
4	Stationery & Printing		15.000
5	Registration of Vehicle		2.000
6	Publicity & Advertisement		14.000
7	Miscellaneous		1.000
Sub Total			114.000

PD Office/Prov HQ			
1	Double Cabin Pick-up	1	5,000
2	Car (1300 cc)	0	0.000
3	Jeeps	1	2,800
District Office			
1	Jeeps (One for each Districts)	34	95,200
2	Single Cabin Pickups	0	0.000
3	Motorcycles (For field Assistant)	84	16,800
Sub Total			119,800
PD Office/Prov HQ			
1	Computer (Desktop)	4	0,600
2	Computer (Laptop)	3	0,450
3	Multimedia Projector	1	0,350
4	Water dispenser	4	0,100
5	Fax Machine	0	0,000
6	Photocopiers	2	0,400
7	Air Conditioner	4	0,320
8	Refrigerator	0	0,000
9	Solar Panels	1	1,500
10	Security Camera System	1	0,500
11	Soil Survey Lab		20,000
12	Miscellaneous		0,000
District Offices			
1	Desktop computers with accessories (One for each Dist)	34	5,100
2	GPS device	9	0,270
3	Photocopiers (One for each Dist)	34	10,200
4	Air Conditioner	0	0,000
5	Miscellaneous	0	0,000
Sub Total			39,790
Furniture P.D./Districts			
1	Furniture		10,000
Sub Total Soil Conservation			784,764
Agriculture Engineering Component (12 Sub Offices for the whole Province)			
S#	Name of Posts/item/ Particular	Agreed by F.D	
		Qty	Amount
1	Assistant Engineer (BPS-17)	12	79,122
2	Office Assistant BS-16)	1	3,600
3	Senior Clerk (BPS-14)	0	0,000
4	Junior Clerk (BPS-11)	2	4,395
5	Unit Supervisor (BPS-12)	11	24,176
6	Internees	25	10,989
7	Project Allowance	15	0,000
Sub Total			122,283
Operational Costs			
1	POL		18,000
2	TA/DA		15,000
3	Repair & Maintenance		3,000
4	Stationery & Printing		1,500

[Handwritten signature]

5	Registration of Vehicle		0.720
6	Publicity & Advertisement		6.000
7	Miscellaneous/Others		1.500
Sub Total			45.720
1	Laptop with printer and Other Accessories	12	1.800
2	Photostate Machine	10	2.000
3	Jimny Jeep	10	28.000
4	Single Cabin with Canopy	1	3.300
Sub Total			35.100
Sub Total Agriculture Engineering			203.103
Grand Total			987.867

Note: Concurrence of vehicles will be subject to reconciliation with the Finance Department.

2. The Administrative Approval/PC-I may be corrected accordingly and copy thereof be furnished to all concerned.

Yours faithfully,

(MUHAMMAD SAIED)

SECTION OFFICER (DEV-III)

Endst. No & Date even.

Copy forwarded for information to the:

1. Accountant General, Khyber Pakhtunkhwa.
2. Chief (Agriculture/Environment), P&D Department.
3. Director FMIU, Finance Department.
4. Master file.

SECTION OFFICER (DEV-III)

PLANNING COMMISSION
MINISTRY OF PLANNING, DEVELOPMENT AND REFORMS
(Public Investment Authorization-II Section)

No.10(899)/PIA-II/PC/2019

Islamabad, the 20th September, 2019

OFFICE MEMORANDUM

Subject: **AUTHORIZATION: CONSERVATION AND EFFICIENT USE OF WATER IN BARANI AREAS OF KHYBER PAKHTUNKHWA**

The undersigned is directed to refer to Ministry of National Food Security & Research O.M. No. 9-6-8/2019-Plan dated 29th April, 2019 on the above subject and to say that the ECNEC in its meeting held on 29th August, 2019 considered the project vide case No. ECNEC-40/5/2019 and took the following decision:

"The Executive Committee of the National Economic Council considered the summary dated 29th August, 2019 submitted by the Ministry of Planning, Development & Reform regarding Water Conservation in Barani Areas of Khyber Pakhtunkhwa and approved the project at a cost of Rs. 14.178 billion including Federal Government's share of Rs. 5.090 billion, Government of Khyber Pakhtunkhwa's share of Rs. 6.766 billion and farmers' share of Rs. 2.322 billion".


2. Approved cost summary of the project is given below: -

(Rs. In Million)		
Item No.	Description	Approved Cost
1	Supervision and Administration	860.306
2	Transport & Equipment	221.835
3	Mass Awareness Programme / Capacity Building	7.500
4	Intervention Costs including Farmer's share	12,085.651
5	Project Consultants and Monitoring, Evaluation & TPV / Impact Evaluation Consultant and Specialist / Advisory Consultant	292.913
6	Physical & Financial Contingencies	709.795
	Total Cost	14,178.00

3. The Sponsoring Agency may issue administrative approval of the project at the total approved cost of Rs. 14.178 billion without FEC, in accordance with the ECNEC decision. The implementation period of the project is 60 months which may also be reflected in the administrative approval.

4. A copy of administrative approval, as and when issued, may be endorsed, inter-alia, to this Ministry.

5. The receipt of this O.M. may kindly be acknowledged.


(Wasim Islam)
Research Officer

✓ Secretary,
Ministry of National Food Security & Research,
Govt. of Pakistan,
Islamabad.

16)
Copy forwarded to:-

1. Member (I&M), Planning Commission
2. Member (Food Security & Climate Change), Planning Commission
3. J.S (Committee), Cabinet Division, Islamabad
4. J.S. (Dev.), Finance Division, Islamabad
5. Chief, PLA Section, Ministry of PDR
6. Chief, Economic Appraisal Section, Ministry of PDR
7. Chief, PIP Section, Ministry of PDR
8. Chief, Climate Change & Environment Section, Ministry of PDR
9. Chief, Water Resources Section Ministry of PDR


(Research Officer)

Copy for information to:-

- i) Director to Minister for Planning, Development and Reform
- ii) PSO to Deputy Chairman, Planning Commission
- iii) SPS to Secretary, Ministry of Planning, Development and Reform
- iv) APS to JCE (Opr.), Ministry of Planning, Development and Reform
- v) Mr. Jahangir Khan, to update record.

PLANNING COMMISSION
MINISTRY OF PLANNING, DEVELOPMENT AND REFORMS
(Public Investment Authorization-II Section)

No.10(899)/PIA-II/PC/2019

Islamabad, the 20th September, 2019

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	Total Cost	14,178.00

3. The Sponsoring Agency may issue administrative approval of the project at the total approved cost of Rs. 14.178 billion without FEC, in accordance with the ECNEC decision. The implementation period of the project is 60 months which may also be reflected in the administrative approval.

4. A copy of administrative approval, as and when issued, may be endorsed, inter-alia, to this Ministry.

5. The receipt of this O.M. may kindly be acknowledged.


(Wasi ul Islam)
Research Officer

✓ Secretary,
Ministry of National Food Security & Research,
Govt. of Pakistan,
Islamabad.



F. 9-8/2019-Plan
Government of Pakistan
M/o National Food Security & Research

Islamabad, the 1st October, 2019.

The Accountant General
Pakistan Revenues,
Islamabad

Subject: **ADMINISTRATIVE APPROVAL FOR THE EXECUTION OF PROJECT
TITLED "WATER CONSERVATION IN BARANI AREAS OF KHYBER
PAKHTUNKHWA"**

Sir,

I am directed to convey administrative approval of the competent authority i.e. Secretary Ministry of National Food Security and Research for the execution of the project titled "Water Conservation in Barani Areas of Khyber Pakhtunkhwa" at the total cost of Rs. 14.178 billion without FEC for the duration of 60 months w.e.f 20.09.2019 i.e. the date of issuance of project authorization by M/o PD&R (copy enclosed).

2. ECNEC, on the recommendation of CDWP vide summary dated 29.08.2019, in its meeting held on 29.08.2019 approved the subject Project. The operational cost of the project will be met out from PSDP of the Federal Government of Pakistan and ADP of Provincial Govt of Khyber Pakhtunkhwa.

3. Director General Federal Water Management Cell / National Project Coordinator appointed by Govt of Pakistan shall be responsible for execution of the project in coordination with Provincial Govt of KP as per its approved schedule and cost, as per guidelines approved by the CDWP/ECNEC for the planning and implementation of the Development Projects issued from time to time. In addition, the financial analysis of the project shall be updated in line with summary presented to ECNEC.

Yours sincerely,

(Aashij Luqman Cheema)
Section Officer (Plan) 1/10

✓ Copy forwarded to DG FWMC for information and initiation of the project activities under intimation to this office.

Copy for information to:-

1. SPS to Secretary Cabinet, Islamabad
2. SPS to Secretary Finance, Islamabad
3. SPS to Secretary PD&R, Islamabad
4. Member FS&CC, M/o Planning, Development & Reform, Islamabad
5. Chief (PIA Section), M/o Planning, Development & Reform, Islamabad
6. Chief (F&A Section), M/o Planning, Development & Reform, Islamabad
7. Chief (PIP Section), M/o Planning, Development & Reform, Islamabad
8. D.G Project Wing, M/o Planning, Development & Reform, Islamabad
9. Joint Secretary (Exp), Finance Division, Islamabad

P.T.O

Copy for necessary action:-

10. Addl. Chief Secretary, Planning & Development, Govt of KPK, Peshawar
11. Respective Provincial Secretary
12. Respective Directorate of Water Management
13. PME Focal Person, M/o NFS&R, Islamabad
14. Project file

(Aashij Luqman Cheema)
Section Officer (Plan)

1/10

CC:

- i) SPS to Secretary, NFS&R
- ii) APS to Addl. Secretary, NFS&R
- iii) APS to Joint Secretary (Plan/IC), NFS&R
- iv) APS to Deputy Secretary (Plan), NFS&R