Water Sector Strategy

Taraqee Foundation

For Prosperous & Enlightened Society

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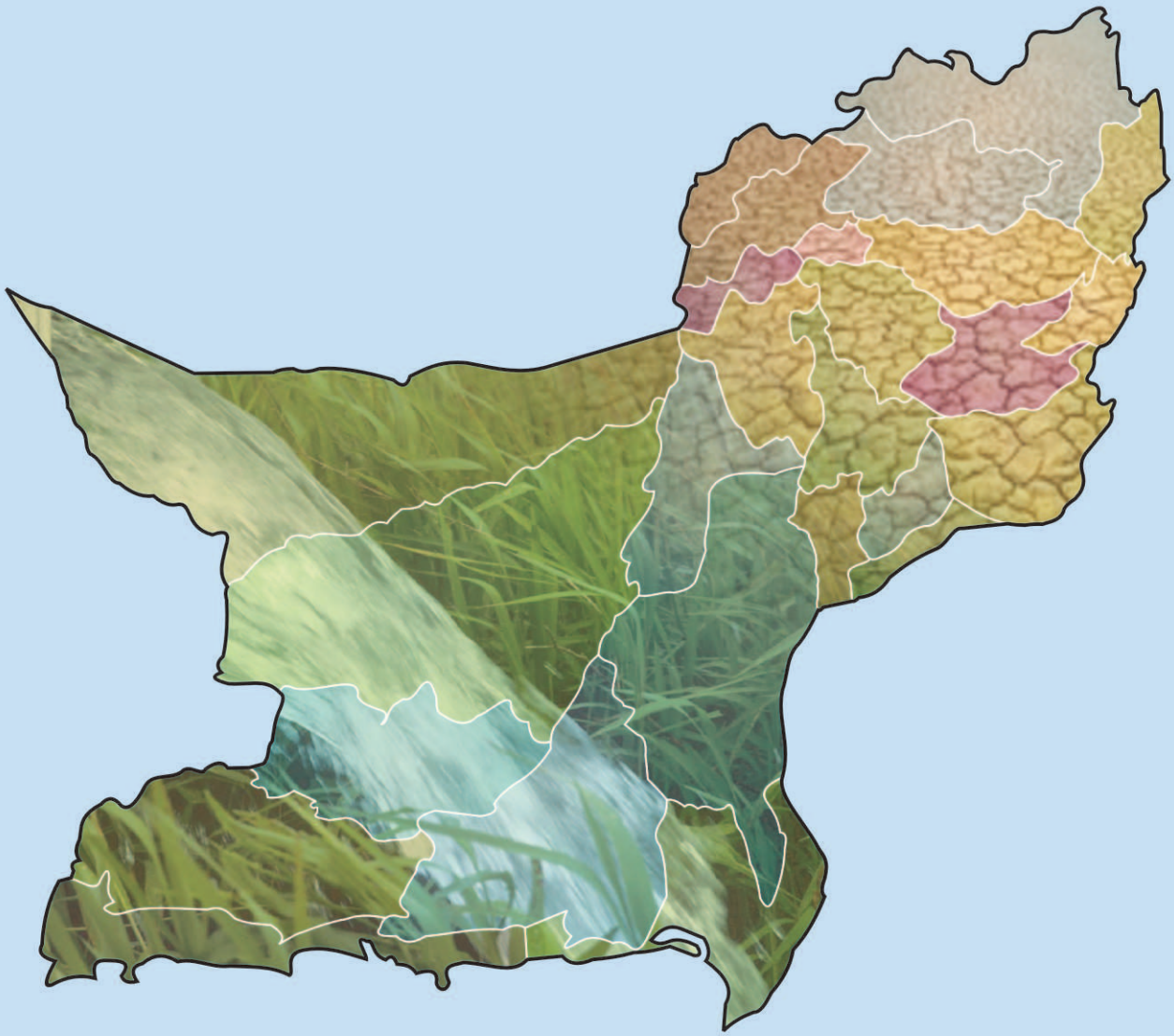

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1. Introduction

At the global level, there is growing recognition that there are strong linkages between water and poverty. The belief that water can drive socio-economic development has provided impetus for the promotion of, and massive investment in, water resources development over the past five decades. Even the critics of water development (mostly environmentalists), despite all their arguments against such development, realize that there have been positive outcomes of such activities when it comes to poverty alleviation. This strongly suggests that there is a relationship between water and poverty and that water resources do play a vital role, either positively or negatively, in the livelihoods of the world's most impoverished societies.

Though socio-economically water is “Good” when it contributes to domestic welfare, agricultural and other production, and the health of the environment; however, it could be “Bad” when it brings water-borne diseases, results in flooding, contributes to land degradation through waterlogging and salinization, or carries pollutants which harm humans and ecosystems. While the poor and marginalized can benefit greatly from the “goodies” water can deliver, it is also they who have the least power and ability to adopt preventive or defensive measures to combat the negative influences of water. For the poor in particular, improved management regimes and good water governance in an holistic manner are absolutely essential to enhance the benefits of water and lessen the negative impacts.

The Taraqee Foundation has had a long history of engagements in the well being and development of rural communities of Balochistan. Recognizing that rural communities in Balochistan, with its arid climate and agriculture oriented economy, are highly dependent on water and that poverty alleviation cannot be addressed without provision of adequate and sufficient quantities of good quality water suitable for domestic and agricultural consumption, the Foundation has concentrated its efforts in a number of water related activities under its Community Physical Infrastructure (CPI) and Environment and Infrastructure (E&I) programmes.

Despite the fact that the Foundation has been quite successful at the local level in its fight against poverty through the mentioned two major Programmes, the fact remains that the issues in water sector in Balochistan, accumulated over the years due to poor governance in the sector, are innumerable and of such large dimension that piecemeal interventions at the community level are not making the impression on the poverty related issues that the marginalized communities in the province are faced with. There are growing concerns that, in the immediately foreseeable future, water sector in the region including Balochistan is going to face additional challenges due to population pressures, climate change impacts leading to increased frequency of droughts and floods.

The above facts (both current and futuristic) have led the Foundation to the conclusion that it is high time that the Foundation's policies, strategies and programmes in the water sector be revisited and reviewed in the light of current ground situation and realities. The aim of the exercise is to come up with a clearly defined comprehensive strategy for its E&I Programme to follow so that larger issues in the water sector can be addressed independently by the Foundation.

This strategy document briefly reviews the current and projected water situation and issues in the province, government policies and priorities in the water sector and the Foundation's capacity to address them through existing E&I and CPI Programmes and makes recommendations on the strategic role that the Foundation should play in the water arena in Balochistan in the future.

2. Balochistan Situation Analysis

2.1. Preamble

Despite, area-wise, being the largest and, population-wise, the smallest province of Pakistan, Balochistan is faced with a multitude of problems due to both man-made and natural dictates. The harsh climate and rugged topography coupled by ill planned human activities and over-use of its natural resource base has aggravated the local environment and negatively affected its natural resource base. Consequently the province has remained the most under-industrialized and with the lowest Human Development Indicators in Pakistan.

The province's economy is heavily dependent on agriculture dominated by fruit production of the highest quality and livestock production both accounting for almost 60% of the province's GDP. Moreover, about 70% of the total population of the province is, in one way or the other, dependent upon these sectors of economy. Moisture deficits occurring at critical times of growth due to high spatial and temporal variations in the low and erratic rainfall are often responsible for low agricultural production. Likely impacts of climatic change are expected to bring about further variations in the precipitation regime, which would make agriculture a highly susceptible and vulnerable sector.

The water sector in the province is faced with problem associated with arid climate, overall water scarcity and its misuse, degrading watersheds and rangelands, and pollution of water resources and wetlands all contributing to adversely affect growth in the two most important sectors of the provincial economy. In the absence of assured supplies of surface water (most streams are ephemeral) and its timely availability for meeting growing water demand for domestic and agricultural use, local communities have come to depend heavily on

the meagre and scanty groundwater resources. As a result, there is heavy withdrawal of groundwater, which far exceeds the natural recharge of aquifers.

Water is the most sought after resource now in the province. The developments in the water sector are not keeping pace with the ever growing demands on water for domestic and agricultural use. In the face of over-exploitation of the meagre resource and wasteful practices, the resultant ecological disaster is making living conditions ever more difficult to manage for the already water starved depressed societies. Consequently the water sector in the province is perhaps the most important sector where interventions both at the micro and macro level are necessary and must be undertaken to bring about a positive change. This offers numerous opportunities for the private sector to explore.

2.2. The Resource Base an Overview

The land resources of Balochistan (Figure 1) comprise of mountains and hilly ranges (19.37 million ha), coastal mountains and plains (9.27 million ha) low land plains (2.2 million ha) and sandy deserts (0.6 million ha). Out of total area, only 1.5 million ha are considered suitable for cultivation out of which about 1.0 million ha is actually being used for growing fruit, vegetables and other field crops.

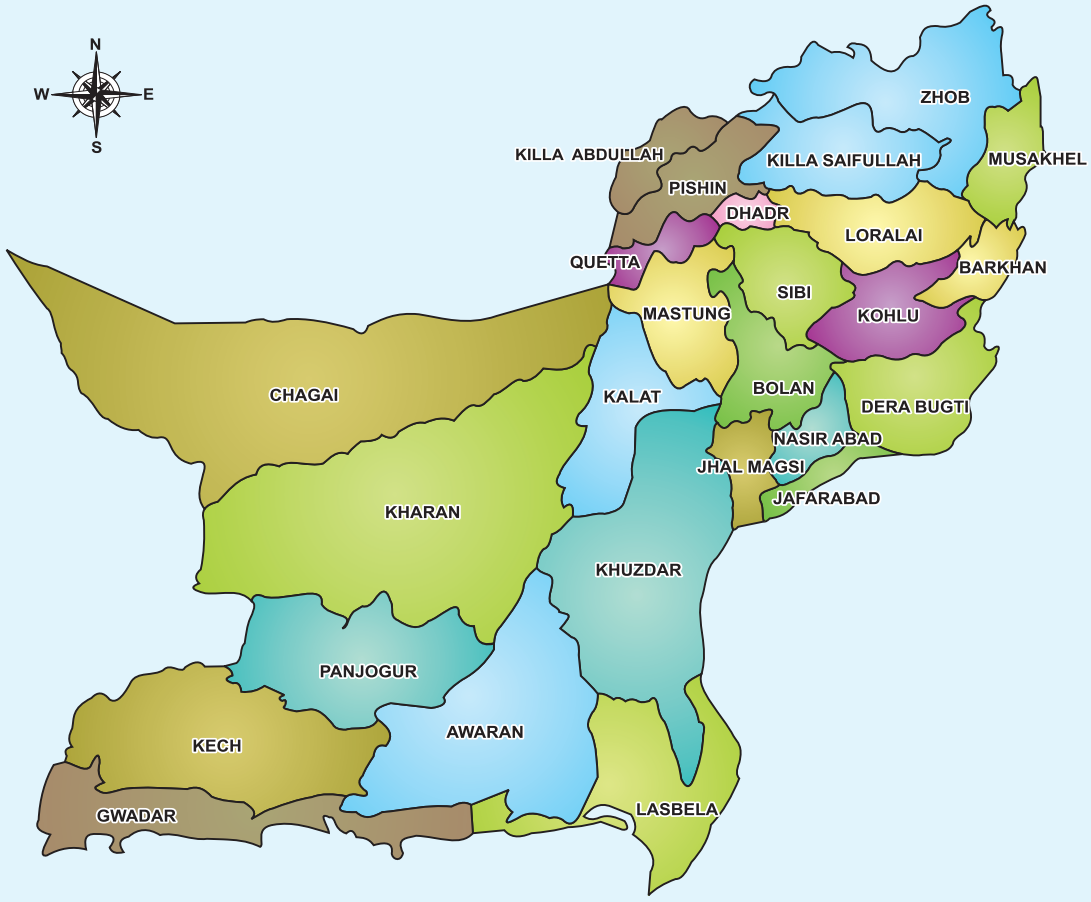

Fig. 1: Balochistan Province of Pakistan showing district boundaries

There are 13 major river basins most of them non-perennial conveying the rainwater and snowmelt from catchment areas in the form of flash floods and smoother runoff towards lower steep lands and plains. The land forms and their potential land use are shown in Figure 2.

Irrigated agriculture in the province is dependent both on surface and groundwater resources. Besides the canals taking off from the Indus River and irrigating the south-eastern districts of Nasirabad and Jaffarabad for growing mostly grain crops including rice, an important source of surface water is floodwater that flows through the ephemeral streams whenever there is rain in the catchment areas. The non-perennial nature of rivers and streams makes constructing storage reservoirs a difficult option particularly as the evaporation rates are extremely high due to dry arid climate. Surface water is therefore considered to be a non-dependable source for irrigation.

Land Form	Present and Potential Use
Mountain ranges	Livestock grazing
Playas and Tidal Plains	Nil. Wetlands & environment
Valley Floors	Agriculture production
Piedmont plains and alluvial fans	Natural recharge to aquifers from precipitation
Sand plains/ deserts	Nil at present but with some potential for vegetation cover

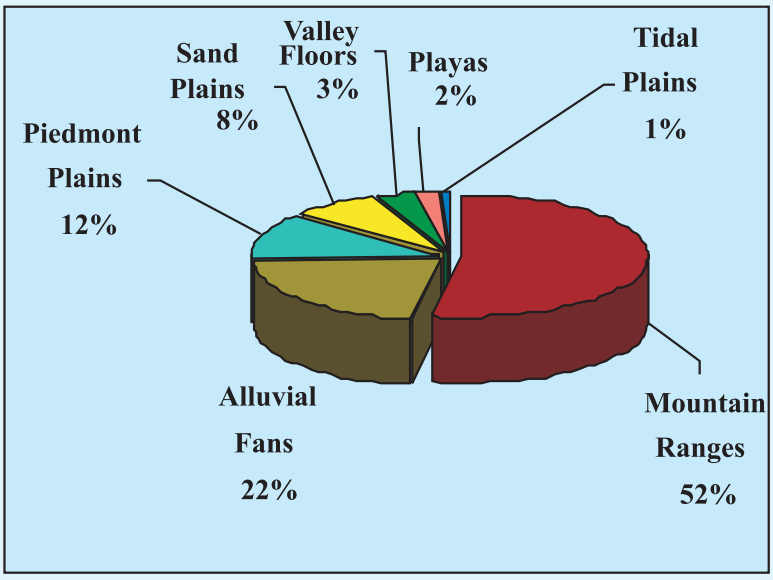

Fig. 2: Landforms and potential for use

Groundwater potential estimated at about 1.2 Billion cubic meters (BM^3) is also available for irrigated-agriculture through the traditional *Karezes*, natural springs, and open wells. Since the advent of electricity in the province in late 60s from the national grid system, a tremendous increase in the number of tubewells for growing fruits and vegetables has been witnessed. The consequent indiscriminate installation of tubewells and pumping of water in excess of natural recharge has caused lowering of water table resulting in the drying of open wells and a number of *Karezes* and springs. Presently there are an estimated 35,000 tubewells of various capacities in the province tapping water now from as deep as 800-1000 feet below the ground surface in some of the groundwater stressed areas. Besides environmental disaster, the continued mining of groundwater and lowering of water table is causing a serious concern not only regarding the sustainability of tubewell-irrigated agriculture but also for meeting even the domestic water demands in the urban centre of the capital city of Quetta.

Surface water potential is crudely estimated at 12.3 Bm^3, which is more than ten times the groundwater potential. Its exploitation is, however, limited to use under the traditional rainwater harvesting systems of *Sailaba* (flood and spate) and *Khushkaba* (dry land agriculture) practices. Because of using obsolete methods of rainwater harvesting and spate irrigation with little scientific knowledge, the systems are highly inefficient with very low productivity involving high risks of crop failures. Scientific rainwater harvesting practices and engineering based spate irrigation offer a great potential to harness this huge resource.

Almost all the watersheds in Balochistan are degraded to varying degrees of severity. Only about 3% (1 M ha) of land area is classified as state forest. A major part of this land (about 70%) is under grasses and shrubs; the rest is sparsely populated coniferous and riverine forest trees. The state forests areas are protected through rather poorly implemented legislation against cutting and hunting. Though exploitation rights for fuel wood, grazing, and fruit collection are specifically included in the notification of each state forest, poor enforcement of laws and regulations has resulted in severe degradation of these forests.

Privately owned pastures and rangelands are in an even greater degraded condition. Overgrazing and cutting of natural vegetation for fuel wood by the local population, nomads, and Afghan refugees has resulted in denudation of catchment areas of theprovince with some green areas totally disappearing. The higher slopes, under such conditions, have been

[1] Karezes are underground tunnels for conveying water from mother well located at the foot of mountain to the day light point from where it is finally distributed for different uses including domestic and agriculture. They are quite useful, as they do not require energy for pumping from the source to the command area.

contributing to soil erosion and silting up of the reservoirs created by delay action dams meant to recharge the declining aquifers. The consequent loss of useful life of these reservoirs and its recharging capacity is the major problem faced.

Typical of the province as a whole, coastal Balochistan has lagged in economic development and suffers from a general lack of industrial infrastructure. Village inhabitants utilize coastal resources for subsistence and shelter as they have done for hundreds of years, with little or no value-added commodities of local origin. The natural resource base and the environment of the coastal landscape of the province have progressively degraded over the years, caused by freshwater scarcity, water pollution caused by industrial and urban sources, untreated sewerage discharge, over fishing, particularly over fishing by commercial trawlers, many of which are foreign owned, and unsustainable exploitation of the mangrove forest and associated natural resources. The mangrove ecosystem is the critical natural resource base for livelihoods in the fishing industry, providing important environmental services, and is the crucial natural resource base for the poor and socially excluded who live in the coastal landscape.

The root causes of poverty in the coastal zone are driven by a failure of governance, market imperfections that result in low income and other material means, lack of access to basic social services, lack of personal security and lack of empowerment to participate in decision-making. All of these factors have a negative impact on the lives of the poor. This has been exacerbated by an increase in coastal development activities that has in turn resulted in the influx of people in search of livelihoods and accelerated pressure on the already depleted natural resources.

2.3. Water Availability

The water sector scenario in Balochistan can be seen from the perspectives of water availability on per capita and per unit area basis. The per capita water availability is universally accepted to be the criterion to determine the conditions of water stress for an area or region/country.

Table 1 shows some vital statistics on Balochistan leading to analysis of water availability situation from both per capita and per unit area perspectives.

Table 1: Balochistan – Vital Statistics and Water Availability Scenario (2006)

S. No.	Parameter	Unit	Value
1.	Population	Millions	7.94
2.	Geographical Area	Million hectare	34.72
3.	Cultivable area	Million hectare	0.87
3.	Surface water Resources*	Billion m^3	19.29
4.	Groundwater Resources	Billion m^3	1.23
5.	Total potential of Water	Billion m^3	20.52
6.	Annual Water Availability from per capita perspective	m^3 per capita	2,584.38
7.	Annual Water Availability from per unit cultivable area perspective	m^3 per hectare	1,413.79
8.	Area irrigated @ 0.6 m depth of water barely sufficient for a low return grain crop with conservation practices	Hectare	235,631.67
9.	Area irrigated @ 1.2 m depth of water barely sufficient for high return apple crop with conservation practices	Hectare	117,815.83

* Includes Balochistan share of water from the Indus River System

As can be seen from the above the figure of per capita water availability in Balochistan is more than double the current national water availability figure of 1200 m^3 itself very near the critical figure of 1000 m^3/capita below which water shortages become a chronic problem. Thus under this criterion Balochistan cannot be considered a water deficient province. However, if the province is bifurcated into smaller units like districts, some areas with very good agricultural potential may have very low per capita water availability while other areas with potential for agriculture may have a very large per capita water availability.

It is therefore that, for a province with agriculture dominated economy, the figure of per capita water availability is fallacious and may send wrong messages. These figures create a myth that the province has abundant water resources. In actual fact this is not so and therefore the per hectare figure of water availability assumes greater importance and is more realistic and clearly shows the poor water availability position of the province. According to these figures the water available is just sufficient to irrigate barely 27 and 13.5% of total cultivable

area for grain crop and apple crop respectively. This shows the tremendous value water assumes to meet the food and fiber demands of the province.

2.4. Water Demand and Use

The population of the province currently is estimated to be around 8.0 million people growing by 2.1 percent per annum. The livestock population is estimated to be around 25 million heads. Total area irrigated by different sources (canals, tubewells, wells, karezes, springs etc.) during 2005-06 was 1.27 million ha, which is 51 percent higher than the area irrigated in 1995-96. Table 2 shows the percent increase in area irrigated by different sources in the 10 year period.

Table 2: Increase in area irrigated by different sources (1995 to 2006)

Irrigation Source	Irrigated area in hectares		Percent Increase
	1995-96	2005-06	
Canals	493,692	594,582	20.4
Tubewells	235,235	456,223	93.9
Wells	14,222	80,976	469.4
Karezes, springs and others	99,650	140,001	40.5
Total	**842,799**	**1,271,782**	**50.9**

Source: Agricultural Statistics of Balochistan 2005-06

It can be seen that there has been a phenomenal increase in the exploitation of groundwater by tubewells and wells for irrigation while little increase has been little increase in the area irrigated by surface irrigation supplies. This has been due to the reason that farmers have more control and independence over use of groundwater. The exploitation of groundwater becomes more, as most of the domestic water requirements are met from the groundwater resources. The Quetta Valley with a very dense population is meeting all domestic water requirements from this resource and therefore this Valley is facing the greatest aquifer depletion problem.

[2] Estimated at a conservative growth rate figure of 2.1 percent per annum

2.5. Aquifer Depletion

Aquifer depletion is the most serious problem faced by the province in many aquifers. Continued destruction of vegetative cover in the watersheds over the past decades is the root cause of watershed degradation, which causes reduced retention of snow in highlands and interception of rainfall in lowlands. The conditions further aggravate the problem of flash floods, which are a constant threat to life and property and are more difficult to manage. The heavy silt loads carried by floodwaters quickly reduce the storage capacity of small reservoirs and render check and delay action dams ineffective for recharge. Recent persistent and extended drought has further aggravated the problem of loss of surface cover. Neglect of Sailaba and Khushkhaba, the traditional systems of irrigation to raise crops is another reason of reduced recharge to the groundwater.

The problem has been aggravated further by the phenomenal increase in the number of tubewells with the introduction of the National Electricity Grid system in the early 70s. There are now over 26,000 electric and diesel operated tubewells continuously pumping groundwater. Meanwhile despite the ever aggravating problem of groundwater depletion, additional tubewells continue to be installed to meet requirement of rural, urban and agriculture sub-sectors.

The reasons for groundwater mining in Balochistan are: a) continued increase in water demand; b) lack of incentives for efficient water use due to heavily subsidized electric tariff; c) unsustainable level of groundwater abstraction; e) neglect of natural recharge systems; and f) ineffective and costly techniques for inducing recharge to the groundwater (delay action dams).

2.6. Irrigated Agriculture

The Nasirabad, Bolan, and Jaffarabad districts are the only districts of the Province where an organized canal irrigated farming system is practiced. The area is fed by the Kirthar and Pat feeder canals taking off from the Indus respectively at Sukkur and Guddu barrages. Rice and wheat are the principal crops grown in the area. In the rest of the Province different types of irrigation practices are followed for meeting demands of agriculture. These are:

- The *Sailaba* irrigation under which run-off waters in temporary or perennial streams is diverted and used on farms and agriculture fields.
- *Khushkaba* irrigation whereby crops are left at the mercy of rain and sheet flow of mountainsides during rain storms is collected in the piedmont plains by constructing low dykes across flow paths.

- Lift irrigation under which water is pumped from aquifers. Tubewell and dug wells are classified under this system of irrigation.
- Spring and Karez irrigation systems under which groundwater is tapped and conveyed by gravity in open channels or underground tunnels to command areas.

The *Sailaba* and *Khushkaba* agriculture systems use only a small fraction of the total water resource, though the area under these systems is quite large. Flood irrigation and water harvesting are the most commonly practiced methods in Balochistan. The farmers divert flood flows by constructing low to medium height earthen bunds across perennial and ephemeral streams. These bunds serve as diversion structures. Water harvesting is done by simply creating small dykes across slopes in alluvial fans and valleys to store water whenever there is rain. The moisture is conserved in the soil for cultivation of crops.

Flood irrigated agriculture is mainly practiced for growing traditional crops of wheat, maize, barley, and pulses. Run-off agriculture is the traditional type of agriculture in most of Balochistan and is practiced on all plains where there is a combination of good soil and favorable slopes. In dug well and tubewell irrigated agriculture system, water is pumped into small water courses for conveyance to the fields. The fixed electricity charges for tubewells have been a stimulant to pump more water and have consequently contributed to excess application of water on the agricultural feilds.

2.7. Poor Efficiency in Water Use in the Agriculture Sector

A salient feature of Balochistan agriculture is the traditional *Sailaba and Khushkaba* systems of dry land agriculture which account for over 50% of the total cultivated area. These systems have so far been neglected by the Government and no large-scale development programme has either been undertaken or is in the pipeline except the provision of routine extension services and renting of crawler-type tractors for construction of bunds. Resultantly, these systems have deteriorated and as a consequence over 76% of floodwater remains unutilized and is ultimately lost.

Irrigation efficiency in the canal irrigated areas is around 34% causing serious problems of waterlogging and salinity, disposal of drainage effluents and shortage of water. In the tubewell-irrigated areas, water conveyance and on-farm application efficiencies are extremely low due to earthen water tanks and channels, and unleveled fields. Almost all fruits, vegetables and winter fodders are over-irrigated, which is most common in Pishin-Lora, Zhob and Nari overdrawn basins. Trickle irrigation has been tried in the past by many organizations, but has not met with wide acceptance by farmers, as water is not a priced commodity and farmers see

no cause for investing in the expensive systems, which also have the disadvantage of lack of local manufacturing capabilities and technical expertise to provide guidance and support in operation and maintenance of the systems.

2.8. Socio-Political Character of the Province

Tribal system, low literacy rate and poverty often create problems in the identification of appropriate projects and their implementation. Under traditional practices members of the Provincial Assembly decide the projects to be started. The project rather than being based on technical, socio-economic, environmental, basin or physiographic considerations are designed to suit localized personal interests. The interests of the communities at large and ecosystems perspectives are therefore ignored. Lack of education among water users, including farmers and the general public, also creates problems in convincing people of the importance of saving water for their own good, as well as for the good of the province and nation.

2.9. Poor Water Quality

Both surface and groundwater may be polluted, particularly in areas where agricultural activity is being intensively pursued. The indiscriminate use of agrochemicals on fruit and vegetables is likely to result in polluted shallow groundwater aquifers, which would create health related problems. Most of the water supply systems, particularly in rural areas are already polluted with bacterial contamination causing serious health concerns. Further disposal of drainage effluents from Pat Feeder and Khirther canals into the outfall drains is now a growing concern between Balochistan and Sindh provinces, as these effluents need transit from Sindh province prior to its disposal to the sea. The Kharif season effluents are usable for crops, but the quality of the Rabi season effluents become brackish. It is established that water quality issues are going to be increasingly important feature of all development works in the water sector in Balochistan.

2.10. Floods and Droughts

Floods and droughts are natural phenomena for which the risks of occurrence are likely to continue to grow. Increasing levels of exposure and insufficient adaptive capacity are among the factors responsible for the rising vulnerability.

The frequency of the occurrence of droughts has increased in recent years. Drought phenomenon (dry year) has now been observed to occur in 4 out of 10 years instead of 3 out of 10. The precipitation during the years 1997-2001 has been exceptionally dry as in this period the precipitation over most of the country has been less than 50% of the normal, causing

severe loss to agricultural production. The effect of the continued low rainfalls over most of the country since the last three years has resulted in low river flows and drought conditions. Not only precious human lives were lost but also thousands of livestock heads died due to damage to the rangelands and fodder crops. The catastrophe exposed the serious limitations in the water development, management, and utilization systems and policies, which calls for a comprehensive strategy/policy on water to streamline the problems of water resources of the country in the near and far future.

Although clear scientific links between the occurrence of extreme events such as droughts, floods, storms and global warming are yet to be established, scientists are increasingly of the opinion that climate change will increase the frequency and intensity of such events. In this scenario Balochistan and its population will be very susceptible. For example, the drought of 1998 2003 was termed the worst in the history of the region, and caused widespread loss of livelihoods and degradation of natural resources. According to provincial authorities, 1.911 million people were affected. A total of 1.76 million livestock perished while 1.973 million acres of cultivable land was damaged, hence making Balochistan the worst affected province of the country. Conversely, uncharacteristically heavy rainfall in northern Pakistan and Balochistan in February, 2003 precipitated flash floods in Balochistan causing many fatalities and damage to infrastructure. A similar situation was again faced in March 2005.

A lot of work would need to be done in the province on improving the situation with regards to droughts and floods through mitigation strategies and preparing the prone population with ways to cope with such disasters in future and minimize the negative effects of the same. The impacts of climate change need to be studied in detail to help plan strategies and effective policies.

2.11. Illiteracy and lack of awareness

Like in other provinces of Pakistan, illiteracy and lack of education among the users of water including farmers and general public is one of the major handicaps in rational use of water. Farmers tend to over-use water on farms and the general public is ignorant about the consequences from the misuse of water. This creates problems for planners and development agencies in convincing them of the importance of achieving savings in water for their own good as well as for the good of the province and nation.

[3] United Nations Drought Update Number 12 (June 8, 2001)

2.12.Non-participatory approach in project implementation

It is now widely accepted that participatory process in any developmental activity is a must for its success. Unfortunately this has never been practiced in the province for any development process involving water. A top-down approach in planning and execution of water projects practiced so far in the province and the country has not produced the desired results due mainly to non-acceptance of the interventions at the grass root level.

3. Taraqee Foundation An Introduction

Founded in 1994 with seed money from the Balochistan Rural and Urban Water and Sanitation Project (BRUWAS) funded by the Royal Netherlands Embassy, the Foundation has been actively engaged in grass root level activities in the core areas of community and physical infrastructure, microfinance, basic health services, gender and advocacy, education and child protection. This is well in accordance with the Mission statement of the Foundation which states as under:

> *"Taraqee Foundation strives to alleviate poverty and empower low income communities through diverse and environmentally sensitive strategies blending indigenous and innovative models. It endeavours to build social and human capital through gender sensitive and people-centred approaches. It struggles for self reliance through sustained services."*

The organization has now grown to become a premier Non Governmental Organization (NGO) of Balochistan with activities spread in eleven districts of the province. These include the districts of Quetta, Qila Saifullah, Pishin, Sibi, Jhal Magsi, Jafarabad, Naseerabad, Bolan, Ziarat, Loralai, and Gwadar. It also has the unique distinction of having worked in areas outside Balochistan viz. the districts of Mansehra and Batagram in NWFP and Muzaffarabad in Azad Jammu and Kashmir. This shows the confidence of donors in the capabilities of the Foundation in satisfactory output delivery.

The Taraqee Foundation has been undertaking the following main programs focusing on different sectors all aimed at alleviating poverty ensuring the well being of local impoverished communities:

1. **Micro-finance and Enterprise Development (MFED) Program:** Under this program the Foundation has very successfully disbursed credit to finance small enterprises at the community level so that these communities can help themselves out of poverty. The target groups included mostly women. Under the programme the Foundation provided skill

trainings to borrowers in the fields of embroidery, carpet industry, garment making, livestock rearing, agriculture, and marketing techniques and facilities. An interesting and innovative idea put ot practice relates to establishing farmers enterprise groups to effectively utilize business development serviced to enhance productivity, products and market diversity presentation and profitability.

2. **Environment and Infrastructure (E&I) Program:** This program was focused on developing infrastructure related to water resources keeping environmental concerns in mind. Besides other works in buildings, roads, and sanitation, site specific interventions in water management and sanitation like lining of channels, construction of on-farm water reservoirs, bunds and other structures under spate irrigation, water supply schemes, etc. were also undertaken. A detailed treatment to this program is given in the next section 4 due to its close relationship with water sector activities.

3. **Basic Health Education and Services (BHES) Program:** This programs aims to provide basic health education and services to the deprived communities with focus on women and children and to develop community resources in health for sustainability sake. The program hs adopted the model of integrated primary health services, reproductive health care with focus on maternal and newborn health and sexually transmitted diseases.

4. **Education Program:** The Foundation started this program to improve formal education in the province particularly focusing the female population. The foundation also has focused on including physically handicapped children in mainstream education system.

4. The E&I Programme and Water Legacy

Poverty and its relationship with natural resources is a complex phenomenon and must be viewed in the context of access to productive assets, public goods investments, institutional arrangements, and cultural and social factors that are all important determinants of poverty. It is well recognized fact that water due to its multi-faced roles in the economic and health sectors significantly affects the poverty levels of marginalized communities. Fortunately this is the cornerstone of Taraqee Foundation's mission, mandate and activities.

Balochistan has an agriculture oriented economy and water has and will continue to play a very significant role in determining the quality of life of the people of the province. In line with its mission statement and recognizing that water is one natural resource having strong linkages with all sectors of economy and is a hard to find resource, Taraqee Foundation has been striving hard to

alleviate poverty through a number of interventions aimed at improving target communities' access to the resource. The interventions under its Environment and Infrastructure Program included drinking water supply schemes, small scale community level slow sand filtration plants, Karez rehabilitation works, construction of water conveyance channels, on-farm water reservoirs, small dams to increase recharge, flood protection works, watershed management, and environmental sanitation. For the future such interventions would have to continue with greater vigour and zeal.

All this shows that water sector is not entirely new to Taraqee Foundation, which has a rich legacy of undertaking successful and meaningfully productive small scale activities in the water sector in Balochistan mostly targeting remote and poor communities of Balochistan. These diverse and isolated activities ranged from assuring and enhancing water supplies for domestic use to provision of water for environment, agriculture and livestock, sanitation, and watershed management. Despite their small scale, the water sector activities have established Taraqee Foundation as a credible partner in water sector in the province, which can add value to other major projects undertaken in the public sector programmes funded by the government or donors. In fact the works undertaken so far have been the main ingredient in the E&I programme of the Foundation. What is now required is to upscale these activities by building up the organization's capacity in the sector and bring about an integration in its various programmes.

5. SWOT Analysis of Taraqee Foundation

The following matrix describes the strengths, weaknesses, opportunities and threats as can be visualized for Taraqee Foundation at the moment to help develop the strategy in the water sector.

Strengths	Weaknesses
• Strong skills in community mobilization in both Baloch and Pushtoon areas of Balochistan giving the organization a political edge over other NGOs • Organization with long standing working relationship with stakeholders at the grass root level (working with communities) for various types of interventions • Well recognized credible partner in development in Balochistan with a policy to add value to mega projects in Balochistan in the public sector • Good experience of micro-credit schemes in rural areas, which would be an asset when working for development and awareness raising in Balochistan • Not entirely new to the water sector interventions in Balochistan. Has a clear lead over other contemporary organisations in this field particularly in the remote areas. • Recognition of the value of water and its status as an economic good with political will at the highest level available within the organization • Due to organizational capabilities, highly proficient in doing value addition works in the water and other sectors	• No coordinated and integrated programme for undertaking interventions in water sector in Balochistan • Currently very little funding available for undertaking water sector interventions at a high level • Adequate technically qualified field staff in water management and allied areas not available with the organization • Lack of experience in water quality related activities • Still “innocent” in the water sector so few weaknesses like lack of capability to do off or on-site water quality analysis, technical designing of project interventions, etc. • Lack of a good water analysis laboratory and a GIS/drawing section at its headquarters

Opportunities	Threats
• Need to work in partnership with other public and private sector organizations by building relationships and adding value to their work • Build in-house capacity in independently undertaking interventions in water sector by recruiting adequately qualified and experienced technical staff and running a vigorous in-house training programme • Involve in water quality related works and establish modest water quality analysis laboratories in t he provincial capital and other urban centres in addition to mobile laboratories to access remote areas • Achieving cross sectoral integration across other programmes and projects of Taraqee Foundation • Secure the quality of water resources to maintain its original character to help improve health of communities in target areas • Join hands with partners to develop and maintain the much needed resource base and Data Centre in water sector in the Province • Run awareness raising programmes in partnership with other private and public sector actors on the value of water and to promote conservation practices at all levels	• Capacity to secure funding to undertake a vigorous long term water programme in the province may not be there • Competition with other civil society organizations to get support for undertaking medium and large water sector projects • Social, political, and tribal institutional and other forces that may become serious threats to improving water governance in the province due to low literacy rates and poor comprehension of the value of water among users • Conflicts among communities where the organization might be working and possible resistance to change

An analysis of the above matrix establishes the Foundation's strength as a dependable and reliable organization, which can add value to water sector interventions and that can be looked upon with a great deal of confidence by donors to provide services in handling/ undertaking bigger projects in the province. The main strength of the organization lies in the fact that it has to its credit working experience of grass root level interventions with excellent trustworthiness among local communities in both Pushtoon and Baloch areas of Balochistan.

6. The Water Vision

The Water Vision Statement of Taraqee Foundation is as follows:

"Water is valued and managed on a sustainable and equitable basis to provide more secure livelihoods for the people of Balochistan"

The above vision statement is translated into the following detailed general statements on how Taraqee Foundation would like to see the provincial water resources and the sector as a whole in the future:

- A province where water resources and systems are managed in such a way that ensures that the rural and urban populations of the province are provided with the fibre for their well-being.
- A province, despite its harsh environment, that has the resilience to buffer the expected impact of climate change and where rural dwellers in particular build on their traditional knowledge and coping strategies by integrating new knowledge and technology.
- A place where the Millennium Development Goals (MDGs) relating to water sector have been achieved through cooperation between development agencies, humanitarian organizations, governments, communities, and donors so that investments in the sustainable management of water resources pay off. The MDGs are given as Annex 1.
- A place where integrated management of water resource principles and practices take their root and people start to realize the value of water and its management on sound grounds to ensure its long term sustainability.

7. The Guiding Principles of Strategy

Considering that water is a finite resource, the water strategy strives to create a more sustainable water resource base in the province. It is based on the recognition that in order to ensure a healthy environment and living conditions for ourselves and our future generations, we must stop acting as if our actions have no consequences on the environment and the resource. Instead we must endeavour to develop new ways to live, work and play. The strategy will

encourages communities to flourish as part of nature's beauty and diversity in shared habitats, where we learn from nature and mimic natural processes to achieve greater environmental health, social well-being and economic vitality. Within this context of sustainability, the Strategy uses an ecosystem approach to increase ecological integrity, to provide suitable conditions for the maintenance of self-sustaining communities and to improve ecological connectivity.

In delivering on its vision, Taraqee Foundation would operate under a number of principles to guide its work. These in particular relates to equity and gender, rights and governance, and the reduction of poverty. The strategy will operate under these principles as follows:

7.1. Promoting good governance in water sector

Good governance is the present day mantra across the world, and includes improved governance at a central level (transparency, accountability, inclusivity) as well as a strategic focus on devolving governance to lower accountable bodies (district, village). Yet the majority of water sector stakeholders remain less engaged in such governance devolution because of their non-involvement in project formulation and implementation. There is still a large disjunct between de facto customary systems of water management and the more formal government driven systems. In some cases this relates to the large differences in the way water resources are managed (a top-down approach with the decisions resting with the departmental officials), political marginalization (majority of farm holders are poor and are at the periphery of political processes, are weak in negotiating their rights and so are politically weak). The strategy will support and work with improving water governance through supporting devolved decision making processes, greater access to information, and greater recognition of customary institutions, which are in many case the de facto management system.

7.2. Empowering communities to become self sustaining

Community Empowerment is about people, civil societies and government working together to make life better. It means that communities must become their own masters. It involves more people being able to influence decisions about their communities, and more people taking responsibility for tackling local problems, rather than expecting others to do so. Taraqee foundation strategy is to empower communities to work themselves in solving their problems in the water sector. This can be brought about through their capacity building, raising their awareness on local issues, sharing problem solving matrix, and involving them in project formulation and implementation.

7.3. Ensuring equity in decision making

Equity considerations are a fundamental driver for much of Taraqee Foundation's work in

the past. Yet in the arid and less literate areas of Balochistan this has so far remained rather elusive. In part this is due to lack of reach into the closed and traditionally conservative societies, tribal set up and the Sardari systems that are prevalent in many parts of Balochistan. More importantly, however, is that customary management systems which are often the de-facto systems for management, do not necessarily directly consider equity among different sections of society. Women in particular are often marginalized from the decision making process resulting in their knowledge and institutional systems not being properly recognized. The Foundation will make every effort to ensure that the principle of equity continues to be the main driver in all water related activities undertaken by it in the province.

7.4. Enabling indigenous and traditional knowledge and water rights

Balochistan is a land of three major linguistic groups (Balochs, Pashtoons, and Brahvis) and many tribes within there. Water rights in Balochistan vary from one socio-linguistic group to the other and are dictated mostly by the customary prevalent tribal laws, though sometime the same may be modified according to dictates of local common resource management like that of water. Under such circumstances communities (different from tribes as they may comprise of people from different tribes but bound by a common cause) act as managers and take their own decisions based on sharing the common resource. Taraqee Foundation's strategy will be to respect and honor the customary laws and water rights of each tribe and location.

Additionally there is wealth of traditional knowledge and experience of managing water resources within the different societies that can be used gainfully to take the process of good governance in water sector a reality. The Foundation will make all out efforts to take advantage of this knowledge and experience wherever available and applicable by adding value to it with modern scientific research to increase its efficacy and usefulness on ground.

7.5. Improving security and reducing conflict

It is no accident that many of the “conflict” areas have the roots of conflict in the natural resource base access to water and rich patch vegetation being two obvious areas where there has been much conflict between settled cultivators and pastoralist (and more nomadic) livestock keepers. With ever dwindling resources these conflicts are bound to swell up further. On the other hand such conflicts, all be it at a much lower order of magnitude, is a fact of life in the management of natural resources including water, contribute in managing for risk and enhance resilience. The management of common property regimes requires the continued negotiation and re-negotiation of rights and responsibilities. Taraqee Foundation through its excellent grass root level contacts and long history of good working relationships with local stakeholders will contribute to improving security and reducing conflicts by following the

process of consultations and negotiations and fully recognizing the secure rights to land and water resources and supporting the ability of users to better negotiate and manage trade-offs. Although there may be competing or conflicting objectives and approaches, this Strategy strives to achieve consensus and a clear direction for future actions.

7.6. Ensuring Women's participation

Project interventions at the village level have brought about changes in the role of women in the water sector. Still, cultural factors continue to have an impact on the nature and scope of activities that can be developed and implemented for women in irrigation schemes. The strict separation of men and women in much of rural Balochistan, clearly structured and defined roles, the low social and economic status of most rural women, restricted mobility and lack of decision-making power influence the extent to which women are involved in these activities. Communities have limited experience with women being involved in village-level decision-making, and both men and women need to be convinced of its importance. Women cannot take full control of potable water supplies due to their restricted mobility. This prevents them from becoming actively involved in O&M activities. The involvement of women in water quantity and quality management has to be seen in the overall context of water-poverty-environment and the strong role women are playing in Balochistan in ensuring water for their families. However, identification of the effective entry point in conservative societies prevalent in Balochistan will be the key for success in this critical and difficult area.

8. Strategic Work Areas

Taraqee Foundation sees itself as playing an important role as a major player at the grass root level in contributing and ensuring resource sustainability through better management of water resources in accordance with the IWRM policy recently approved by the Balochistan Government. With its excellent background of credibility of working with local communities the Foundation finds itself in an excellent position as a credible partner in development. The strategy for the foundation would be to look for opportunities in the following areas of work, which are identified to directly or indirectly impact the livelihoods of the people of the province.

8.1. IWRM

Balochistan Government has recently approved the IWRM policy for the province which stresses the need to consider watershed-water-farming system framework for management of water resources at the basin level. This farming systems approach in agriculture is also essential on the front of poverty-reduction because poorest-of-the-poor live in *Sailaba* and *Khushkhaba* areas. The traditional approach of water management looking at surface and groundwater irrespective of farming systems would no more address the people and their

livelihood sources. The strategic role of Taraqee Foundation will be in introducing the concepts and principles of IWRM at the grass root level to ensure sustainability in water resources and become a source of income generation. For this avenues will be found to build working relationships with the public sector organizations in a private-public partnership concept with the ultimate aim to conserving the water resources in agriculture, the major use of water.

The detailed policy statements are given as Annex 2.

8.2. Water for Domestic and other Uses

Water management for other sub-sectors of water use (non-agricultural) includes water for: a) people; b) livestock; c) industry and mining; and d) ecosystems. Water for people has to be seen in the urban and rural context. However, water quality for domestic use is a major concern in both rural and urban areas. This would require installation of water filtration and treatment plants in all water supply systems including public and private networks. The water use by other sub-sectors is small and would continue to be around 3%. The future dependence of these sub-sectors would be largely on groundwater and as such would require more judicious use of the resource. In the coastal areas, deep groundwater is brackish in quality; therefore, the dependence of domestic water supplies would continue to be on water stored in dams. Desalination of seawater through technological solutions like reverse osmosis and solar desalination would need added emphasis. As the depth of freshwater layer in the coastal areas is rather thin if at all available, intrusion and up-coning of deeper brackish groundwater into the freshwater zone is a common phenomenon in tubewells and would need to be addressed accordingly.

Taraqee Foundation will undertake projects aimed at providing clean drinking water targeting deprived and poor communities in the remote areas of the province, where water is a rare and much sought after commodity. This will be combined with provision of adequate sanitation facilities and garbage disposal systems for the beneficiary communities with their active participation.

The Foundation will also try to establish a modest water analysis laboratory in Quetta able to carry out bacteriological and chemical analysis of some essential parameters of importance in water quality for drinking. A mobile laboratory will also be acquired for on-site analysis, as most areas in Balochistan and remote and sample taking and bringing it to the Central laboratory for analysis would not be possible and may lead to erroneous conclusions.

8.3. Conservation Interventions

The growth of the agriculture sector and population translates into an increasing reliance on floodwater, as the only unexploited resource available to the province in the future. Traditional water management schemes for floodwater involve an enormous cost in attempting to control unpredictable and frequently severe floods. Developing, implementing, maintaining and rehabilitating these schemes on sound engineering principles, will in all likelihood become costly and complex as time goes on, with repercussions for the natural environment of the province. However, by including the benefits associated with the development of these schemes for groundwater recharge to sustain the tubewell-irrigated horticulture and having a shift in the development paradigm would reduce the cost tremendously and thus justify the investments in this area.

8.4. High Efficiency Irrigation Systems

High efficiency irrigation systems (drip/bubbler, sub-irrigation and sprinkler) for fruit plants, vegetables and even grain crops could not be adopted by farmers even after implementation of numerous public-sector projects during the last over 15 years, primarily because of: a) high initial cost of the installed systems under the public sector projects; b) lack of materials availability; c) high transportation cost of materials from Karachi or Lahore; d) lack of local manufacturing facility; e) lack of availability of irrigation services in the private sector to install these systems; and, f) lack of backstopping services and training on use and maintenance to the farmers. Taraqee Foundation will strive to remove the above constraints to successful adoption of the technologies by undertaking well designed projects and negotiate for manufacturing the system components locally.

8.5. Capacity Building and Awareness Raising

Building the capacity of communities in undertaking projects outlined above and operating and maintaining the same after completion will be an essential part of Taraqee Foundation's strategy. This will ensure sustainability of project interventions and lessen the dependability of the communities on donors and project proponents. The Foundation will organize training programs and awareness raising events on a regular basis for areas where it will undertake interventions in the water sector. This will ensure that the interventions are sustainable on a long term basis and do not suffer the ignominy of failure that may result in waste of precious investment.

8.6. Coping with Climate Change

It must be accepted that climate change is not just an “environmental” concern but really a

"development" concern for under developed areas like Balochistan, whose environment is extremely fragile. This means that climate change as an issue must take center stage as a major developmental problem that the province will have to face in the coming days in the form of frequent and more severe droughts and floods than the recent ones. This requires concerted and focused actions by both the government and the civil society.

As a responsible member of the civil society, Taraqee Foundation will make determined efforts to face the challenge of climate change through projects aimed at increasing food production through improved agriculture with increased water availability, increasing community incomes through alternative livelihoods, improving health conditions, improving access to safe drinking water, and improving the safety of housing. Other strategies would include increasing income through access to common property and reducing threats to livelihoods via community based initiatives.

8.7. Participatory Drainage

Seepage from the system resulting from continuous development has caused waterlogging and salinity in the canal irrigated areas in Naseerablad and Jaffarabad districts. The objectives of more recent drainage systems have not been realized so far by the Government because of inefficient management and inadequate O&M funds. Considerable inputs from international agencies have been made, however, with little success. The sector is considered to be purely a government sponsored one and farmers do not want to invest in drainage activities by contributing in the cost.

Taraqee Foundation will look at avenues to promote participatory drainage concept in the canal irrigated areas of the province aimed at preventing land degradation by waterlogging and salinization and to rehabilitate land that has gone out of production due to the two problems.

9. Working at the Micro Scale

The strategy for Taraqee Foundation in the water sector would remained focused on interventions at the grass root level by adding value to the macro level projects undertaken in the public sector and those supported by the donors. The idea is to will undertake projects aimed at achieving the integrated approach to water management at the river sub-basin level as per Government of Balochistan approved IWRM policy. Further the Foundation sees for itself to play a greater role as a value adding agency in the water sector and hopes to further develop and strengthen its linkages with the government, donors and other important partners and stakeholders in the water sector in Balochistan.

Based on local conditions and circumstances Taraqee Foundation would be looking at activities at the micro scale that would address some of the very pertinent water sector issues in the province. The following sections give an idea of some proposed interventions grouped under specific issues. These interventions include but are not limited to the following:

9.1. Poor Water Availability

i. Construction of small/mini dams at community level to store water for off season use. This should improve local water availability and community access to water for both agriculture and domestic purposes.

ii. Construction of small/mini dams and other structures to induce recharge to local aquifers. The interventions would be supported by appropriate artificial recharge technologies. Such interventions are expected to improve local water table conditions and help rehabilitate Karez systems.

iii. Promotion and construction of rainwater harvesting structures to catch rainwater that otherwise goes waste. The harvesting techniques will include both rooftop as well as catchment area harvesting. The activities will help make additional water available for promoting small scale agriculture and kitchen gardening.

iv. Promotion of *sailaba* and *khushkaba* systems of irrigation that is based on engineering principles and technically sound designs. This will reduce dependence on the already stressed groundwater resources and harness floodwaters that go waste to depressions and causes damages to property besides being lost to evaporation.

9.2. Erosion and Degradation of Watersheds

i. Undertaking watershed management works including both engineering structures and bio-technologies in the piedmont areas. Working on these interventions with community participation will reduce precious land erosion active in these areas and resultantly increase the useful life of reservoirs created for recharging depleting aquifers and agriculture purposes.

9.3. Poverty and Livelihoods

I. Supporting the growth of vegetation around delay action dams and improved landscaping around them to convert the areas into environmental parks and encourage

local tourists.

ii. Promoting fish culture in dam reservoirs to provide alternate source of income for local communties. This and above activity would target poverty issues by identifying new income generation opportunities and diversifying the income base of local communities.

9.4. Poor Water Use Efficiencies

i. Reducing conveyance losses in the distribution systems of irrigation systems. This would include channel linings.

ii. Promoting and undertaking installation of site specific appropriate efficient irrigation technologies for water use including trickle, bubbler, sprayer, sprinkler and underground seepage pipe. The interventions in this direction would arrest the problem of overuse of water in the agriculture sector besides improving water availability for increased production.

9.5. Temporal Variations in Water Availability

I. Creating small reservoirs at the farm level to help better control over precious water use and ensure supplies during power breakdowns and low flows in Karezes/irrigation channels.

9.6. Isolation in Water Sector Interventions

i. Developing and implementing basin management plans on small sub-basin level to achieve the ends of integrated approach to problem solving in water. This activity will be undertaken with local stakeholders' close and active participation, which would also create general community awareness about the planning processes and the advantages of integrated approaches to satisfy all competing users' demands through use of collective wisdom in managing their water resources in a judicious way to minimize losses.

1.7. Domestic Water Scarcity

i. Installing clean drinking water points at the village/community level. These interventions will address gender and health issues in particular die to improvement in the access to safe drinking water to local women who are the main water carriers for

their families.

It is hoped that the strategy of working at the micro level in the above arenas would not only improve the local environment but would also better the health and livelihoods of the communities in general.

10. Project Identification

The strategic focus of Taraqee Foundation will be on alleviating poverty through better water governance in the province. With this mind the following pilot projects are identified for initiation in Balochistan as part of effort to address poverty and livelihood issues of the communities in Balochistan through better water management with integrated approaches.

10.1. Sustaining rural livelihoods through water management

Recognizing that water is of immense importance to the provincial economy and majority of the population dependence on this commodity to earn their livelihoods, this project seeks to establish pilot scale schemes in selected areas of Balochistan through integrated approaches to solving the water scarcity, its pollution and inefficient use, and degrading watersheds. Besides the schemes will aim to raise awareness and build the capacity of stakeholders including communities, local government, and grass root organizations to tackle water sector problems by understanding the intricacies and complexities and making an holistic approach to problem solving.

The overall goal of the project is:

> "Sustainable management of water resources and aquatic ecosystem goods and services in an integrated manner to alleviate poverty and improve livelihoods"

With the above goal in mind the following are the objectives of the project:

I. Establish pilot schemes in well-defined small watersheds to promote and popularize integrated management of water resources to achieve long-term sustainability and productivity;

ii. Build stakeholders capacity to tackle emergent issues in the water sector from an ecosystem perspective so as to satisfy all competing users of water;

iii. Sensitize stakeholders on integrated approach to sustainable management of water resources;

iv. Explore enabling conditions, synergies and mechanisms where indigenous/local knowledge and new business models complement one another in advancing innovation in water resource and ecosystem management practices;

The project is expected to provide a comprehensive review and validation of how ecosystems may be managed to secure water supply and sustainable economic growth in a watershed. Further this will increase understanding of how ecosystem approaches may be embedded in integrated water resources management practices to maintain functional ecosystems that achieve sustainable development and a balancing of social, economic and environmental objectives. Following are some major expected outputs;

- Functional community managed medium sized pilot model projects on IWRM installed.

- User communities sensitized on the negative implications of unsustainable water resources management practices.

- Poverty and livelihood issues and concerns of beneficiary communities are comprehensively addressed through:

    - Improved availability of water for agriculture, humans, livestock, and environmental use;

    - Improved access of rural women to clean potable water for domestic consumption; and,

    - Stakeholders better health and hygiene practices.

- Capacity of line departments, civil society organizations, and local water users built to deal with critical water issues and unsustainable management and use of natural resources.

Apart from defining priorities for further research-practice integration and collaboration in these endeavors, a key aim of the project would be to reduce uncertainty to enable financing of initiatives by brining together and mobilizing public institutions, non-governmental organizations, donors, as well as local beneficiary community resources.

10.2.Improving Water Availability at Community Level

Currently almost all ground and surface water resources in the province (particularly in the upland areas) with the exception of flood waters have already been developed. Finding new sources of water for development is becoming ever more difficult. This project is aimed to address water availability problem in the rural areas of Balochistan, which are dependent on agriculture.

The overall goal of this project is:

> "to seek solutions to the complex water problems and challenges being faced in the rural communities so that the availability of water becomes more assured"

Specific objectives of the project are:

1) Improve water availability, both irrigation and precipitation, within existing cropping systems, that can decrease dependence on groundwater resources at farm and command level;

2) Improve the design, performance, and management of irrigation practices and systems at farm and command level;

3) Introduce and install rainwater harvesting structures at community level to improve water availability for agriculture and drinking for humans and livestock;

4) Explore opportunities to reduce the dependence on groundwater resources by developing integrated crop and livestock systems that are used in conjunction with improved irrigation practices at farm level; and,

5) Develop water saving technologies, including wastewater reuse.

10.3. Rehabilitation of Karez Systems by Rejuvenating Aquifers

In the past, groundwater in Balochistan was tapped through the traditional Karez system to provide a dependable source of water for practicing agriculture and meeting domestic requirements. These excellent indigenous systems have deteriorated over the years due to reduced groundwater levels, as a result of over pumping of aquifers and as such a vast majority of the Karez systems have become dead and in-operational.

The immediate goal of this pilot project would be to undertake area specific schemes to help elevate local groundwater tables through suitable and appropriate artificial recharge technologies using floodwaters that otherwise go waste. The elevated water tables will rejuvenate the local aquifers which would help rehabilitate dead Karezes and make them operational thus improving upon water availability conditions in the target area and reduce dependence on groundwater currently being over-exploited through deep tubewells fitted with heavy duty pumps.

The following are the specific objectives of the Project.

1. Install site specific appropriate technologies of artificial recharge in various stressed areas of Balochistan to rejuvenate aquifers; and,

2. Improve the working and efficiency of the local Karez systems by carrying out rehabilitation operations.

Annex-1: Millennium Development Goals

The Millennium Development Goals (MDGs) are eight goals to be achieved by 2015 that respond to the world's main development challenges. The MDGs are drawn from the actions and targets contained in the Millennium Declaration that was adopted by 189 nations-and signed by 147 heads of state and governments during the UN Millennium Summit in September 2000.

The eight MDGs, given below, break down into 21 quantifiable targets that are measured by 60 indicators.

Goal 1: Eradicate extreme poverty and hunger

Goal 2: Achieve universal primary education

Goal 3: Promote gender equality and empower women

Goal 4: Reduce child mortality

Goal 5: Improve maternal health

Goal 6: Combat HIV/AIDS, malaria and other diseases

Goal 7: Ensure environmental sustainability

Goal 8: Develop a Global Partnership for Development

These goals:

i. synthesise, in a single package, many of the most important commitments made separately at the international conferences and summits of the 1990s;

ii. recognise explicitly the interdependence between growth, poverty reduction and sustainable development;

iii. acknowledge that development rests on the foundations of democratic governance,

the rule of law, respect for human rights and peace and security;

iv. are based on time-bound and measurable targets accompanied by indicators for monitoring progress; and,

v. bring together, in the eighth Goal, the responsibilities of developing countries with those of developed countries, founded on a global partnership endorsed at the International Conference on Financing for Development in Monterrey, Mexico in March 2002, and again at the Johannesburg World Summit on Sustainable Development in August 2002.

Annex-2: IWRM Policy for Balochistan A Brief

Following are the main policy statements in the IWRM Policy document for Balochistan

A. Water Availability and Potential for Development

1. Recognize the fact that potential for development lies in surface water to meet growing needs of various sub-sectors of water use and to enhance groundwater recharge of depleted aquifers.

2. Assign highest priority to *Sailaba* farming and minor perennial irrigation for development of surface waters to expand the command area and to enhance the groundwater recharge.

3. Assign higher priority to Indus basin irrigation system for expanding canal network to use allocated unutilized water resources (perennial and non-perennial).

4. Ensure that groundwater development is restricted to basins having potential for development.

5. Undertake a study for the re-assessment of basin-wide availability and use of water resources (surface and groundwater) for planning of sustainable development and management of the resource.

B. Water Resources Assessment and Monitoring

1. Enforce basin-wide approach for collection of data for surface (river-flows, floodwater, runoff and precipitation) and groundwater to have reliable assessment and monitoring of the resource.

2. Establish adequate and reliable data acquisition systems (spatial coverage and temporal quality) for surface and groundwater resources, agriculture and land use.

3. Strengthen existing database and enhance modeling facilities for effective planning and management of the resource.

4. Develop and implement programmes for capacity building of the data collecting institutions.

C. Managing Water Demand

1. Promote the fact that new water resources in future would come largely from managing the water demand and saving of the existing losses.

2. Ensure access to water resource information by all the stakeholders to initiate beginning of water demand management for all sub-sectors of water use.

3. Encourage and support effective public participation, awareness and education programmes for initiating water demand management.

4. Encourage and support educational institutions (Universities, Colleges, Schools and Madrassas) to include water resources management courses in the curricula.

5. Establish Educational Curricula Project to formulate water resources management courses by active involvement of all stakeholders.

D. Linking Water Development with IWRM Approach

1. Enforce adoption of IWRM approach as a framework for planning, formulation and implementation of water projects to achieve basin sustainability

2. Restructure and strengthen DPDM-IPD to address needs of water sector institutions in planning, design, implementation and monitoring of IWRM Projects.

3. Restructure and strengthen Planning and Data Section of the Agriculture Department for formulation of integrated irrigated agriculture projects including the On-Farm Water Management.

E. IWRM for Agriculture

1. Enforce and support adoption of basin approach as a hydrological unit for sustainable planning, development and management of water resources for agriculture.

2. Undertake formulation of Basin Management Plans for the 15 basins of the Balochistan province starting with the three overdrawn basins Pishin-Lora, Nari River and Zhob River basins.

3. Undertake a feasibility study for selected Mogha commands of Pat Feeder and Khirther canals to integrate irrigation and drainage for enhancing water productivity and sustainability.

4. Develop and implement programme for remodeling of Mogha commands of Pat Feeder and Khirther canals to optimize irrigation efficiency and to reduce waterlogging and salinity.

5. Transfer minor irrigation schemes to the Water Users' Associations after organizing them and enhancing their O&M capacity.

6. Develop and support measures to improve water use and economic efficiency of irrigated agriculture under minor irrigation schemes.

7. Develop and implement a strategy of conjunctive use of water for minor irrigation schemes to harness shallow groundwater developed due to inefficient irrigation.

8. Undertake a study for assessment of the social and farmers' institutional impact on water rights, water allocation and availability to the lower riparian.

9. Undertake a study and assessment of Sailaba and Spate irrigation systems in Balochistan and development of cost-effective design manuals.

10. Ensure development of Spate Irrigation with active participation of water users to have improvements in existing systems rather than introducing traditional surface irrigation schemes.

11. Encourage Water Users' Associations to implement Spate irrigation schemes instead of contractors.

12. Ensure development of multi-purpose small dams for storage of floodwater and diversion of stored water for Spate irrigation and storage of the excess for provision of water for supplemental irrigation during the dry-spells or prolonged droughts.

13. Promote Khushkhaba systems as an integral part of the basin plans and these communities should not be left due to the associated risks, because they also qualify on the front of poverty reduction.

F. Adjusting Crops and Cropping Pattern with Water Availability

1. Discourage farmers to grow rice or to increase water productivity in Pat Feeder and Khirther canal commands by increasing Abiana rates of rice from Rs. 202 to Rs. 500 per acre.

2. Encourage farmers to replace rice with cotton in areas having light to medium textured soils.

3. Restrict the area of onions and fodders in tubewell-irrigated farms, as these crops consume large amount of water.

4. Undertake a study for identification of crops and cropping patterns for Sailaba and Khushkhaba farming systems considering drought tolerance, climatic conditions and root characteristics.

5. Undertake a study for identification of crops and cropping pattern for irrigated crops (surface and groundwater systems) considering water productivity and climatic conditions.

G. IWRM for Other Sub-sectors

1. Assign higher priority to water conservation measures including installation of water meters for domestic water supply in urban centers/towns so that consumers pay for

the amount of water consumed. Ensure high quality standards for the construction of under implementation schemes for the Quetta city because of severe mining of groundwater.

2. Enforce sliding scale of water tariff to provide incentives to poor people who consume less water.

3. Encourage projects for replacement of leaky pipeline to reduce water losses and to provide safe and clean water to the consumers in all the cities and towns of Balochistan.

4. Undertake a study to develop "Sustainable Rural Water Supply Schemes" for domestic and stockwater, which are cost-effective (capital and O&M).

5. Undertake a study and assessment of renewable energy resources and utilization for power generation for water supply purposes.

6. Undertake a study to assess "Minimum Water Requirement for Ecosystems of Balochistan".

7. Assign responsibility to Livestock Department for the development of stockwater.

8. Promote construction of small storage dams for domestic purpose. Such storages can also be used for irrigation purposes if excess water is available. This is the only source of water for domestic needs in the coastal areas like Gwadar, as the deep groundwater is brackish in quality, and shallow groundwater is polluted due to the disposal of the sewage water into the groundwater using the septic tank system.

H. Environmental Water Management

1. Recognize the need for a shift in the concept of drainage as disposal of effluent of Pat Feeder and Khirther canals to the safe utilization of effluents for production of crops, grasses and fuelwood.

2. Enforce EPA legislations for restricting entry of sewage effluents into water streams.

3. Develop and implement low-cost treatment system for sewage effluents and safe utilization for peri-urban agriculture.

I. Cost Recovery of Irrigation Infrastructure

1. Develop and enforce a strategy for assessment and recovery of Abiana during 2004-05 by increasing recovery from 10% to 30%. Subsequent increase would be made to achieve level of over 70% in a period of 3 years.
2. Undertake a study for rationalizing Abiana rates and to increase recovery.
3. Encourage Water Users' Associations to enforce flat rates of Abiana in minor perennial irrigation schemes to avoid additional cost in the assessment of the Abiana.
4. Authorize Water Users Associations to collect Abiana and use it for day-to-day maintenance and for future investments in schemes, which have not been transferred.

J. Electricity Tariff for Tubewells

1. Fix upper limit of subsidy during 2004-05 by restricting it at the present level, where GoB and GoP will continue to contribute their share, so that the farmer's share is dependent on the actual amount of electricity consumed minus the subsidy.
2. Undertake a study to evaluate alternative options like variable scale electricity tariff, where concessions be given to farmers who are consuming less energy and less water. Provide incentives to farmers who installed water meters and sprinkler/drip irrigation systems.
3. Undertake a study for the comparative evaluation of water productivity and economic efficiency of farms under electric- and diesel-operated tubewells.

K. Cost-Effectivity of Water Conservation Interventions

1. Undertake a study to ascertain the effectiveness of delay action dams in recharging

shallow and deep aquifers and their contribution at local and basin/regional level.

2. Undertake a study for assessment and identification of potential sites for recharge of groundwater using delay action dams and enforce the outcome for future investments.

3. Assign priority to the Spate irrigation schemes having higher cost-effectivity to increase the watering intensity of the command area and enhance recharge to the groundwater.

4. Assign priority to the minor irrigation schemes having higher cost-effectivity to increase the command area and enhance recharge to the groundwater.

L. Promoting Inter-provincial Cooperation

1. Resolve on urgent basis the trans-boundary issues: a) disposal of drainage effluents from Pat Feeder and Khirther canals; and b) diversion of canal water supplies and sharing of shortages during the drought period as per Water Apportionment Accord.

2. Facilitate tours of experts, farmers and politicians to study the groundwater use and measures of water conservation adopted by farmers of other provinces having similar ecologies.

M. Fostering Participation

1. Encourage and support participation of water users in water resource development and management schemes as an integral part of the water policy.

2. Provide legal framework and support to build and strengthen water users' institutions at the basin level for sustainable management of the resource.

3. Promote gender sensitization and encourage women participation in domestic water supply, water hygiene, and environmental health by providing mandatory representation in various forums.

N. Institutional Restructuring and Strengthening

1. Establish "Water Resources Management Authority" (WRMA) as an apex organization to recommend, coordinate, regulate and monitor appropriate policy measures and initiate dialogues among the stakeholders for IWRM and sustained economic growth.

2. Encourage and support measures to take political leaders on board to "Make Water as Business of Everyone" including the establishment of Basin Water Boards represented interalia by public representatives, community leaders and tribal chiefs, in addition to experts.

3. Restructure and strengthen provincial line departments to implement the IWRM policy and reforms and to make them responsive to the beneficiaries (farmers and households).

4. Undertake a study for assessment of training needs of the provincial line departments and research institutions and formulation of the training programme.

5. Encourage and support water management research institutions to identify and prioritize the research agenda to address needs of line departments and demand of the water users.

A. High Efficiency Irrigation Systems

1. Constitute a special "Water Conservation and Management Fund" jointly by the GOP/GOB and the ADB as an endowment for initiating well-designed Pilots under the WRM Authority.

2. Encourage redesign and remodeling of tubewells prior to the installation of drip irrigation to reduce size of the pumping set and to reduce electricity consumption.

3. Encourage and support private sector for the installation of drip and sprinkler irrigation systems at farmers' fields through development of local Irrigation Service Companies.

4. Encourage and support the private sector to initiate local manufacturing of drip and sprinkler irrigation systems materials in Balochistan.

5. Enforce regulatory measures for quality installation of drip and sprinkler irrigation systems and ensure provision of technical backstopping by the public-sector institutions.

B. Groundwater Development and Management

1. Impose ban on installation of new agricultural tubewells in the three over-drawn basins Pishin-Lora, Nari river and Zoab river. Installation of tubewells for drinking purposes should be restricted only in case of replacement of dried wells.

2. Allow replacement of dried agricultural tubewells in basins having limited potential for development.

3. Restrict installation of new agricultural tubewells to basins having potential for sustainable development.

4. The QESCO may be made responsible for providing reliable power supply to the farmers and other consumers involved in pumping of groundwater and irrigation related activities.

5. Introduce the concept of skimming dugwells in the coastal areas including the Gwadar and ban may be imposed on the installation of tubewells, which will certainly induce the intrusion of seawater into the thin freshwater lens in these areas.

Annex 3: Water and Sanitation Sector Strategy for Balochistan

1. Introduction

Access to safe water and sanitation and solid waste disposal are basic human rights. They are an essential component of primary health care and are important for poverty alleviation. Provision of safe water supply and sanitation services are an effective health intervention that reduces the mortality caused by water-borne diseases by an average of 65% and the related morbidity by 26%. Inadequate sanitation and water result not only in more sickness and death, but also in higher health costs, lower worker productivity and lower school enrolment.

Balochistan has the lowest water and sanitation indicators in Pakistan. The poor are particularly vulnerable in this context. The urban poor spend a disproportionately large part of their income buying water from vendors while in rural areas fetching water from long distances is the responsibility of women and children. Inadequate sanitation facilities lead to a prevalence of disease especially among the poor who, as a result, spend a significant proportion of their income on requisite medical care. Insufficient attention to wastewater treatment and disposal is also causing severe environmental problems in the province.

Recognizing the need for improvements in water and sanitation service coverage, the Balochistan Poverty Reduction Strategy has recommended: i) a policy shift focusing on low cost technology and sustainable model; ii) capacity building of district and sub-district functionaries vis-a-vis their new roles and responsibilities; and, iii) replication of successful low cost interventions with community involvement. The problems confronting the sector can only be addressed adequately within the framework of a comprehensive water and sanitation sector strategy. The Government of Balochistan has therefore prepared a strategy to provide framework for the water and sanitation sector. This strategy is outlined in the following sections.

2. Water Supply and Sanitation in Balochistan

The water and sanitation indicators for Balochistan are far lower compared to the national coverage and this disparity increases in the rural areas. Nearly one-half of the population of the province relies on unprotected wells, ponds, rivers, canals or streams for their drinking water needs. In the urban areas, nearly 80% of the population has access to piped water inside (74%) or outside (5%) the house and another 10% to other improved sources. In rural areas, these figures are 15%, 3% and 26% respectively, with only 38% of the rural population having access to improved sources of water within a 2 km or ½ hr distance from their homes. The burden of fetching water largely falls on the women and girls. Where groundwater is available, there is the problem of over drawing due to subsidized electricity for agricultural tubewells.

Adequate excreta disposal facilities are not available to 71% of the rural population, wastewater disposal is available to barely 1%, and there is no solid waste collection and disposal system. Most schools lack proper latrines, posing, especially problems for girls.

Garbage litters the landscape, particularly in urban areas and along main roads. Urban solid waste coverage outside Quetta is mainly in Gwadar district (13%), Kila Abdullah district (10%) and in other districts is less than 3%. There in no sanitary landfill site and wastewater treatment plant in any urban or rural settlement in Balochistan.

3. Water Supply at a Glance

3.1 Urban Water Supply

In Balochistan there are 46 urban places (including 3 cantonments) having a total of 1,568,780 population[7]. The water supply and sanitation systems for the three cantonment areas (Loralai, Quetta, and Zhob cantonments) have been developed and are managed by the army authorities. In Quetta city, the Quetta Water and Sanitation Agency (QWASA) is responsible for the development and management of water supply and sewerage systems.

The PHED has developed water supply schemes in all remaining 42 towns and according to the BLGO 2001, the relevant district government is responsible for maintaining these schemes.

In about half the towns/urban settlements, groundwater is the source of water supply while the rest obtain water from springs, canals/rivers and dams. In all the towns, water is supplied intermittently and the quantity of water supplied is not known.as there is no metering system either at source or at consumers' end. The water quality at the source is generally monitored at the time of source development while water quality at the consumer' end is rarely monitored. In most areas, water tariff is collected from users by the PHED staff while in a few towns this task has been contracted out.

3.2 Rural Water Supply

There are 6,554 rural settlements (out of which 540 are un-inhabited) having a population of 4,997,105[8]. The PHED has developed 1,658[9] water supply schemes of which 373 schemes are non-functioning due to various reasons. Of the total schemes, 696 are managed by PHED and 962 have been handed over to the communities for operation and maintenance on self help basis under the Social Action Program (SAP) (started 1992 and continued till 1998). Under the agreement between the PHED and the communities, PHED constructed the schemes through

contractors and on completion handed these over to the communities who were responsible for the full O&M of the schemes except major repairs, if any.

The Local Government Department, with donor assistance, has installed community hand pumps in small settlements. NGOs have also assisted communities in the installation of hand pumps. These hand pumps are manufactured in Karachi, Quetta and Lahore, and directly sold in bulk to government/donor projects. The O&M of the hand pumps installed by the local government and NGOs is the responsibility of the users. However, as local shopkeepers do not keep the spares of these hand pumps timely maintenance cannot be done.

In both rural and urban areas, drinking water is contaminated and even where it is treated at source, the water gets contaminated in the distribution system due to old, corroded and damaged distribution networks. Contamination leads to the prevalence of water-borne diseases among users who do not treat/boil the water received at the household level from the municipal system. Most users in this category belong to lower income groups.

3.3 Private Sector Participation in Water Supply

The private sector has developed tubewells, particularly in Quetta, on private land and, sells water to vendors who, in turn, sell it to households in tractors/tankers. In both rural and urban areas, water is also often sold in drums loaded on donkey carts. Bottled (mineral) water for drinking is available in almost all urban places.

In urban areas private housing societies have developed their own water supply system, and operate and maintain these through user charges. Similarly government housing areas (railway colonies etc.) develop and maintain their own system.

Since PHED does not have adequate staff for billing and collection of water tariff, the private sector has been brought in for the collection of water tariff through annual auction of collection rights.

3.4 Water Quality

Water quality is only checked at the time of development of a new water supply scheme and, there is no system for regular monitoring either at source or at the consumer end. According to a national study on drinking water quality which included information about four cities in Balochistan (Quetta, Khuzdar, Loralai and Ziarat), all the drinking water samples collected in the province (except those from Quetta) were contaminated with bacteria and were unsafe for human

consumption.[10]

4. Sanitation at a Glance

4.1 Urban Sanitation

Only a part of Quetta city is being served by a sewerage system and this has been developed and is maintained by the Quetta Water and Sanitation Agency (QWASA), who is responsible for providing sewerage facilities. There are a mere 1,165 (1,102 domestic and 63 commercial) sewerage connections in the entire city. In addition to the QWASA sewerage system, the communities have constructed sewer lines in some parts of the city. The sewerage network (especially the portions constructed by the communities) has not been mapped by QWASA. Also, wastewater is discharged into the natural drains without any treatment. The domestic sewerage fee is only 10% of the water fee and is billed in the consumer water bills.

In a few towns sewerage/drainage systems have been developed by the PHED and are maintained on crisis management basis by the TMAs.

4.2 Rural Sanitation

Only a small proportion of the rural population has access to toilet facilities. There is no sewerage system in any of the villages in Balochistan. As a result, open defecation and bucket/ pit latrines are the norm. In the past the government has provided subsidized latrines (VIP latrine, etc.) in rural areas.

4.3 Wastewater Treatment

At present there is no wastewater treatment plant for urban or rural areas. In urban areas the wastewater generated from houses is discharged into street drains/ sewers and, in the absence of street drains the wastewater remains stagnant in the street. The wastewater generated from densely populated areas is discharged into natural drains without any treatment.

4.4 Private Sector Participation in Sanitation

Private sweepers/cleaners provide services at the household level for excreta and solid waste disposal and charge a monthly fee. As sanitary practices are not followed, both the workers and the community face health risks. In addition, the private sector provides the materials used in the construction of toilets and sewerage systems.

5. Solid Waste Management at a Glance

5.1 Solid Waste Management in Quetta

In Quetta, solid waste collection, transportation and disposal is done by the town municipal administrations of Chiltan and Zarghoon towns. The TMA of Chiltan town lifts less than 50% of the solid waste generated while the rest is left lying in the streets and or in unused plots of land. The collected solid waste is transported to the dumping site located outside the city.

Only 26% of the population in towns other than Quetta has access to solid waste disposal facilities.

5.2 Solid Waste Management in Towns and Rural Area

There are no solid waste management facilities in rural areas and households simply dump solid waste either in their lanes on in adjacent open plots. The increased use of plastic bags has made it very difficult to use the solid waste as manure.

5.3 Private Sector Participation in Solid Waste Management

The private sector is participating in the recycling of household waste materials such as paper, glass and iron. Vendors buy such material from households while scavengers collect it from municipal waste dumps and sell it to the *Kabari*.

6. National and Provincial Policy Framework

A number of goals have been set out to facilitate improvements in the provision of adequate water and sanitation services under various international agreements, and, national and provincial policies.

6.1 Millennium Development Goals

The issue of drinking water is addressed in the Millennium Development Goals[11] (MDG) under Goal 7, Target 10 which intends to *"Half, by 2015, the proportion of people without sustainable access to safe drinking water".*

In Pakistan under the MDG, plans are underway to extend the coverage of clean drinking water from 70% in 2005-06 to 93% in 2015.

In Balochistan to achieve the goal of reducing the percentage of population without safe

water from 54% to 27% is a daunting task because it means increasing the present coverage by about 60%.

6.2 National Water Policy

A national water policy has been prepared which, once approved would provide the framework for integrated water resource management.

6.3 Ten Years Perspective Plan 2001-2011

The envisaged targets are providing (i) safe drinking water for an additional 55 million (84% coverage) people (urban 27 million and rural 28 million); sanitation for an additional 54 million (63% coverage) people (28 million urban and 26 million rural); and solid waste collection and disposal facilities to 55% of the population. The strategies followed to achieve these targets include promotion of self-sustaining systems through induction of private sector and rationalizing user charges.

Medium Term Development Framework 2005-2010: The main targets outlined within the framework of a national water policy and national water supply and sanitation policy and plan (both are yet to be prepared) are: (i) Preparation of district water supply and sanitation plans including tehsil level schemes, (ii) Regularization of 75% of Katchi abadis and provision of WSS in these areas, (iii) Provision of WSS in villages with more than 100 households (iv) consideration for major cities to borrow from market, (v) public-private partnership in the management of physical infrastructure, (vi) allocation of upto 10% of budget for promotion of health, sanitation and environmental program, (vii) adoption of uniform policy for RWSS -continue O&M of the RWSS by communities, and in case of PHED O&M the budget allocations would be increased until their transfer to communities, (viii) setting up additional training centers for all categories of technicians and managers involved in WSS. Rs 600 billion have been envisaged to achieve the MTDF (2005-2010) targets.

6.4 Balochistan Poverty Reduction Strategy

The Balochistan Poverty Reduction Strategy also addresses the issue of improving water and sanitation services so as to facilitate poverty reduction.

6.5 Balochistan Conservation Strategy

There has been a steady decline in groundwater sources in the province due to the government's policy of charging flat rates for electricity usage for agriculture tubewells. The issue of depletion of water is addressed by the Balochistan conservation strategy whose goal is to

promote the social and economic well-being of the people.

7. Water and Sanitation Issues

1. Poor households have limited access to service, particularly in urban areas.

2. There is no database or management information systems for the sector due to which the locations of schemes developed by government agencies is difficult to ascertain and the total sector coverage (i.e., households and population connected to the public systems, private systems, others) cannot be fully determined.

3. The identification of schemes to be developed is not demand/need based.

4. The engineering designs of the systems adopted by the government agencies are technically complex and therefore tend to have higher capital costs; this may also result in higher operating and maintenance costs and / or skill requirements.

5. The construction quality of the private contractor is poor and supervision is weak; consequently, communities are reluctant to take over schemes meant to be handed over for community operation, breakdowns are frequent, and a large number of schemes are non-operational.

6. No element of capital costs is recovered through users charges from consumers; and, there is no contribution towards capital cost from the communities.

7. The mechanisms for collection of user charges are inadequate and there are no water meters, hence water charges are not consumption based.

8. The element of recovery of operating cost in government operated water supply schemes is almost non-existent and water tariff recovered is deposited in the provincial government accounts and thus not available for operation and maintenance.

9. The electricity tariff charged by the power utility for water and sanitation (all municipal services) do not take into account the fact that these are public services and not commercial operations, particularly as there are heavily subsidized tariffs for agricultural tubewells in the province and subsided tariffs for agricultural and reclamation tubewells in all provinces.

10. The allocations for O&M expenditures of the water supply schemes are inadequate due to which the schemes are operated below design capacity and there is little regular and preventive maintenance. As a result, the schemes may become non-functional.

11. Technical operation and maintenance systems are not well established (and not fully known by some technical staff) and are not being followed. Hence, O&M standards are low.

12. There are leakages and losses in the water supply distribution network, the quantum of which is not known due to an absence of bulk water metering. Furthermore, there is no leak detection program.

13. There is no mechanism for monitoring water quality either at source or consumer end.

14. Sewerage services are limited in urban areas and almost non-existent in rural areas. There are no municipal waste water treatment plants. Untreated waste water is discharged in natural streams posing public health hazards.

15. Solid waste collection services are limited in urban areas and absent in rural areas. There is no sanitary landfill site for solid waste.

Annex-4: Mega Projects in Public Sector

Balochistan has been receiving financial assistance from the Federal Government and other donors including the World Bank for numerous major projects in the water sector. A list of these is given in the following pages.

i. Balochistan Small-scale Irrigation (US$40 million):

The project would develop water resources through restoring and increasing water storage; increasing productivity of water through more efficient use, and developing capacity to formulate a water resources development plan using surface, groundwater and watershed management. Components include: water management (with a special emphasis on groundwater); infrastructure for restoring the hydrological balance of Bund Khushdil Khan; construction of delay action dams and selected small-scale irrigation projects; on-farm water management; modernization of irrigation systems and subsidies for efficient on-farm irrigation systems and modern irrigation technologies; and institutional development - among farmers, water users and different levels o f government. The programme is funded by the World Bank.

The project would cover an area of about 73,000 hectares. It would be implemented over a period of five years. Its major components are: (i) community development and support program which would promote formation of effective farmer organizations through a well structured social mobilization and support program; (ii) distributary level improvement program which would provide for rehabilitation of distributaries/minors; (iii) watercourse and on-farm improvements program which will help renovating and/or constructing watercourses, field ditches, water storage tanks as well as promoting other measures which enhance water application efficiency in the canal command and barani areas (iv) improvements in branch/distribution canals supplying water to secondary level channels managed by farmers; (v) local/minor irrigation schemes development program outside the Indus Basin Irrigation System; and (vi) project management support component.

ii. Balochistan Partnerships for Sustainable Development:

*With an overall goal of **sustained ecological and human well-being in Balochistan**, this 6-year project funded by the Royal Netherlands Embassy (RNE) has been recently initiated by the International Union for the Conservation Nature (IUCN) for execution in six districts of Balochistan. These include Quetta, Mastung, Lasbela, Gwadar, Qila Saifullah and Pishin. Following are the objecti9ves of the*

project:

1. *Promote sound environmental governance at the district level through visioning, planning and implementation.*

2. *Facilitate integrated water, coastal and marine resource management.*

3. *Enhance capacity of relevant stakeholders to support sustainable development in Balochistan.*

The project aims to achieve its objectives by building partnerships with the governmental and non-governmental agencies in the province. These partners, though having varying official mandate, are expected to play the following role in Programme's implementation:

- *Facilitate in information collection about the past, present and future activities of their respective sectors.*

- *Facilitate policy formulation and review as a result of learning from the research and implementation.*

- *Play a lead role in development and approval of the respective management plans.*
- *Participate in implementing programme interventions.*

- *Guide and facilitate the teams deployed in the fields in conducting surveys and assessments.*

- *Provide the available guidelines and policies about the follow-up of the intended interventions.*

- *Takeover the respective completed interventions to make those sustainable.*

- *Help the Programme in complying with existing rules and regulations.*

- *Provide administrative support in the field to ensure security and continuity of the initiatives.*

iii. Federal Government Funded Projects

The federal Government has approved a number of mega projects for Balochistan in the water sector with a total financial outlay of over Rs. 55 Billion to be spent over a 10 year period. Following is a list of the projects:

S. No.	Name of Scheme	Cost (Billion Rupees)
1.	Kachhi Canal (under completion)	31,204
2.	Mirani Dam (completed)	5,861
3.	Sabakzai Dam (Under completion)	1,010
4.	Balochistan effluent disposal into RBOD(ROBOD-III)	4,485
5.	Greater Quetta Water Supply & Environmental Project	7,965
6.	National program for improvement of water courses in Pakistan Balochistan Share	5.060
	Total	**55 585**