EUROPEAN UNION

CSCCC

STAKEHOLDER RECOMMENDATIONS FOR CLIMATE CHANGE IMPLEMENTATION FRAMEWORK, BALOCHISTAN

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LIST OF ACRONYMS

ADB	Asian Development Bank
AEDB	Alternate Energy Development Board
ADBP	Agricultural Development Bank of Pakistan
AJK	Azad Jammu & Kashmir
AR	Annual Report
CADD	Capital Administration & Dev. Division
CBOs	Community Based Organizations
CC	Climate Change
CCI	Council of Common Interests
CDA	Capital Development Authority
CDG	City District Government
CETPs	Combined Effluent Treatment Plants
CO2	Carbon Dioxide
CSCCC	Civil Society Coalition for Climate Change
CSD	Conference on Sustainable Development
CSR	Corporate Social Responsibility
DDMAs	District Disaster Management Authorities
DMC	Domestic Material Consumption
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EU	European Union
FAO	Food and Agriculture Organization
FATA	Federally Administered Tribal Areas
FC	Forman Christian
FDI	Foreign Direct Investment
FFC	Federal Flood Commission
Fig.	Figure
FI	Financial Institution
FPCCI	Federation of Pakistan Chambers of Commerce & Industry
GB	Gilgit Baltistan
GCISC	Global Change Impact Studies Centre
GDP	Gross Domestic Product
GHGs	Greenhouse gases
GHI	Global Hunger Index
GIS	Geographical Information System
GJ	Giga Joule
GLOF	Glacial Lake Outburst Floods
GoKP	Government of Khyber Pakhtunkhwa
GOP	Government of Pakistan
GPS	Global Positioning System
HDIP	Hydro Carbon Development Institute of Pakistan
HEC	Higher Education Commission
HPP	Hydropower potential
HTV	Heavy Transport Vehicle
ICM	Integrated Coastal Management
ICTs	Information and Communication Technologies
IEE	Initial Environmental Examination
IPCC	Inter-provincial Coordination Committee

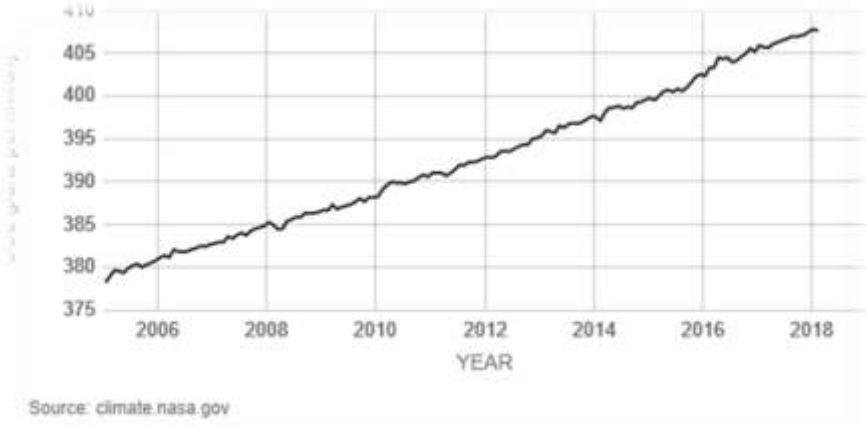
IPM	Integrated Pest Management
IRSA	Indus River System Authority
IUCN	International Union for Conservation of Nature and Natural Resources
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
Kg	Kilogram
kl	kilo liters (1000 liters)
Km	Kilo-meter
KPK	Khyber Pakhtunkhwa
LG	Local Governments
LGRDD	Local Government, Elections and Rural Development Department
LPG	Liquefied Petroleum Gas
LTV	Light Transport Vehicle M/o Ministry of
MAF	Million Acre Foot
MDGs	Millennium Development Goals
MF	Material Footprint
MOCC	Ministry of Climate Change
MPCD	Marine Pollution Control Department
MRV	Measuring, Reporting, and Verification
MW	Mega Watt
NAP	National Action Plan
NARC	National Agricultural Research Council
NCCF	National Climate Change Fund
NCCP	National Climate Change Policy
NCPC	National Cleaner Production Center
NCS	National Conservation Strategy
NDMA	National Disaster Management Authority
NEECA	National Energy Efficiency and Conservation Authority
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environmental Quality Standards
NGOs	Non-Governmental Organizations
NHA	National Highways Authority
NIE	National Implementing Entity
NIO	National Institute of Oceanography
NSDS	National Sustainable Development Strategy
OGP	Open Government Partnership
OECD	Organization for Economic Co-operation and Development
OGRA	Oil and Gas Regulatory Authority
PAEC	Pakistan Atomic Energy Commission
P&D	Planning and Development
Pak EPA	Pakistan Environmental Protection Agency
Pak-INDC	Pakistan's Intended Nationally Determined Contribution
PARC	Pakistan Agricultural Research Council
PC	Planning Commission
PCRET	Pakistan Council of Renewable Energy Technologies
PCRWR	Pakistan Council of Research in Water Resources
PCSIR	Pakistan Council of Scientific and Industrial Research
PDMAs	Provincial Disaster Management Authorities
PITB	Punjab Information Technology Board
PMD/MET	Pakistan Meteorological Department
PPP	Public Private Partnership
PPPA	Public Private Partnership Authority
PPRA	Public Procurement Regulatory Authority
Prov.	Province, including AJK, GB & FATA
PRSP	Poverty Reduction Strategy Paper

PSDP	Public Sector Development Program
PSLM	Pakistan Social and Living Standards Measurement
PSQCA	Pakistan Standards & Quality Control Authority
PTA	Pakistan Telecommunication Authority
R&D	Research and Development
REDD+	Reduction of Emissions from Deforestation and Forest degradation
Rs.	Rupees
SCP	Sustainable Consumption and Production
BCDA	Balochistan Coastal Development Authority
SDGs	Sustainable Development Goals
SEA	Strategic Environment Assessment
SERRA	State Earthquake Rehabilitation and Reconstruction Authority, AJK
SLM	Sustainable Land Management
SMEDA	Small and Medium Enterprise Development Authority
SMEs	Small and Medium Enterprises
SUPARCO	Space and Upper Atmosphere Research Commission
UN	United Nations
UNCSD	United Nation Conference on Sustainable Development
UN Environment	United Nations Environment Programme
UNESCO	United Nation Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Authority
WSSD	World Summit on Sustainable Development
WWF	World Wildlife Fund
ZTBL	Zarai Taraqiati Bank Limited

BACKGROUND AND RATIONALE

Global research going back to 1824 in fields ranging through physics, oceanography, biology and geology have confirmed that human activity—mainly burning fossil fuels, raising livestock and destroying carbon sinks like forests and wetlands—is increasing greenhouse gas emissions and causing global temperatures to rise rapidly, putting humanity at risk. Every legitimate scientific academy and institution agrees that time is running out and urgent action is needed to keep temperature increase below 2 degrees Celsius.

However despite scientific evidence there is a disconnect between the reality of climate change and the priority given to it by the governments around the world in taking measures that are critical for keeping PPM rate below 3%. The Atmospheric CO2 is rising at an unprecedented rate. The consequences of this rapid increase are profound for earth's temperatures, climates, ecosystems and species, both on land and in the oceans.



There is need for recognition from all stakeholders that overexploitation of natural resources and following unsustainable pathways to development that irrevocably disturb the balance between nature and human activity will put the planet at risk. While we need economic development there is an equal and urgent need to protect the environment, and to remember that the two are not equal considerations. The current economic model can be changed but the finite resources of the planet cannot be enhanced to meet the needs of a human population that has more than quadrupled to seven billion and rising in little more than a century. All studies are unanimous in their conclusion that we must refrain from burning fossil fuel to avoid catastrophic warming.

Pakistan is among several countries whose carbon footprint is a fraction of global GHG emissions, but where the magnitude of climate induced stress has created disproportionate vulnerability on ground. As far as numbers go, Pakistan accounts for a mere 0.8% of total global emissions even as its carbon footprint has grown by 123 per cent over the last two decades against an average industrial growth rate of 5.33 per cent per annum between 1990-2017 .

Pakistan's industrial base and population have considerably expanded between 1990 and 2018, and correspondingly, the target increase of greenhouse gas emissions can be traced to the energy sector which accounts for 46 per cent of the national carbon count, followed by agriculture with 41 per cent and thereafter other sectors . Power generation for Pakistan's ever increasing energy consumption needs, and expanding transportation are expected to further drive up energy-based emissions. Meanwhile, there is a high dependency on agriculture for employing roughly half the national workforce, providing food security and bolstering GDP and export revenues.

Even greater is Pakistan's reliance on the Indus river system to feed agriculture, other industrial usages and domestic consumption. Between 2010-2014, repeated megaflooding across the Indus rivers cost a staggering US$ 18 billion in damages, affecting 38.12 million people, destroying 3.45 million houses and 10.63 million acres of crop. Climate related losses averaged US$ 3.99 billion each year between 1994 and 2013 (citation needed), rolling back what modest economic gains were made during the 1990s.

The stresses of climate change are all too evident in Pakistan and the region at large. Accelerated melting of glaciers, erratic monsoons, frequency of extreme weather events such as flash floods and heat waves have a massive cumulative impact on Pakistan's poor climate resilience and governance mechanisms. In 2015, Pakistan requisitioned US$ 40 billion abatement cost in mitigation and 7- 14 million USD to meet adaptation needs as part of it its Nationally Determined Contribution, projecting an increase from 405 metric tons carbon dioxide to more than 1,603 metric tons of CO2 in the next 15 years.

Rationale

Recognizing the crucial mandate available to provinces to implement climate action, the Civil Society Coalition for Climate Change (CSCCC) collaborated with the Ministry of Climate Change (MoCC) and Environmental Protection Agency, Balochistan (EPA) to conduct a consultative workshop to formulate policy recommendations that help construct an institutional framework for achieving the objectives of climate change policies at the state level.

In order to develop a framework that feeds into existing policies and also reflects Balochistans specific short and long term concerns, CSCCC used the National Climate Change Implementation Framework as the building block, and aligned it with the National Climate Change Policy to construct sector specific templates for developing a sub-national framework of activities that dovetail with the national policy and framework. A template for Monitoring, Reporting and Verification Framework was also developed to help with measuring progress on indicators. The templates were shared with Balochistan government for review and comments before circulation to all the participants ahead of the workshop date to help them make a more meaningful contribution to the process (templates in annexure).The workshop format was designed for co creation of policy and engaged all key stakeholders from public sector and civil society to make consensus based recommendations on sector specific thematic areas.

DEMOGRAPHIC PROFILE BALOCHISTAN

Balochistan—located in the Southwestern region of Pakistan (220N to 320N, 660E to 700 E)—is the largest province in terms of territory and the smallest in terms of population. The province spans over approximately 347,190 km2 which makes up 44% of the total land area of Pakistan. Latest figures from the Population Census of 2017 show the population of Balochistan at 12,344,408, of which 52.5% are male and 47.6% female. The population of Balochistan is nearly twice as much as its population as recorded in 1998, with an average annual growth rate of 3.37%, which also happens to be the highest of all the provinces of Pakistan. In terms of percentage population, though, Balochistan makes up less than 6% of the total population of Pakistan and has an average population density of 35 persons per km2 compared to the national average population density of 236 persons per km2 and 536 persons per km2 for Punjab province. Almost 72.4% of the total population is based in rural areas while the remaining 27.6% reside in urban areas. Quetta, the provincial capital city of Balochistan, has a population of just over 1 million.

Balochistan is divided into six administrative divisions, namely Quetta, Zhob, Sibi, Nasirabad, Kalat, and Makran, which are further divided into 32 districts and 137 tehsils. Each district is headed by a District Coordination Officer (DCO). Geographically, around 80% of the area is described as inter-mountainous, while the remaining area is composed of flood plains and coastal plains. The major mountain ranges include Sulaiman, Toba-Kakar, Central Brahui, Kirthar, Chagai, Raskoh and central Makran.

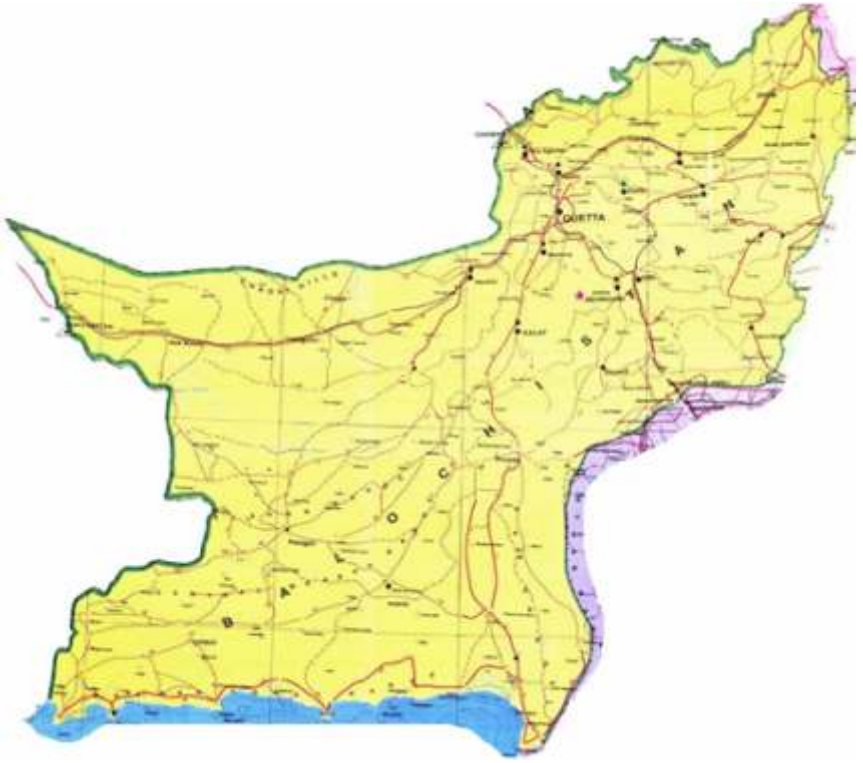


Figure 1: Map of Balochistan Province (Source: Government of Pakistan)

Ethnically, the Baloch are a majority in the South of Balochistan while Pashtuns are a majority in the North. Quetta, situated in the North, has a Pashtun majority with Baloch, Hazara, and Punjabi minorities. In the Kalat region and some other parts of the province there are a significant numbers of Brahui speakers. Along the coast, various Makrani Baloch tribes are predominant. Persian-speaking Dehwars also live in the Kalat region, and further west towards the Iran border. Additionally, an estimated 769,000 Afghan refugees also live in the province including Pashtuns, Tajiks, and Hazaras. Many Sindhi farmers have also moved to the more arable lands in the East of the province.

Balochistan's climate is described as continental semi-arid Mediterranean, with average annual precipitation ranging from 200 to 350 mm and a variable proportion of the total precipitation occurring as snow and rain in the winter period or as heavy downpours in summer. Non-irrigated agriculture is not possible in Balochistan due to the uniform aridity across the entire province, with average annual precipitation not exceeding 350-400 mm in least arid areas, and in many parts, as low as 50 mm annually (see Figure 3).

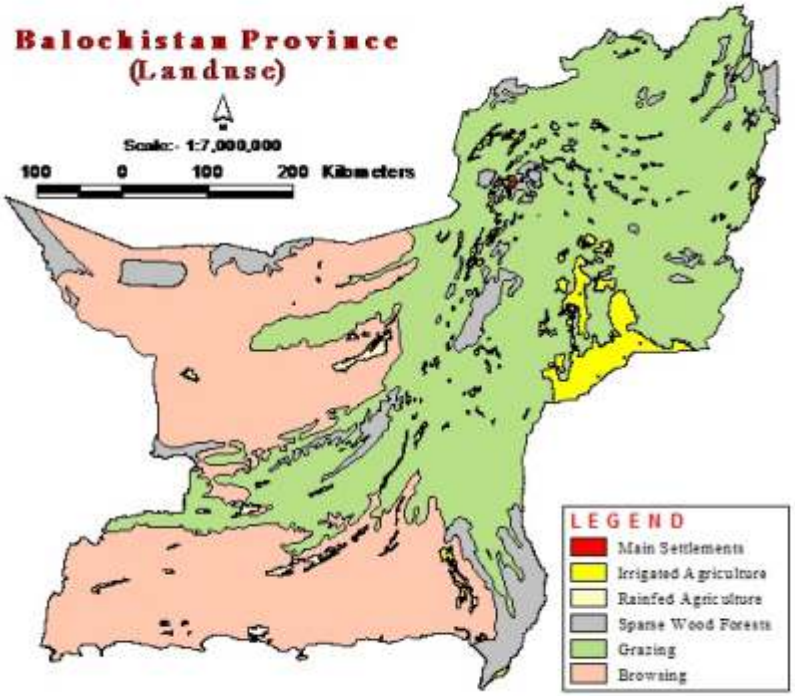


Figure 2: Map Showing Pre-Dominant Land Use in Balochistan Province
(Source: Bureau of Statistics)

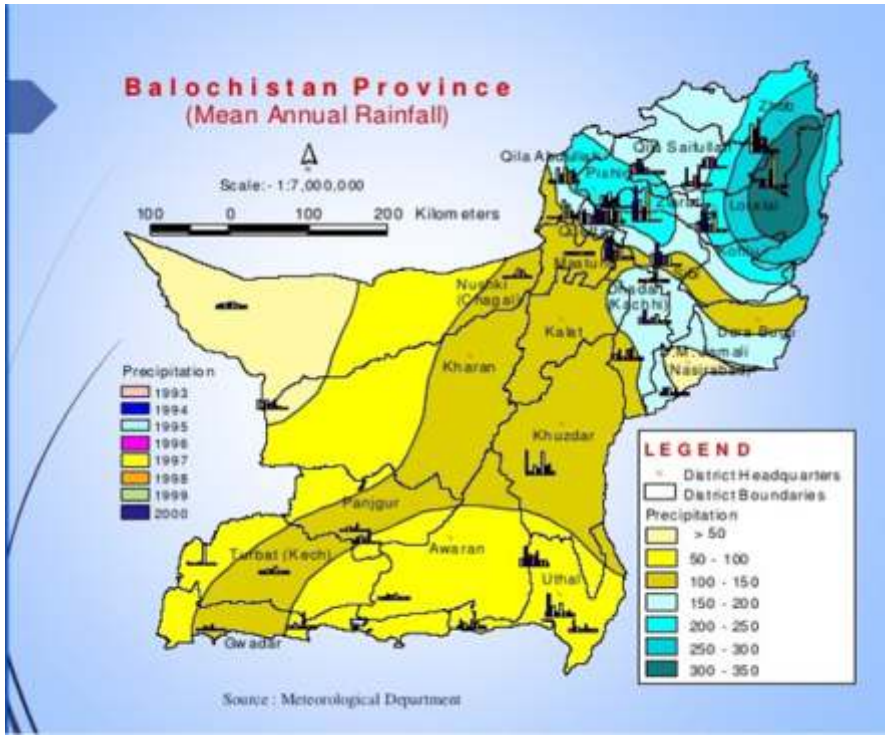


Figure 3: Mean Annual Rainfall in Balochistan (Source: PMD)

BALOCHISTAN CLIMATE CHANGE PROFILE

The unique physiography of Balochistan, featuring rough terrain with a combination of mountainous tracts and plains with varying heights, means that it faces a unique set of challenges linking to climate change. The ecology of the province has distinct ecosystems such as mountain ranges, deserts and dry-lands, inland water bodies, forests, woodlands,and grasslands.

In addition, Balochistan has a vast coastline stretching over 800 km from near Karachi to the Gwadar Bay (Rasool et. Al 2002), with a rich marine life, large areas of mangrove forests. While the coastal ecosystems in Balochistan are highly productive, providing a range of goods and services, the continued impacts of climate change on the region may impact their productivity and resilience.

As the driest region in Pakistan, Balochistan receives 210 mm of rainfall per annum on average, with a warming trend in mean temperatures. Between 1960-2007, the total change in temperature recorded was 1.15 Celsius. Alongside this, it has been observed that Balochistan had the highest rise in mean maximum temperature in the same period, increasing at 1.10 celsius (PMD, 2009). There has also been an increase in the frequency of warm days in Balochistan, at around 4-16 days per decade. Conversely, there has also been a noted increase in the frequency of cold days in mountainous regions of Pakistan, particularly in Balochistan, of an average of 30-60 days (ibid).

Impact of climate change in Balochistan

The changes in the climate of Balochistan manifest in some of its most vital sectors, and have far reaching impacts. As the province with the lowest HDI in Pakistan, climate change is expected to exacerbate existing vulnerabilities.

Agriculture and Livestock

Agriculture and Livestock employ the largest proportion of Balochistan's population at 67%, as well as contributing more than half of the provincial GDP (government of Balochistan, 2010). The province already receives meagre rainfall, and with further climate impacts such as extreme weather events, drought and epidemics, the sector is extremely vulnerable. More than half of the cultivated area of Balochistan, 53% is under 'Sailaba (floodwater) and Khushkhaba (rainfall and localized runoff) farming systems. While 47% of the land is irrigated, the non irrigated farming systems cater to the livelihoods of the poorest strata of the population, and even minor changes in the hydrology and weather can have devastating impacts.

Energy

Data suggests that the total electricity demand in Balochistan is between 1400-1600 MW, while the actual supply is in the region of 700 MW. Electric grid networks in the province do not have sufficient capacity to transmit energy as per the full demand. While the mineral and natural resource rich province has sufficient resources to generate and fulfil its energy demand, much of this is supplied to the national electric grid. Balochistan contains more than 33% of the natural gas of the country, 9% of the coal and 2% of the probable oil reserves, and accounts for 40% of the primary energy production in Pakistan. However, the province itself relies on biomass energy such as firewood and dung cakes for its energy needs, leading to alarming amounts of deforestation.

The province is also set to see increasing investments through the China Pakistan Economic Corridor, such as the 300 MW imported coal based power project at Gwadar, Pakistan, and the 1320 MW coal fired power plant in Hub, Balochistan. As an important player in the power sector of Pakistan, and the investments in energy in the past decades, it is important that Balochistan's mitigation options are carefully weighed.

Health

The sparsely populated province of Balochistan is the lowest in terms of the HDI in Pakistan. Inadequate support of health services, due to a number of reasons ranging from the lack of available facilities and trained practitioners,

to communities living in remote areas/nomadic communities that are unable to access basic services as well as face other socio-cultural barriers that restrict equal opportunities for growth. Infant mortality rates are high at 79 per 1000 live births in Balochistan, while malaria positivity rates were the highest in Pakistan at 12.19% in 2006. ; in Balochistan in particular, more than 60% BHUs are without electricity, more than 70% do not have running water and more than 90% have no public toilets. Of the expected pregnancies in a time period, only 24% register for prenatal care at BHUs and 15% register for delivery. This data also shows that most BHUs are generally in a dilapidated state and remain underutilized[1].

There is evidence to suggest that extreme events, as well as lack of access to water and other essential goods and services, may negatively impact the resilence of the already vulnerable population of Balochistan, as the risk of water borne diseases, epidemics and malnutrition increase with the incidents of these events.

Environment and Forestry

An estimated 80% of the land area in Balochistan is rangeland (Ahmad and Islam, 2011), in which animal production is heaviliy dependent on grazing resources, while also providing ecosystem services such as carbon sequestration, fuelwood for household energy, nutrient recycling, biodiversity and wildlife habitat, and ecotourism. In addition, the mangroves of Balochistan are an important asset, that are threatened by sea level rise, changes in temperature and precipitation and increasing frequency and intensity of extreme events, that will impact the soil quality and biodiversity status of Balochistan.

Disaster Risk Reduction

A major climatic factor impeding the development of Balochistan is the recurring drought, which has severely affected both Lasbela and Gwadar in the recent years. The effects of this phenomenon are so prominent in the province because it results in reduced crop output, depleting water levels and increased livestock and wildlife mortality rates in the province. At the same time, the province, particularly communities living in the three main river basins, i.e. Gwadar Ormara basin, Porlai River Basin and Hub River Basin, are at risk during the monsoon season when they are flooded. During the 2007 floods in Lasbela, heavy rain damaged nearly 40% of health facilities, as well as in the past, washing away sections of the Makran Coastal highway, causing losses of millions.

With remote communities and underdeveloped physical infrastructure, relief and rescue post disaster is difficult in the province, highlighting the need for pre emptive adaptation and early warning systems.

Coastal Areas

The coastal districts of Balochistan are natural resource based economies, where the majority of people are dependent on marine fisheries. The 800 km long coastline is also at risk from coastal erosion and sea intrusion, particularly on Dam Bander, Pasni, Sub Bander, Pashukan and Jiwani, intruding on farming land. The coastal belt is also facing an increased number of above average intense cyclones, such as Cyclone Gonu (2006), Yemyin (2007) and Phet(2010). At the same time, changes in sea surface temperatures as well as environmental degradation and over fishing have impacted marine ecology in the area.

As the coastal belt of Balochistan continues to be developed as a major trading hub for Pakistan, the implications for the environment and local communities, who are already impacted by extreme events and who rely solely on natural resources for their livelihoods, must be taken into account.

[1]Health Indicators of Pakistan, Gateway Paper II, Sania Nishtar, 2010

ARCHITECTURE OF POLICIES GOVERNING CLIMATE CHANGE

As Balochistan continues to face the impacts of climate change, that manifest in extreme weather events, the province is also home to some of the most important trading ports in Pakistan, that highlight its strategic importance for the country. In addition, mineral rich Balochistan provides a large proportion, 33% of the total natural gas of Pakistan, as well as 9% of the coal, which is set to increase under the developing projects by the Government in collaboration with CPEC. Like the rest of Pakistan, Balochistan is faced with the unique challenge of adapting to the impact of climate change, while ensuring that emissions are curbed.

At present, the province does not have a Climate Change Policy, although it is to be developed keeping the National Climate Change Policy of Pakistan as a basis.

ARCHITECTURE OF POLICIES GOVERNING CLIMATE CHANGE

The CSCCC secretariat engaged in a pre-workshop consultation with the EPA on the 19th of September 2017. In this consultation, CSCCC met with key personnel from the EPA department to narrow down the scope of the Consultation, refine its objectives, identify key themes for discussion. In order to ensure a participatory and inclusive approach for the co creation of this document, EPA was requested to nominate officials from government departments linked to climate and environment, while CSCCC would be responsible for the participation of key stakeholders from civil society, academia and private sector.

The inception dialogue was conducted at two levels to develop a broad based constituency of support for the workshop objectives. The CSCCC delegation called on the Chief Secretary of Balochistan, to apprise him about the purpose of organizing the workshop and the expected outcome of the session. A meeting was also held at the Department of Planning and Development Balochistan with participation from relevant line departments to share proposed agenda and receive input from department representatives. CSCCC followed a 'Whole of Government Approach' to build consensus on objectives, identify thematic areas and share program methodology. Focal persons from both sides were nominated and roles and responsibilities were distributed with mutual consent to streamline activities.

Concurrently, following a review of the National Climate Change Policy, the National Implementation Framework for the Implementation of the Climate Change Policy, CSCCC developed a set of tools to be implemented during the workshop, i.e. Implementation Framework tool to identify quantifiable actions in line with existing policies, and an MRV Framework to match the identified actions with measurable monitoring indicators. These tools were reviewed by the Balochistan government and CSCCC's roster of experts before finalization. CSCCC then developed a set of reference materials for each group in the consultative workshop, drawing from the existing policies and SDGs, to ensure that the consultative dialogues were in line with national policies

Workshop Methodology

The structure and design of the workshop was built on the concepts of the Lima-Paris Action Agenda and anchored in the principles of the Open Government Partnership (OGP) that highlight the importance of civil society and emphasizes the need for engagement with policy makers in framing policies that are representative, participatory and inclusive. The workshop brought together policy makers and relevant stakeholders from the government, civil society, academia, private sector and the media to set the climate change agenda for Punjab contextualised in its adaptation and mitigation needs. The inaugural plenary speakers focused on challenges and policy priorities taking into account shared sector specific constraints peculiar to the local geography and topographical range. The threats and opportunities were shared with the audience/participants to amplify concerns and suggest solutions on way forward.

The workshop session was divided into six working groups and tasked with the development of an Implementation and Monitoring, Reporting and Verification Framework aligned with the goals of the Punjab Climate Change Policy and in

consonance with the National Climate Change Policy and Framework. Effort was also made to identify compatible activities that dovetail seamlessly with the SDGs and help in building complementary synergies. Each working group comprised of representatives from the government and civil society and was gender balanced to make it participatory and inclusive. The six thematic area for the working groups were based on the key areas of focus in the National Climate Change Policy.

i) Agriculture and Livestock
ii) Disaster Risk Reduction
iii) Health
iv) Water
v) Energy
vi) Environments and Biodiversity.

The recommendations of each table were captured in writing and documented for an accurate compilation of ideas to develop a roadmap for future action. The deliberative exercise and interactive session was successful in preparing a list of suggested activities with timelines to prioritise needs (longterm -short term-high-low) and identify potential sources of finance and implementing partners. The collaborative strategy was designed to foster collective ownership and responsibility for planning, implementing and monitoring policies to strengthen climate governance. Existing sources of information and data were used to establish baseline and make future projections. .

Impacts of climate change on water availability

Water is increasingly being recognized as one of the most valuable commodities in Balochistan, where most agriculture depends upon natural sources of water i.e. Sailaba and Khushkhaba. In addition, the province receives well under the average national rainfall per annum at 210 mm/annum. As climate change threatens water availability and rainfall patterns, particularly in Balochistan where there have been observed changes in rainfall patterns, as well as a 1.10 degree Celsius rise in mean temperatures between 1960-2007, leading to increased surface evaporation.

With 18 river basins, most of which are non perennial, rainwater and snowmelt from catchment areas in the form of flash floods is transported to lower steep lands and plains, forming the basis for much of the water supply for agriculture.

Groundwater potential is estimated at 1.2 BM3, which is available for irrigated agriculture through traditional Karezes, natural springs and open wells. Due to the availability of electricity, tubewells, some going to the depth of 1000 feet below ground in water stressed areas, have been installed, leading to dangerous depletion of aquifers. Surface water potential is estimated at 12.3 BM3, which is exploited using the traditional sailaba and khuskhaba methods.

As the temperatures and rainfall patterns in Balochistan continue to vary, as well as unsustainable practices regarding the extraction of groundwater, there is evidence that water scarcity will become the foremost challenge to human lives, the economy and the environment of Balochistan. Drought conditions are already rampant in the province, and adequate strategies to address the anticipated water shortages are necessary.

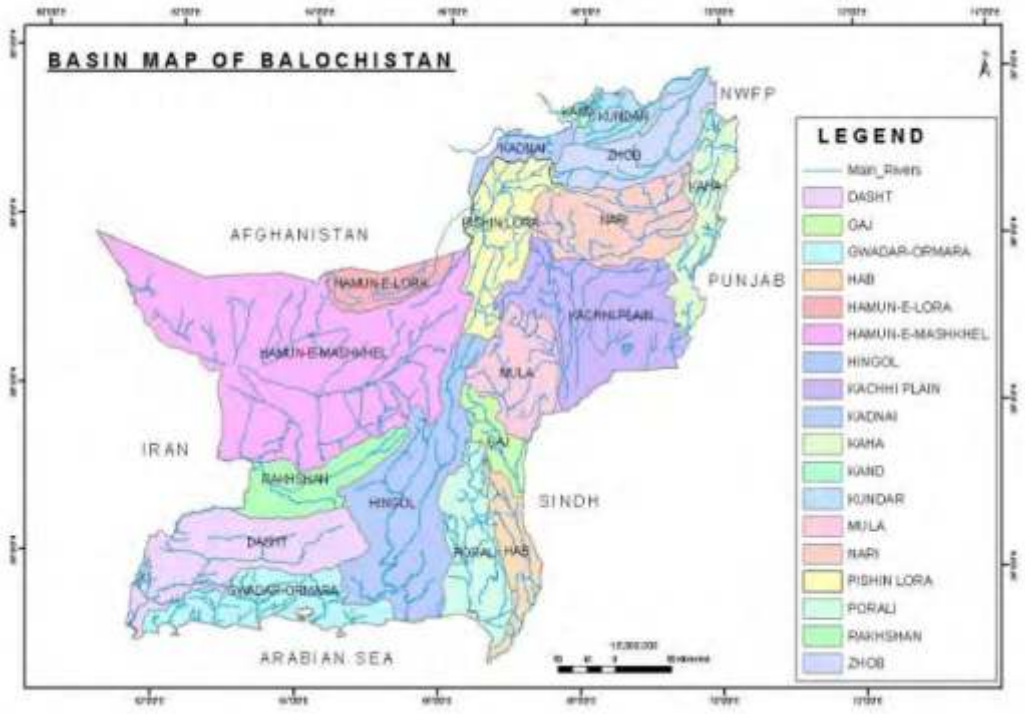


Figure 4: Source: Irrigation Dept. Govt of Balochistan, 2016

Implementation Framework

Objective 1: Develop and strengthen relevant institutions, policies and framework to promote integrated water resource management with special focus on water related rules and regulations, financial management and capacity building						
Actions	**Target**	**Priority**	**Potential/ Sources of Financing**	**Implementation Institutions Partners**	**Indicative Timeline**	**Estimated Budget (USD-Million)**
Initiate development of Balochistan Water Policy on Integrated approaches	Integrated Water Resource Management Policy Developed	High priority/ short term	Federal & provincial govt. donors & private sector.	Planning and Development Department (P&D) and irrigation, water, agriculture line departments	2 years	1
Training programs for enhancing water resource management	1000 personell working at provincial/district level trained	High priority/ short term	Same as above	Same as above	2 years	1
Develop Standard Operating Procedures (SOPs) for planning, designing, construction monitoring, operations and maintenance for various categories of water supply schemes	SOPs developed at provincial and local levels	High priority/ medium term	--	Balochistan P&D department, Industries and Commerce Department, Ministry of Water and Power, EPA	3-5 years	10
Establish and promote appropriate water pricing mechanism to ensure recovery of O and M and capital costs	Water pricing mechanism developed and integrated into SOPs	High Priority, Long term	Private sector, provincial budget	Same as above	5 to10 years	10
Objective 1: Develop and strengthen relevant institutions, policies and framework to promote integrated water resource management with special focus on water related rules and regulations, financial management and capacity building						
Create awareness and promote rainwater harvesting at household and local levels	15000 households across all districts adopt rainwater harvesting	High Priority, Short term	Donor funded projects	Balochistan PHED, PCRWR	On a rolling basis	12

Adoption of high efficiency irrigation techniques	1000 commercial farmers and 15000 small landholders adopt efficient irrigation/subsidy introduced	High priority/ medium term	As above	Balochistan Agriculture Department	3-5 years	12
Revise and enforce building by laws having water efficient equipment for better water use efficiency	Revised By Laws	High priority/ long term	Government funding/provincial funding	Urban Planning Unit	3-5 years	10

MRV Framework

Actions	Indicators	Baseline *(What is the current value?)*	Target *(What is the target value?)*	Means of *Verification (How will it be measured?)*	Frequency *(How often will it be measured?)*	Responsibility (Who will measurer?)	Reporting *(Where will it be reported?)*
Initiate development of Balochistan Water Policy on Integrated approaches Training programs for enhancing water resource management Develop Standard Operating Procedures (SOPs) for planning, designing, construction, monitoring, operations and maintenance for various categories of water supply schemes Establish and promote appropriate water pricing mechanism to ensure recovery of O and M and capital costs Create awareness and promote rainwater	Development of Water policy for Balochistan	No Integrated Water Policy for Balochistan	Policy developed with an implementation plan for the next 10 years	Consultative meetings held, assessments conducted, final policy developed	Quarterly	Bureau of Water, EPA, WASA	IWRM policy for Balochistan
	Number of staff at provincial institutions and local institutions trained	No capacity assessment conducted as yet	At least 50% of relevant staff in institutions trained	Trainings conducted (attendance sheets and payments)/ Evaluations	Quarterly	PHED, irrigation, P&D and agriculture, EPA	Departmental progress reports on monthly basis.
	SOPs developed, water conservation projects improved design and operations	Outdated SOPs	SOPs at provincial and district levels developed	PCRWR water quality report, OPD health, register health dept.	Quarterly	PHED dept., PCRWR (Quetta)	Quarterly PCRWR Reports.

harvesting at household and local levelsAdoption of high efficiency irrigation techniques Revise and enforce building by laws having water efficient equipment for better water use efficiency	Water pricing mechanism in place that promotes recovery of costs	Water pricing mechanism outdated	Recovery of costs through integrated water pricing	WAPDA, Ministry of Water and Power	Quarterly Reporting	Water department, engineering departments	Departmental Reports, Energy Board reports
	Rainwater harvesting institutionalized at household and local level	Negligible use of rainwater harvesting	Number of projects	Municipal corporations, agriculture departments etc	Quarterly Reporting	PHED departments, Municipal corporations, development authorities	EPA reporting,
	Efficient water use in irrigation	Needs verification.	Number of projects installed	Agriculture dept. report (trickle irrigation dept.), chamber of irrigation.	Quarterly Reporting	Agriculture dept., engineering dept.	Departmental reports
						ENV, PHE, (WASA agriculture, municipal authority, local govt. depts.)	BI- annual, EPA reporting, departments report.

DRR and Climate Change

Balochistan continues to face the threat of extreme events, and with weak disaster response systems and remote populations, these extreme events rapidly turn into disasters.

Since 2007, the coastal belt in Balochistan has been experiencing an increased number of above average and intense cyclones, for instance, Cyclone Gonu (2007), Cyclone Yemin (2007) and Cyclone Phet (2010).

Cyclone Gonu, also known as 'Super Cyclonic Storm Gonu' was the strongest recorded tropical cyclone in the Arabian Sea. It managed to collide with parts of Gwadar on June 4, 2007 and damaged over 200 fishing boats in the coastal town of Sur Bandar. The same year, Cyclone Yemyin, famed as the Tropical Cyclone 03B, made its second landfall on June 26, near Ormara and Pasni towns of Gwadar. At least 380 people were killed while some 250,000 people were homeless after the cyclone flattened their homes. Cyclone Yemyin also displaced almost 300,000 people.

The coastal districts of Balochistan have three main river basins: Gwadar-Ormara basin, Porlai River basin and Hub River basin. During monsoon, these basins over spill small dams and reservoirs after getting flooded. The coastal communities, in the catchment areas and floodplains, live in a constant fear that a new wave of fresh floods will wash away their homes and other properties including livelihoods[2].

During the 2007 floods in Lasbela, heavy rain damaged over 40 per cent of the health facilities. In the past, rains had washed away sections of the Makran Coastal Highway, roads and bridges, causing losses of millions to the national exchequer.

[2]https://tribune.com.pk/story/1463981/embattled-balochistan-now-different-foe/

HAZARD RANKING

S.No.	District	Drought	Floods	Earthquake	Landslides	Fine	Locusts/Pests	Industrial & Mines Accidents	Transport Accidents	Cyclones	Tasunami	Refugees & IDPs
1	Awaran	5	1	4	–	–	–	–	–	2	–	–
2	Kacchi	2	5	2	–	–	–	2	2	–	–	4
3	Barkhan	–	5	1	–	–	–	–		–	–	–
4	Chagai	5	1	3	–	–	–	–	1	–	–	–
5	Dera-Bugti	2	4	1	–	–	–	–	–	–	–	–
6	Gawadar	4	5		–	–	–	–	–	5	5	–
7	Harnai	2	5	4	2	–	1	–	1	–	–	–
8	Jafferabad	2	5	2	–	2	1	–	–	–	–	4
9	Sohbat Pur	2	5	2	–	2	1	–	–	–	–	4
10	Jhal Magsi	2	5	2	–	–	–	–	–	–	–	4
11	Killa Abdullah		2	5	3	–	–	–	2	–	–	4
12	Killa Saifullah	3	4	3	3	–	1	–	–	–	–	3
13	Kohlu	–	4	1	3	–		–	–	–	–	–
14	Kharan	4	2	3	–	–		–	–	–	–	–
15	Kalat	2	4	5	1	–	1	–	1	–	–	–
16	Khuzdar	2	5	4	–	–	2	–		–	–	–
17	Kech	5	3	4	–	–	2	–	2	–	–	–
18	Lasbela	1	5	5	–	–	2	–	2	5	5	
19	Loralai	3	5	2	–	–	1	–	1	–	–	3
20	Mastung	3	3	5	–	–	1	–	1	–	–	–
21	Musakhail	–	5	1	3	–	–	–	–	–	–	–
22	Nushki	4	1	5	–	–	–	–	1	–	–	–
23	Nasirabad	1	5	2	–	2	2	–	–	–	–	4
24	Panjgur	5	1	4	–	–	3	–	–	2	–	–
25	Pishin	5	3	5	–	–	2	–	–	–	–	3
26	Quetta	3	3	5	–	–	2	2	1	–	–	3
27	Lehri	3	3	2	–	–	–	–	–	–	–	4
28	Sibi	2	5	2	–	–	–	–	–	–	–	4
29	Sherani	–	4	1	4	–	–	–	–	–	–	–
30	Washuk	4	1	4	–	–	–	–	–	–	–	–
31	Ziarat	2	4	5	3	–	2	–	–	–	–	–
32	Zhob	2	5	1	–	–	1	–	–	–	–	3

Scoring Keys

Extremely High	High	Moderate	Low	Very Low	Nil
5	4	3	2	1	–

Figure 5: Source: PDMA Balochistan 2017

Implementation Framework

Actions	Target	Priority	Potential/ Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Strategy # 1: Incorporate hazard mitigation policies						
Prepare an integrated natural hazard zoning map	All Districts	High	PDMA	PDMA P&D Department	2 Year	25
Identify the landslide vulnerable mountain areas	All Province	High	PDMA	PDMA P&D Department	1 Year	
Identify low floods risk areas for future land use planning.	All Province	High	PDMA Irrigation Departments Ministry of Water & Power	PDMA P&D Department Irrigation Departments	1 Year	
Identify safe areas for evacuation of people and livestock in each vulnerable locality	All Province	High	PDMA	PDMA P&D Department	1 Year	
Update river laws to protect Streams, rivers banks and its flood plain areas from encroachments	All Province	Medium	PDMA Communication, works, Physical Planning and housing department	Communication, works, Physical Planning and housing department	5 Year	5
Strategy # 2: Public Awareness And Media Contribution						
Develop a Provincial Media Strategy on DRR	All Province	High	PDMA	Information Department, PDMA, Media Houses, Community	3 Year	5
Conduct special emergency handling situation training programs for NGOs and volunteer organizations	50 NGOs	Medium	National and International Donors PDMA	PDMA	3 Year	20

Actions	Target	Priority	Potential/ Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Conduct special awareness campaigns for different segments of society and particularly for those communities living in vulnerable areas, through radio, TV, print media and participatory workshops	25 Districts of Baluchistan	Medium	Information Department, PDMA, Media Houses, Community	Information Department, PDMA, Media Houses, Community	4 Years	25
Strategy # 3: Strengthening the Early warning system						
Improvement in real-time meteorological and hydrological data collection and processing for understanding natural processes and evolving disasters.	All province	High	PDMA Science & Information Technology, PAK-MET GCISC	PDMA PAK-MET	2 Years	30
Development of SOPs for line department for DRR	All line departments	High	Line departments	PDMA P&D	3 Years	5
Upgrade and expand weather monitoring station network in the Province	All province	High	PDMA PAK MET	PAK MET	5 Years	25
Establish regional flood forecasting and warning centres at divisional Level	All province	High	PAK MET Irrigation	PAK MET	5 Years	100
Strategy # 4: Plantation barriers along coastal areas to control sand and soil erosion and to reduce the disastrous impacts of cyclones and tsunamis.						
Get local community organizations involved in building and maintaining vegetative barriers in the coastal areas	25 CSO	Medium	National and international Donors	PDMA Forest	5 Year	25

Initiate campaigns to plant mangroves, coastal palm and other trees suitable for coastal areas to control sand and soil erosion	15 Campaigns/ Year	Medium	National and international Donors	PDMA Academia Forest P&D	5 Year	30

MRV Framework

Strategy #1	Actions	Indicators	Baseline	Target	Data Source	Frequency	Responsibility	Reporting
Incorporate hazard mitigation policies	Prepare an integrated natural hazard zoning map	# of Natural hazard maps prepared by each district	No hazard Mapping available	All districts	DDMA	Every Six Month	PDMA PAK MET P&D	Province Natural Hazard Mapping Report
	Identify the landslides vulnerable mountain areas	# of areas landslides areas identifies in vulnerable districts	No hazard Mapping available	All landslide vulnerable areas	DDMA	Every Year	DDMA	Vulnerability assessment
	Identify low floods risk areas for future land use planning.	# of areas flood risk areas for future land use planning	No hazard Mapping available	All landslide vulnerable areas	DDMA	Every Year	DDMA	Vulnerability assessment
	Identify safe areas for evacuation of people and livestock in each vulnerable locality	# of safe areas for evacuation of people and livestock in each vulnerable district	No baseline available	All districts of province	DDMA	Every six month	DDMA	District disaster risk reduction plan
	Update river laws to protect Streams, rivers banks and its flood plain areas from encroachments	# of updated laws	No baseline available	All districts of province	PDMA Irrigation department	Every six month	DDMA	Province Natural Hazard Mapping Report

Strategy #2	Actions	Indicators	Baseline	Target	Data Source	Frequency	Responsibility	Reporting
Public Awareness And Media Contribution	Develop a Provincial Media Strategy on DRR	Media strategy on DRR	There is media strategy for DRR	Develop a comprehensive media strategy to address the DRR challenges in Baloshistan	PDMA Media Houses Information department	Once	Information department	Media Strategy
	Conduct special emergency handling situation training programs for NGOs and volunteer organizations	# of training organized # of NGOs and Volunteer participated in trainings	20% NGOS and Volunteer organization currently involve in DRR trainings	50 organizations will participate in emergency trainings	NGOs Volunteer organizations PDMA	Quarterly	P&D PDMA	Activity Reports
	Conduct special awareness campaigns for different segments of society and particularly for those communities living in vulnerable areas, through radio, TV, print media and participatory workshops	# of awareness session organized in different communities related to DRR and Climate change	No specific data available in this regard	Awareness session will be organized in 25 most disaster vulnerable districts of Balochistan	NGOs, INGOs Volunteer organizations PDMA	Quarterly	P&D PDMA	Activity eports
Strategy #3	**Actions**	**Indicators**	**Baseline**	**Target**	**Data Source**	**Frequency**	**Responsibility**	**Reporting**
Strengthening the Early warning system	Improvement in real-time meteorological and hydrological data collection and processing for understanding natural processes and evolving disasters.	# of districts from where in real-time meteor-ological and hydr-ological data collected for mon-itoring, Prediction and timely early warning of the aforementioned extreme events	Data is not available on districts level	All districts of Balochistan province	PAK MET	Every SIX month	PDMA	Early warning system annual report

Strategy #3	Actions	Indicators	Baseline	Target	Data Source	Frequency	Responsibility	Reporting
	Development of SOPs for line department for DRR	# of departments develop their SOPS with regard to DRR and Climate change	4-5 department have their SOPS for DRR	All government department will prepare their SOPS with regard to DRR	All line department	Every six Month	PDMA	Departments DRR SOPs
	Upgrade and expand weather monitoring station network in the Province	# or Weather monitoring station upgraded # of new weather monitoring stations		Expand the updated weather monitoring station all over Balochistan	PAK-MET	Every six Month	PAK-MET	Department Annual Report
	Establish regional flood forecasting and warning centres at divisional Level	# of flood forecasting and warning center established and regional and divisional level		7 divisions of Balochistan	Irrigation Department PDMA	Every six Month	PAK-MET Irrigation	Department Annual Report
Strategy #4	**Actions**	**Indicators**	**Baseline**	**Target**	**Data Source**	**Frequency**	**Responsibility**	**Reporting**
Plantation barriers along coastal areas to control sand and soil erosion and to reduce the disastrous impacts of cyclones and tsunamis.	Get local community organizations involved in building and maintaining vegetative barriers in the coastal areas	# of vegetative barriers in the coastal areas build and maintained by LSOs		80-90% disaster prone costal area will be secure by vegetative barriers build and maintained by LSOs	LSOs	Every Six Month	PDMA, Local Government and rural development authority	PDMA annual reports
	Initiate campaigns to plant mangroves, coastal palm and other trees suitable for coastal areas to control sand and soil erosion	# Campaigns for Mangroves plantations # of Acers covered will mangroves though these campaigns		1 campaigns quarterly.	PDMA, EPA LSOs	Quarterly	PDMA EPA	PDMA Annual reports

ENERGY

Energy and climate change mitigation

The mineral rich province of Balochistan contains more than Balochistan contains around 33% of natural gas, 9% coal, 2% probable oil reserves and 40% of primary energy production of Pakistan. Ironically, 80% of the energy demand of Balochistan is met by the use of biomass energy- firewood and dung cakes. While the majority of the natural gas comes from Balochistan, there is a limited supply of piped natural gas and liquid petroleum gas to most of the areas of the province. About less than half of the villages in Balochistan have electricity and they suffer from frequent interruptions in service. According to the data available, total electricity demand of Balochistan is about 1650 megawatt (MW). However, the electric grid network transmission capacity is about 650 MW. Due to theft, line losses, diversion of power and indisputable governance of other provinces on the Ministry of Power and Water, Balochistan does not get the required amount of energy.

Intriguingly, Balochistan produces sufficient power to meet the demand of the whole province. However, most of the electricity goes to the national grid. Over 2,200 MW of electricity is generated in Balochistan but the region gets only 400 MW.

Balochistan geographic location instills a considerable potential for producing renewable energy, e.g. wind. According to AEDB Balochistan coastal belt- Gwadar and Makran hold potential sites for development, installation and commissioning of wind farm projects. The Lasbella District of Balochistan Province also has good power generation seasons (5 meters per second in winter and 8 meters per second in the summer). There is a need for dissemination of knowledge and technology, especially in villages of Balochistan like Lasbella, which are deprived of the primary amenities of life including electricity.

Implementation Framework

Actions	Target	Priority	Potential/ Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Strategy 1: Strengthening of relevant institutions, policies, rules and regulations, financial mechanisms, innovative and accessible resources for energy efficiency						
Build capacity to examine IEE and EIA reports (to be carried out before commencement of any energy project) in the relevant institution	32 districts	High and short term	EIA, private govt. resources, EIA, evaluation of govt. EPA	Environment dept., development dept., agriculture dept., PND	6 month to 1 year	25

Actions	Target	Priority	Potential/ Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Skill development through hands on training, refresher courses, staff exchange programs, and coordination with local and foreign academia and technical institutions	Balochistan government institutions	High/short term	Govt., donor agencies, GIZ, WB, GCF, UNDP.	Energy Department of Balochistan, WAPDA, Private Power Infrastructure Board, TEVTA and line departments and academia	Rolling basis	5 million/year
Introduce disaggregated grass root level renewable energy based power transmission systems	5 districts each year	High/Medium	WB, ADB, QESCO, Govt.	Energy Department, Ministry of Water and Power	6	20
Extend adequate transmission lines to meet electricity demands	5 districts each year	High/long term	WB, ADB, QESCO, Govt., NTDC	QESCO, Govt., NTDC	5-10 years	50
Strategy 2: Research and development for clean energy technology and tap provincial resources for renewable resources and technologies such as bio-fuel, solar, wind, geothermal energy						
Prepare Baseline primary data on solar, wind, biogas and hydrogen and geo thermal energy potential	Baseline prepared that identifies potential projects	High/short term	ADB, World Bank, Government Budget	Balochistan Department of Energy, AEDB	3 Years	50
Encourage and build capacity for community driven solar and wind energy plants to provide affordable electricity to communities living in the forest zone	Communities in 15 districts capacitated	High/medium term	ADB, World Bank, UNDP	AEDB, Energy Department, NGOs	3 Years	50

Actions	Target	Priority	Potential/Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Strategy 3: Reduce carbon footprints by promoting energy efficiency						
Disseminate fuel efficient cookers and energy saving devices	30% of population in 18 districts conserving energy	High/short term	ADB, UNDP, World Bank, private sector	AEDB, NGOs and CSOs, Energy Department	2 years	5
Improve refining operations and quality of oil and gas products	70% of oil and gas plants produce improved quality of prouct	High /long term	As above	Energy Department, AEDB, WAPDA	5-10 years	15

MRV Framework

Actions	Indicators	Baseline *(What is the current value?)*	Target *(What is the target value?)*	Means of *Verification (How will it be measured?)*	Frequency *(How often will it be measured?)*	Responsibility **(Who will measurer?)**	Reporting *(Where will it be reported?)*
Build capacity to examine IEE and EIA reports (to be carried out before commencement of any energy project) in the relevant institution Skill development through hands on training, refresher courses, staff exchange programs, and coordination with local and foreign academia and technical institutions Introduce disaggregated grass root level renewable energy based power transmission systems Extend adequate transmission lines to meet electricity demands Prepare Baseline primary data on solar, wind, biogas and hydrogen and geo thermal energy potential Encourage and build capacity for community driven solar and wind energy plants to provide affordable electricity to communities living in the forest zone Disseminate fuel efficient cookers and energy saving devices	Build capacity, No. of district survey.	10%	20%	Reports, data	6 months	Environment depts., donors	Annual Report
	QESCO role out plan for net metering, energy board	0%	10-20%	Connection data, reports	yearly	QUESO	annually
	Established no. of grids	5%	10%	Reports, QESCO, data, NTDC	Yearly	Up to 1 to 32 KV, QESCO, NTDC	Annually
	Transmission lines developed	1%	5%	Security force, post data.	6 months	Home dept. GOB, FC force,	annually
	Data collected against objectives	5%	15%	Data bank	Monthly basis	Concerned depts.	Monthly basis.
	Number of households using renewable energy	No data available	Conversion to renewable sources	Regular monitoring reports	6 months	Concerned dept., civil societies, third party evaluation.	End of the project
	Number of households using energy saving devices	No data available	Energy saving at household level	Monitoring reports	6 months	Third party evaluation, AEDB	Bi annually

ENVIRONMENT AND COASTAL AREAS

Climate change impacts on environment and coastal areas

Only about 3% of the land in Balochistan is classified as state forest, and a major part of this land (around 70%) is under grasses and shrubs. While there is legislation to protect the areas against exploitation, it is weak and does not take sufficiently into account emerging threats such as climate change, i.e. temperatures, precipitation changes, and extreme events. Balochistan's rangeland degradation is a major issue, that causes environmental problems, ecosystem instability, threats to floral and faunal biodiversity, adaptive changes in traditional pastoral livelihood patterns and increased vulnerability of poor pastoral communities (Ahmad and Islam 2011, Ahmad et al. 2012). The coastal mangrove forests of Balochistan are also an important resource, increasingly threated by deforestation and climate impacts.

The coastal districts of Balochistan are natural resource based economies, where the majority of people are dependent on marine fisheries. The 800 km long coastline is also at risk from coastal erosion and sea intrusion, particularly on Dam Bander, Pasni, Sub Bander, Pashukan and Jiwani, intruding on farming land. The coastal belt is also facing an increased number of above average intense cyclones, such as Cyclone Gonu (2006), Yemyin (2007) and Phet(2010). At the same time, changes in sea surface temperatures as well as environmental degradation and over fishing have impacted marine ecology in the area.

Implementation Framework

Actions	Target	Priority	Potential/ Sources of Financing	Implementation Institutions Partners	Indicative Timeline	Estimated Budget (USD-Million)
Objective: Sustainably manage forests, combat desertification, halt deforestation and reverse land and forest degradation and biodiversity loss						
Process, approve and implement the draft National Forest Policy and carry out intensive institutional and legal reforms both at the federal and provincial levels to promote good forest ecosystem management	All districts	High /Medium term	Federal Government, Provincial forest departments	Forest, EPA, PMD PHE, academia, P and DD	3-5 years.	1

Policy implementation including effective implementation of legislation, Human Resource Development and GIS Research labs Effective use of authority.	All districts	High/Long Term	Provincial Government, International Donors	Forest, cabinet, law dept., district academia, institutions	continuous	17
Set biodiversity indivators and tap financial resources for implementation of the Biodiversity Action Plan (BAP)	All Districts	High/Short Term	WWF, province G, donor agencies	WWF, province G, donor agencies	1-3 years	2
Empirical research on flora and fauna in the context of their responses to current and historical climate change and ecosystem conservation	Coastal Districts and districts with significant wetlands/forest cover/parks	High/short term	As above	As above	2-4 years	2
Strategy: Reduce Marine Pollution and sustainably use marine resources, including through sustainable management of fisheries, aquaculture and tourism						
Prepare and implement integrated coastal zone management plans for protection of marine life	Coastal Districts of Balochistan	High/Long term	Donor Agencies, WWF	Balochistan Coastal Development Authority, EPA, EPD, Government of Balochistan	5-10 years	2
Increase area under mangrove, protection conversion of coastal areas into residential and industrial uses to strengthen resilience of the coastal zone, and take action for their restoration in order to achieve healthy and productive oceans	Coastal districts of Balochistan	High/long term	As above	As above	5-10 years	10

MRV Framework

Actions	Indicators	Baseline *(What is the current value?)*	Target *(What is the target value?)*	Means of *Verification (How will it be measured?)*	Frequency *(How often will it be measured?)*	Responsibility **(Who will measurer?)**	Reporting *(Where will it be reported?)*
Process, approve and implement the draft National Forest Policy and carry out intensive institutional and legal reforms both at the federal and provincial levels to promote good forest ecosystem management	Forest Policy with implementation framework and capacity building plan for provincial level	Draft policy	Policy and implementation framework developed	Policy document	Quarterly	Forest Department, Ministry of Climate Change	Annual Reports of the relevant ministry
Policy implementation including effective implementation of legislation, Human Resource Development and GIS Research labs	Implementation framework for policy at provincial level developed and GIS labs established	No data	All districts of Balochistan	Capacity building sessions and plans, Establishment of GIS centres, records of legislation	Quarterly	Forest, agriculture, livestock.	Departmental reports
Set biodiversity indicators and tap financial resources for implementation of the Biodiversity Action Plan (BAP) Empirical research on flora and fauna in the context of their responses to current and historical climate change and ecosystem conservation	Data base, facilities, future predictions.	0	100%	Graphical map, data base, vegetation indices	Quarterly	Forest, met experts	Annual Report for Forest Department
Prepare and implement integrated coastal zone management plans for protection of marine life	Evidence of climate impacts on biodiversity	Limited empirical research	At least 10 biodiversity rich districts covered	Research papers	Quarterly	Academia, Forest Department, Third Party	Departmental reports at local level
Increase area under mangrove, protection conversion of coastal areas into residential and industrial uses to strengthen resilience of the coastal zone, and take action	Policy developed	Limited plans	Plans for each coastal zone	Plans developed	Quarterly	Third Party, Coasl Dev Authority	Departmental reports
for their restoration in order to achieve healthy and productive oceans	Percentage of land area under the coastal zone including mangrove area and restoration of degraded land	Limited data	Increase in percentage of land under coastal protection	Records showing land under coastal department	Quarterly	Coastal Dev Authority. EPA	Departmental Reports

Climate Change impacts on health

The health impacts of extreme events in Balochistan have already been observed. In the case of the drought of 1997-2002, causing a loss of PKR 25 billion to the national exchequer, the drought contributed to the incidence of Crimean Congo Hemorrhagic Fever (CCHF). Malnutrition, TB and Hepatitis affected thousands of local communities in this period.

Communicable diseases such as Malaria, Acute Respiratory Infections, Ringworm, Chicken Pox, Rubella, Scabies, Measles etc form the main bulk of healthcare problems in Balochistan (Provincial Disaster Risk Management Plan). However, infant and under-five mortality in Balochistan was estimated at 72 and 89 per thousand live births, higher in rural compared to urban areas. 21% of children aged less than 5 had had diarrhea in two weeks prior to the survey (Balochistan MICS survey, 2011).

While there are health facilities available, data suggests that satisfaction with the health services particularly in the public sector is low. In Balochistan, 60% of BHUs are without electricity, more than 70% do not have running water and more than 90% do not have public toilets[3]. Not only does this seriously impede the ability to address day to day health concerns, but also has implications for the inability to handle epidemics and large scale disasters and relief efforts.

Type of Health Facility	Number
Teaching Hospitals	4
District Headquarter Hospital	27
Tehsil headquarter hospitals/civil hospitals	10
Rural health centres	82
Basic Health Units	549
Dispensaries	575
Mother and child health centres	90
Sub health centres	24

Figure 6: Health Facility Assessment Report Balochistan, 2012

[3]Nishtar S. Health Indicators of Pakistan – Gateway Paper II. Islamabad, Pakistan: Heartfile; 2007.

Implementation Framework

Actions	Outcomes	Priority	Potential/ Sources of Financing	Lead Implementation Institutions	Partner Institutions	Indicative Timeline	Estimated Budget (USD-Million)
Strategy 1: Draft, prioritize and implement district wise health, heat and disaster management plans which help to reduce risk to human health from climate induced disaster and disease.							
Risk Assessment	District wise data base.	High/Short-term	WHO, Global fund, Health department, CSO's.	Health department Balochistan.	Public health department, Academia, think tanks.	3 months	1 million p/ district.
Devise health management action plan	Health specific framework.	High/medium term	WHO, Global fund, Health department, CSOS.	Health department Balochistan, Public Health specialist.	WHO, Civil Society organizations, Ministry of health, private practitioners.	3 months	2 million.
Relevant Legislative Changes	Reduction in factors that cause health risks.	High/long term	WHO, Global fund, Health department, CSOS.	Advocacy groups, CSO's, Environmental lawyers, provincial govt.	WHO, Civil Society organizations, Ministry of health, private practitioners.	1 year	2 million.
***Priority : ranking (high, medium and low) and (short-term, medium-term and long term)**							
Strategy 2: Conduct needs assessment of the health sector, identifying infrastructure, human resource and financial human resource required by sub urban and rural health facilities to equip them to handle climate induced disease and disaster.							
Assessment of health infrastructure and human capital.	Capacity assessment of the infrastructure and Human capital in Health	High/Short-term	International organization, health dept.	Health officials, think tanks, academia.	Health officials, think tanks, academia.	6 months	0.2 Million / p district.
Strategy 3: Take measures to reduce waterborne diseases and insure access to safe clean drinking water							
Conduct assessments on the impacts of climate change on vector/waterborne and nutritional diseases.	Impact Assessment Report of multiple domains	High	Health, Balochistan Saaf Pani Company Department, P&D Department, National and international Donors	Health Department	Health, CSOs, INGOs Health	1 Year	50 Million

Actions	Outcomes	Priority	Potential/ Sources of Financing	Lead Implementation Institutions	Partner Institutions	Indicative Timeline	Estimated Budget (USD-Million)
Use media and civil society organizations to educate and sensitize public as well as health personal to the climate change related health issues particularly	Reduction water borne diseases.	High	Health, Balochistan Saaf Pani Company Department, P&D Department, National and international Donors	Balochistan Saaf Paani Company Information and Culture	Health, CSOs, INGOs Health	2 Years	20 Million
Strategy 4: Educating and sensitizing health personnel and the public about climate change related health issues.							
Design communication strategies to inform the general public of climate change related health hazard and its geographical span, particularly, alerting health personnel in the vicinity.	Public Awareness and capacity building regarding Heath and Climate change	High	Health, P&D Department, National and international Donors	Health Department	Health, P&D Department, National and international Donors	2 years	20 Million

MRV Framework

Strategy #1	Actions	Indicators	Baseline	Target	Data Source	Frequency	Responsibility	Reporting
Draft, prioritize and implement district wise health, heat and disaster management plans which help to reduce risk to human health from climate induced disaster and disease.	Risk assessment	Public health data base/ data of Balochistan's districts.	There is no climate change related baseline available in Balochistan.	36 districts	General populations, health institutions, CSO's.	Annual	Health department Balochistan.	Annual health risk assessment report.
	Devise health disaster management action plan.	END epidemic/ climate change disease, expand/ build capacity 60-70 % health service providers.	No disaster management plan available for health.	Substantially reduce the number of death due to climate change and disaster.	District wise disease incidence report.	Plan reviewed every year.	Health department.	Health disaster management report.
	Relevant legislative changes regarding health.	Number of legislative changes for health.	Environmental laws	Reduction of carbon emission and other factors resulting environmental degradation.	PA	Continuous review	Law makers, CSO, Academia	Passage of law.
Strategy #2	**Actions**	**Indicators**	**Baseline**	**Target**	**Data Source**	**Frequency**	**Responsibility**	**Reporting**
Conduct needs assessment of the health sector, identifying infrastructure, human resource and financial human resource required by sub urban and rural health facilities to equip them to handle climate induced disease and disaster	Assessment of health infrastructure and human capital.	# of Health and climate change related Assessment survey conducted	h	All Balochistan	District Health authorities' record. District Disease surveillance record.	Quarterly	Health Department	District Health Information System (DHIS). Reports

Strategy #3	Actions	Indicators	Baseline	Target	Data Source	Frequency	Responsibility	Reporting
Take measures to reduce waterborne diseases and insure access to safe clean drinking water	Conduct assessments on the impacts of climate change on vector/waterborne and nutritional diseases.	# or reports prepared		80% reduction in the cases of waterborne diseases	District Health Information System (DHIS).	Every Six Month	Health Department	disease surveillance system
	Use media and civil society organizations to educate and sensitize public as well as health personal to the climate change related health issues particularly	# of awareness program arranged by Media # or awareness session organized for community by civil society.	No data available currently on this indicator	70-80 % Public and health personals will be aware of the health issues related to climate change	Knowledge assessment studies	Every Six Month	Health Department	Annual health risk assessment report.
Strategy #4	**Actions**	**Indicators**	**Baseline**	**Target**	**Data Source**	**Frequency**	**Responsibility**	**Reporting**
Educating and sensitizing health personnel and the public about climate change related health issues.	Design communication strategies to inform the general public of climate change related health hazard and its geographical span, particularly, alerting health personnel in the vicinity.	# of Communication Strategies develop	No communication strategy available at provincial level	1 communication strategy for general Pubic and 1 communication strategy health personal	Health Department P&D Department	Quarterly	P&D Department	Final Commun-ication Strategies

AGRICULTURE AND LIVESTOCK

Climate change impacts on food security, agriculture and livestock

Agriculture and Livestock is the dominant employment sector in Balochistan's economy. It contributes to 52% of the entire provincial GDP and employs approximately 67% of the total labour force. Other sectors that contribute to the provincial GDP are services, construction and transport sector at 33%, industry at 10% and 5% contribution by minerals and mining industry (Government of Balochistan 2010).

Changing climatic conditions and its associated negative impacts thus, have far-reaching negative effects on not only the agriculture and livestock sector of Balochistan but the overall food security of the country owing to reduced crop yields, adverse effects on livestock health, productivity and reproduction, as well as from losses due to water scarcity and extreme weather events.

The climate of upland Balochistan is continental semi- arid Mediterranean, with annual precipitation varying from 200 to 350 mm and a variable proportion of this total fall as moisture of snow and rain in the mid-winter period or as intense showers in summer. Cereal crops in particular wheat are grown by most dryland farmers as dual purpose crop, with the grain is used for human consumption and the straw as animal feed. In Balochistan two types of dryland systems are prevailing:

i. Khushkaba: It is a type of farming in which only localized (with in field) run off is generated and crop suffer moderate to severe moisture stress during crop cycle.

ii. Sailaba: It is a type of farming in which water is harvested through temporary streams, and crops complete its life cycle on the stored moisture.

Yield expectations are low, ranging from only 100 to 800 kg/ha in Khushkaba and 1000 to 1500 kg/ha in sailaba farming. Farmers expect cultivation 3-5 years out of 10 years. In this high risk environment agricultural inputs are minimal.

In the arid uplands of Balochistan, environmental stresses are the main yield limiting factors in crop production. Major stresses are cold and drought in winter and the combined effects of drought and heat and a short growing season during spring (PARC 2014).

Limited precipitation and availability of surface water drastically restricted the cultivated area to around 2.1 million ha during 2000–01; this is around 6% of the province's geographical area. About 47% of the cultivated area is irrigated, while the remaining 53% is under Sailaba (floodwater) and Khushkhaba (rainfall and localized runoff) farming systems as described above. Although irrigated crop production plays a dominant role in the agricultural economy of Balochistan, Sailaba and Khushkhaba farming systems contribute to the livelihoods of a sizable majority of the population, regarded as the poorest of the poor. These two farming systems are dependent on precipitation and runoff; their performance therefore fluctuates drastically with variations in precipitations and runoff. Without runoff, economical harvests are not possible due to low precipitation.

The agro-ecological diversity of Balochistan permits cultivation of a wide range of field crops and horticulture. Although the province is a net importer of wheat, traditional cereal production (wheat, rice, barley, sorghum and millet) has remained important to its economy, covering 70% of the cropped area and contributing 50% to the gross value of crops. Besides, cereals serve as an important source of fodder for livestock. The high altitude arid environments provide ideal conditions for the production of deciduous fruits. Balochistan's share of deciduous fruits (apples, plums, pears, apricots, peaches and pomegranates) and non-deciduous fruits (dates) ranges from 35 to 85% of Pakistan's production. In the case of grapes, almonds and cumin, the province has a near monopoly in the country.

Irrigated agriculture is dependent on both surface water and groundwater resources. Around 30% of flood water is harnessed for agriculture through Sailaba diversions, storage dams and minor-perennial irrigation schemes. The groundwater resource is available for irrigated agriculture through karezes, springs and wells. With increased availability of electricity from the national grid, there has been a tremendous increase in the number of tube wells. Indiscriminate installation of tube wells and pumping of water in excess of recharge have caused the water table to lower resulting in the drying out of dug-wells and a number of karezes and springs. Ground water mining and lowering of the water table are therefore causing serious concern regarding the sustainability of groundwater-irrigated agriculture (ICARDA 2010).

Livestock production is one of the major sources of income for around 70% of the rural population. About 92% of the geographical area of the province is rangelands, which provide grazing to around 20 million small ruminants (sheep and goats). Large proportions of livestock owners are transhumant (45%), who commute between winter and summer quarters to adjust to seasonal feed requirements, and nomadic (50%), who constantly move between highlands and plains and sometimes cross international borders. The stock owners are entirely dependent on livestock for their livelihoods, trading livestock and livestock products (ICARDA 2010).

Implementation Framework

Actions	Target	Priority	Potential/ Sources of Financing	Implementing Institutions/ Partners	Indicative Timeline	Estimated Budget (USD-Million)
Strategy 1: Adopt sustainable agriculture practices, technologies for sustainable production systems and to meet food security						
Focus on improving water use efficiency for irrigation through using sprinkler and trickle irrigation etc	25 UC	High/Short-term	UN, World Bank	PAD, agriculture dept.	3 years	20
Introduce training programs for exposing farmers to international successful farming practices	Whole province	High/Short-term	IFAD, WFP	PAD, agriculture dept. PP	3 years	10
Formulate Balochistan Food Security Policy followed by strategic action plan	Policy for all districts	High/medium term	FAO	Govt. of Baluchistan, donors	2 years	1
Encourage agro forestry, floriculture and social forestry	All districts	medium	IFAD, WFP, FAO	P and D department, Forestry Department, Agriculture Department	3 years	10
Encourage access to export markets by facilitating packaging and eco labeling of agriculture products	60%	High/long term	Private sector	Seed sector, research extensions, P& D, donors, Export regulatory authorities	5-10 years	10

Actions	Target	Priority	Potential/ Sources of Financing	Implementing Institutions/ Partners	Indicative Timeline	Estimated Budget (USD-Million)
Strategy: Reduce food loss and waste and ensure quality nutrition						
Enhancing capacity building of PPD.	30%	High	PT, donors	**PPD, Agriculture Departments**	3 years	4
Environment friendly pesticides.	5-10%	High	Pro, F, donors	**Irrigation and agriculture departments**	5 years	7
Legislation on food standards	Legislation passed	Medium	Donors	**Agriculture, irrigation, PHE departments**	3 years	1
Increase and ensure protection and preservation of prime agricultural land and combat desertification and drought						
Develop Balochistan Land Use Policies to protect land use planning and zoning of agricultural land	Policy covering all districts	High/Short Term	IFAD, FAO, Other donors	**EPA Balochistan, Forestry Department, Agriculture Departments**	1 years	2
Employ Environmentally sound multi cropping and crop management practices from traditional to high value economic crops	Area specific	High/short term	As above	**As above**	5-10 years	2
Control soil problems such as water logging, salinity, sodicity and soil structure eterorioration	10 districts	High/medium term	As above	**As above**	3-5 years	10
Develop capacity of institutions on remote sensing and GIS techniques to assess temporal changes in land cover of different agro ecological zones	Relevant institutions in all districts	High/long term	As above	**As above**	5-10 years	25

MRV Framework

Actions	Indicators	Baseline *(What is the current value?)*	Target *(What is the target value?)*	Means of *Verification (How will it be measured?)*	Frequency *(How often will it be measured?)*	Responsibility (Who will measurer?)	Reporting *(Where will it be reported?)*
Focus on improving water use efficiency for irrigation through using sprinkler and trickle irrigation etcIntroduce training programs for exposing farmers to international successful farming practices Formulate Balochistan Food Security Policy followed by strategic action plan	Number of landholders with improved water efficiency	Current area (unknown)	+-20%	Reports /data, pictures	Annually	Agriculture Department, water department, PHED department, irrigation departments	Agriculture statistics books.
	Farmers with improved cropping patterns	<1%	+- 5%	Field survey pictures/numeric data.	Quarterly	As above	Agriculture statistics books.
	Food security plans in place	None	Policy developed for all districts	Policy	Quarterly	Ministry of Food Security, EPA, Agriculture departments, irrigation departments	Food security policy
Encourage agro forestry, floriculture and social forestry Encourage access to export markets by facilitating packaging and eco labeling of agriculture products	Area under cultivation yield and water table.	50-60% acres	100 area distribution	Survey area data	Bi-annually	CRS	Annual report
	Export of sustainable produce	15-20%	60%	Export data	Quarterly	CRS	Annual report
Enhancing capacity building of PPD.	Trained staff	No baseline available	At least 60% of staff trained	Attendance sheets, training reports, evaluations	Bi annually	Agriculture, irrigation and PPD departments	Annual report
Environment friendly pesticides.	Agric. Bank Uptake Data Fertilizer company	Unknown >2%	50% farmers	Third part evaluation	Monthly	Agric. bank and agric. Dept.	Annual report
Legislation on food standards	Legislation passed on food standards	No data	Legislation passed	Reports from legislative sessions	Quarterly	Agriculture department, irrigation departments	Annual report

Develop Balochistan Land Use Policies to protect land use planning and zoning of agricultural land	Zoning of land carried out	Data not available	Zoning carried out for all land	Zoning maps	Quarterly	EPA, Forest Department	Annual report
Employ Environmentally sound multi cropping and crop management practices from traditional to high value economic crops	Number of farmers converting to high value crops	Limited data	40% increase	Reports from agriculture departments	Quarterly	Agriculture, irrigation departments	Agriculture statistics reports
Control soil problems such as water logging, salinity, sodicity and soil structure deterorioration	Quality of soil	Limited data (district level)	Improvement in soil quality in target districts	Reports from departments	Quarterly	As above	As above
Develop capacity of institutions on remote sensing and GIS techniques to assess temporal changes in land cover of different agro ecological zones	Uptake of GIS techniques in institutions	Limited data	Increased use of GIS in relevant departments across districts	GIS data reports, training reports	Quarterly	As above	As above