Environment

Sustainable use of resources and environmental concern has become increasingly important. The inability to address the situation will result in extremely high environmental and economic cost in future. Environmental factors are changing drastically and if left unchecked, pollution and environmental degradation will pose a monumental threat to social and economic growth of the country. Pollution on a wide scale is damaging the land, water, and air as unchecked economic activity has decreased the availability of fresh water resources along with clean air. Since Pakistan is predominantly an agrarian country, hence the dependence of agriculture on natural resources makes it necessary to help improve the country's capacity to achieve environmentally sustainable economic development to meet the requirements of present and future generation. Environmental degradation is also fundamentally linked to poverty since poor are directly dependent on natural resources for their livelihood.

In the list of environmentally vulnerable countries, Pakistan is ranked among the top few. Urbanization of the country has made serious changes to the ecosystem of the urban and rural areas of the country. The biodiversity of the country is under threat due to the massive depletion of natural resources. The Government of Pakistan recognized the need to conserve biodiversity and is now committed to several international protocols and conventions. Pakistan has also set sight on the goals of sustainable development through vision 2025. Avoiding environmental degradation will ensure food, water and environmental securities in the future. Despite the integration of environmental consideration into development, the environment sector has not been given its due place in past. There is a dire need to address the situation, otherwise resultant cost of environmental degradation to the society in both health and monetary terms will be immense.

Environment and Climate Change

Climate change affects people and the environment in many ways. Some of these impacts, like hurricanes and severe heat waves could be life threatening. Other factors like spreading weeds will be less serious. The global community is now acknowledging that climate change will be the most destructive element of nature in the coming century. Pakistan is a very small contributor to the Green House Gas (GHG) emissions, but the country will be mostly impacted by the negative effects of climate change.

Events like increased glacier melt severe and extreme floods and droughts, etc. are already hitting the country and will continue to do so in future. Considerable increase in frequency and intensity of extreme weather events coupled with erratic monsoon rains causing frequent and intense floods and droughts are going to be the main concern. The projected recession of Hindu Kush-Karakoram-Himalayan glaciers due to global warming and carbon soot deposits from trans-boundary pollution sources will threaten water inflows into Indus River System (IRS). Overall changes in the weather system may cause decrease in the already scanty forest cover due to rapid change in climatic conditions to allow natural migration of adversely affected plant species. Intrusion of saline water in the Indus delta will also adversely affect coastal agriculture, mangroves and breeding grounds of fish.

Pakistan's geographical location and socio-economic fragility had made it at the top of the list of countries that are most vulnerable to the environmental, social and economic

ramifications of climate change (German watch, 2011).Lack of resources and capabilities to adapt to the changes will worsen the situation. Climate change increases the variability of monsoon rains and enhances the frequency and severity of extreme events such as floods and droughts. The extreme conditions of the weather in Pakistan like the floods of 2010, 2011 and 2012, worst drought during 1999-2003, two cyclones in one month in Karachi/Gwadar coasts in 2008 and increased incidence of landslides, GLOFS (Glacial Lake Outburst Floods) in the northern areas of Pakistan bear testimony to the ugly face of climate change. Under the 10 years National Disaster Management Plan (NDMP) institutional capacity building is being enhanced to combat disasters in first phase of this plan, surveillance and forecasting capacity is being enhanced by replacing and installing weather surveillance radars at various places of the country.

Environmental and Climate Change Strategy / Policy

Strategy to achieve the objectives of environment protection is to include the following elements:

- The Millennium Development Goals (MDGs) are the center-piece of development efforts of the Government of Pakistan. The achievement of sustainable environmental targets (Goal-7) needs active persuasion at all levels.
- An action plan for implementation of National Climate Change policy has been finalized and requires adequate sharing of responsibilities at all levels for its implementation.
- In the wake of the 18th Amendment, environmental regulation of the country is reviewed and revised in consultation with federal and provincial environmental protection agencies, civil society and private sector. This will help in better implementation of policies and rules.
- Involvement of private sector and NGO's in specific relation to Public Private Partnership for effective and efficient conversation and management of natural resources.

Environmental Sustainability (MDG 7) and Pakistan

According to a report released by the WHO/UNICEF Joint Monitoring Program (JMP) 2014, in Pakistan 91 percent people had gained access to source of drinking water by 2012 while this ratio was 85 percent and 88 percent in 1990 and 2000, respectively. The MDG target is to achieve the ratio of 93 percent by 2015. Moreover, 48 percent people have been using improved sanitation by 2012 while this ratio was 27 percent and 37 percent in 1990 and 2000, respectively. The MDG target for access to sanitation is 90 percent by 2015. Pakistan's forest cover and protected area had remained more or less constant over the last decade. The country's forest cover and protected areas are unlikely to change in the coming years too because of the climatic conditions and population pressures. Pakistan has surpassed its target of converting 0.920 million of vehicles on Compressed Natural Gas (CNG) with more than 2.8 million vehicles reported to be running on CNG. Pakistan is on track to meet the target for land protection for the conservation of wildlife as a percentage of total land area. However, there is a lag in equity based indicators of forest cover, sulphur content in high speed diesel, proportion of population with access to sanitation and energy efficiency. The government has instructed oil refineries to reduce the sulfur content in high speed diesel from current levels of 1% to 0.5% or less to meet Euro standard specifications. This would require significant investment by refineries, and it is not clear if this target can be achieved. Lack of awareness about environmental issues as well as gross violation of government regulations pose serious challenges in overcoming this lag.

Project / Programs Undertaken during 2013-14

The government has undertaken projects and programs on many levels to support the environmental goals through federal/provincial resources. These projects and programs are under implementation with focus on areas of capacity building, clean drinking water, environmental management, biodiversity, air pollution control and watershed management, urban development, restoration of lakes/ water bodies, environmental awareness, waste management, wetlands etc. After the 18th amendment, the bulk of the responsibility of

devolved sectors has been undertaken by the provinces. However, the federal government still needs to develop new country wide programs.

Environment and climate change programs have to be in line with the Vision 2025 while necessitating the sustainable growth of the country through integration of environmental considerations in development. Some of the important programs at the federal level during 2014-15 included as follows:

- Establishing National Multilateral Environmental (MEAS) Secretariat (Islamabad).
- Establishment of Clean Development Mechanism Cell (Islamabad).
- Establishment of National Bio-safety Centre (NBC) Project (Islamabad).
- Sustainable Land Management Project, Phase-1 (Islamabad).
- Development and Implementation of Water and Sanitation Management Information System in Pakistan.
- Establishment of Centre for Sustainable Organization.
- Establishment of Geometric Centre for Climate change and Sustainable Development 2012-2015 (Islamabad).
- Indoor Air Quality in Buildings.

State of Environment
Air

The key factors responsible for air pollution in Pakistan are rapidly growing energy demand due to relatively higher population growth rates, fast growing transport sector, unplanned infrastructure, and widespread use of low-quality fuel and above all are the alarming level of particulate matters (PM10 and PM25). Air quality data received in major cities confirmed presence of high concentration of suspended particulate matter in air (2- 3.5) times higher than the safe limit .The deteriorating quality of urban air is the major issue affecting the atmospheric ecosystem in Pakistan. Urban air quality has deteriorated in the wake of growing industrialization, enhanced use of chemical, fast increasing mechanical traffic and increased energy consumption.

The country has been benefitting from steady economic development over the last few years. This has been accompanied by rising urbanization, higher income and an increase in the private ownership of motor vehicles. However, due to lack of effective enforcement of motor vehicle fitness regulation, the increase in air pollution from vehicles could be alarming. The problem is compounded by the fact that the average life of vehicles being used in the country is quite long. As a result, such vehicles due to their weak engines contribute more in increasing air pollution. Furthermore, motorcycles and rickshaws, due to their two stroke engines are the most inefficient in burning fuel and thus contribute most to lethal emissions.

Table 16.1 Motor Vehicles on the Roads (000 Nos.)

Year	Total	Motorcycles/Scooters	Rickshaws
2002-03	2737.1	2656.2	80.9
2003-04	2963.5	2882.5	81.0
2004-05	3146.4	3064.9	81.5
2005-06	3868.8	3791.0	77.8
2006-07	4542.9	4463.9	79.0
2007-08	5126.3	5037.0	89.3
2008-09	5456.4	5368.0	88.4
2009-10	5501.2	5412.1	89.1
2010-11	5558.6	5468.8	89.8
2011-12	6114.5	6015.7	102.4
2012-13	5920.5	5800.0	120.5
2013-14	6208.0	6100.0	108.0
2014-15 (July-March)	6563.0	6450.0	113.0

Source: National Transport Research Centre.

The major problems arising from rapid urbanization include pollution, inadequate waste management, unprecedented traffic congestion and the almost instant destruction of fragile ecosystems. Earlier researches have shown the destructive effects of particulate matter on human life such as a wide range of respiratory diseases and heart ailments. The worsening air scenario (particulate matter 10) in major cities can be considered as a sign of warning e.g. according to UN Agency, World Health Organization Quetta, Peshawar, Lahore and Karachi are now considered amongst the most polluted cities in Asia Pacific. In the winter months, with delayed rainfall, the cold and continuously dry conditions concentrate all the pollutants in the lower levels of the atmosphere, causing the smog to spread all over the Punjab.

Table 16.2: Consumption of coal (000 M/Tons)

Year	Power	Brick Kilns	Household
2002-03	203.6	2,607.0	1.1
2003-04	184.9	2,589.4	1.0
2004-05	179.9	3,906.7	-
2005-06	149.3	4,221.8	-
2006-07	164.4	3,277.5	1.0
2007-08	162.0	3,760.7	1.0
2008-09	112.5	3,274.8	0.8
2009-10	125.5	3,005.2	-
2010-11	96.5	3,003.6	-
2011-12	104.6	3,108.0	-
2012-13	63.0	2,696.0	-
2013-14	160.7	2,727.6	-
2014-15 (July-March)	110.0	2,688.0	-

Source: Hydrocarbon Development Institute of Pakistan.
-: Not Available

Future Projections and Trends

With the existing trends and pattern, if timely measures are not taken, the following key environmental indicators are likely to emerge:

- Population to grow from 188.02 million in 2014 to 234.4 million by 2025 (United Nations, Department of Economic and Social Affairs, Population Division (2011), making cities more congested and polluted.
- Number of vehicles on roads to increase from 13.88 million in 2014-15(July-March) to 35 million further deteriorating air qualities in cities.
- As the natural gas deposits are getting exhausted, use of low cost fuel like coal, Refuse Derived Fuel, (RDF) Tyre Derived Fuel (TDF) etc. will be opted. Burning of low grade fuels could worsen the air quality.
- Solid waste generation in the country is expected to enhance from 20 million tons/year to 27 million tons/year adding more heaps of garbage and open dumping sites.
- Use of pesticides and industrial chemicals will increase manifolds adding more toxicity to water and soil.
- Water pollution load will increase proportionally with rise in population, which could add 25% more pollution to the water bodies.

There is also a lack of related data in the country which had made the matters worse for the country. All the programs and plans of the previous years have been based on outdated data and incomplete information. An efficient network of data websites has to be developed which can churn out correct and useable data on regular basis. Many departments and institutes are working in this sector but most of their efforts are focused on a single pollutant of a specific area. There is urgent need to establish an efficient air quality management system to address the situation with following goals:

- Identify and establish appropriate policies on air quality.
- Identify relevant legislative and regulatory requirements.

- Identify all sources of air pollution caused by human activities.
- Set appropriate objectives and targets for human and environmental health.
- Set priorities for achieving objectives and targets.
- Establish viable structure and programs to implement policies and achieve objective targets.
- Facilitate the monitoring of air quality and its effects on human health and environment.
- Facilitate urban planning, corrective action and the prevention of adverse effects.
- Ensure compliance with emission and air quality standards.

Water

According to Pakistan Council of Research in Water Resources (PCRWR), the majority of the population in the country is exposed to the hazards of drinking unsafe and polluted water from both surface and ground water sources. As derived from the National Water Quality Monitoring Program carried out by the PCRWR, the 4 major contaminants in drinking water sources of Pakistan were bacteriological (68 percent), arsenic (24 percent), nitrate (13 percent) and fluoride (5 percent).About 2 million wet tons of human excreta are annually produced in the urban sector of which around 50 percent pollute water bodies. The National Conservation Strategy states that almost 40 percent of all disease related deaths are connected to water borne diseases. Other sources of water pollution are industrial effluents, solid waste, hospital waste, chemical fertilizers and pesticides.

In this perspective, it is the demand of time to take milestone initiatives to ensure that drinking water is as free of such impurities as is possible and this can be accomplished by timely monitoring and treatment of drinking water quality. To address this issue of national importance, federal government, through PCRWR has implemented several national water quality monitoring and surveillance activities such as The National Water Quality Monitoring Program (NWQMP). The outcome of all five phases of NWQMP has led to the realization that the federal, provincial and local governments need to take immediate initiatives for the provision of safe drinking water to the public in order to prevent the onslaught of water borne diseases. Advocacy efforts for the awareness and education of the general public, regarding the water quality testing and treatment are also required.

Access to an adequate supply of water for all (agriculture, industry and domestic users) is one of the absolute priorities of Vision 2025. Top five goals for water security are:

- Increase water storage capacity, applicable to the requirements of each province in line with defined strategic needs and international benchmarks: from currently 30 days to 45 days by 2018, and 90 days by 2025.
- Invest in proven methods and technologies to minimize wastage (e.g. in the agriculture sector), promote conversation and gain efficiencies through rationalization of pricing.
- Enable more effective allocation with direct reference to national & provincial priorities and related social and economic considerations.
- Establish institutional mechanisms e.g. a National Water Commission to effectively manage all resources of water (surface, subsurface ,rain) and their sectoral and regional allocations.
- Provision of access to a minimum baseline of suitable water to every person in Pakistan.

The Government of Pakistan has signed number of regional and global commitments in 2013 and 2014 and is committed to fulfilling these commitments for achieving Sustainable Development Goals (SDG's). The Planning Commission will coordinate between all stakeholders towards formulating an Integrated Water Resource Management Strategy.

Implementation of a comprehensive National Water Policy: reflecting a transparent and coherent institutional framework and policy adapted to the demands of the 21st century which also gives due consideration to climate change would be adopted at the earliest. The

resulting strategy will: Combine multiple elements including technical advancements and social considerations to give response to the formidable challenge of water scarcity. The government will carefully reconsider applying reasonable water usage charges and incentive to encourage efficient and effective use of our scarce resource. Further, comprehensive awareness drive will be started to educate people about the benefits of judicious consumption and shared consequences of wastages. Due consideration will be provided to harvest rain water in lakes and ponds and also at the household and community levels.(Pakistan Vision 2025).

Solid Waste /Management

Solid waste can be defined as material that has no value to the person who is responsible for it and is also not intended to discharge it properly. The absence of a proper solid waste disposal system and huge amount of uncollected waste poses great threat to the public health as they are the source of mosquitoes and flies which transmit malaria and cholera later on. One of very hazardous and un-noticed drawback of the waste disposal in Pakistan is that hospital and industrial waste is treated as ordinary waste. Only 30% of solid waste quantities generated are generally collected. Increase in the solid waste is due to increase in urban population, industrialization and changing consumption pattern.

Integrated Solid Waste Management (ISWM) which is combination of those activities that best protects the community itself and environment is not significantly present in the major cities of country. In most cities, poor collection and transportation of municipal solid waste is reported and the waste which is collected, have a high percentage of organic matter that can be recovered via composting and recycling. Solid waste management position in rural areas is more devastating where mostly open dumping is carried out. Hence, due to poor solid waste management large number of communicable diseases and unhygienic environment are being created.

The recommendations that can be considered for the improvement of the current situation regarding solid waste management includes:-

- Raising awareness about consequences caused by solid waste pollution.
- Collective role of government sector, NGO's, Private sector for solid waste management.
- Legislation should be done which would be effective and find ways to implement its effectively application of 3 R's (Reduce, Recycle and Reuse) concept in solid waste management system.
- House to house collection of solid waste should be organized.
- Littering of solid waste should be prohibited in cities, towns and urban areas. Proper segregation would be vital for scientific disposal of waste.
- Developing legal framework and national guidelines for solid waste management that includes waste management and basic recycling rules.

Solid Waste Management through Integrated Resource Recovery Center (IRRC)

UN-Habitat, in close collaboration with the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) and the Ministry of Climate Change, is currently implementing a project on "Pro-poor and sustainable solid waste management in secondary cities and small towns''. The project contributes to this goal by setting up an Integrated Resource Recovery Center (IRRC) in Islamabad that will enable the city to turn waste into resources through composting, recycling and bio digestion, thereby diverting solid waste from landfills or open dump sites. In the medium term, it is envisaged to replicate this model to cities across the whole country. This project is being carried out through a multi-stakeholder approach, the participation of the Ministry of Climate change is instrumental in the successful implementation of this model, as well as in capitalizing from the climate benefit of setting-up decentralized solid waste management systems, through the IRRC.

Sanitation

Sanitation is one of the basic necessities of human life as it saves lives, resources and let human being live with dignity. Poor hygiene and sanitation not only harms the human health but also gives birth to multiple socio-economic

and environmental concerns including contamination of perennial water sources in the country. This disease burden leads to high child mortality and huge economic burden on people as well as on the government. Pakistan has a high under five years mortality rate of 72 per 1000 children, ranking second highest in South Asia. Pakistani children suffer diarrhea. This also affects physical and mental growth of children under five. Lack of safe water and sanitation facilities is also one of the contributing factors in the spread of polio virus.

The sanitation and hygiene situation in the country remains at a crises point as just 48 percent of the population has access to improved sanitation and more than 40 million people continue to defecate in the open. Only 24 percent households of Pakistan have access to underground and covered drains. 42 percent have access to open drains and 33 percent live with no system. The current expenditure on sanitation and hygiene is very limited. The rural households spend around 20 percent of their monthly income Rs. (410-20) on medical costs, largely due to sanitation & water borne diseases. Pakistan is currently off track in meeting its sanitation Millennium Development Goals (MDGs) target. A momentum to tackle this crisis needs to be built in line with the Millennium Development Goals, South Asian Conference on Sanitation (SACOSAN) commitments and the United Nations call on sanitation.

In order to build the momentum and accelerate the progress on sanitation and hygiene in the country, Pakistan Conference on Sanitation (PACOSAN) was held in February, 2015 in collaboration with the key development partners working in the country. Pakistan government is committed to save its children from death, living with disabilities or not achieving their potential physical and mental growth to compete with other nations in the world. Pakistan Conference on Sanitation (PACOSAN) draws upon the commitments made in South Asia's flagship Inter-Ministerial Conference on Sanitation (PACOSAN) which takes place in every two/three years with delegates from all eight countries of South Asia committing to further accelerate sanitation and hygiene behavioral change in South Asia.

Forest

Under Millennium Development Goals (Goal-7) Pakistan had committed to increase forest cover to 6% by the year 2015, which could not be achieved mainly due to financial constraints of federal and provincial governments. Slow Overseas Development Assistance (OSA) from bilateral or multilateral sources impedes government policies and plans to bring additional lands under tree cover. The developing countries need uninterrupted flow of pledged financial resources from developed countries to adapt to a changing global climate and reduce carbon emission to boost forest growth. However, in order to increase the forest cover, significant programs of forestation and mass tree planting are operational in the country.

Measures to Increase Forest Cover

Mass Afforestation and Tree Planting Campaigns

Seasonal tree planting in spring and monsoon is a regular function of provincial forest departments; other concerned federal and provincial departments, non-governmental organizations and general public are also motivated to participate in national tree planting drives. The role of Ministry of Climate Change in federal government is to plan these campaigns and to monitor tree planting achievements for reporting at national and international levels. During FY 2014-15 two inter-provincial meetings were held on the onset of monsoon 2014 and spring 2015 whereby achievement of tree planting has been as follows:

Table 16.3: Tree Planting

Season	Target	Achievement	Survival Rate
Monsoon	29 million	27 million	70%
Spring 2015	49 million	On-going activity	-

Source: Ministry of Climate Change

Reducing Emissions from Deforestation and Forest Degradation (REDD+)

Under the UN Framework Convention on Climate Change, a new mechanism Reducing Emissions from Deforestation and Forest Degradation (REDD+) has been adopted. Pakistan has vast potential of controlling deforestation under REDD+, Ministry of Climate Change has constituted a National Steering Committee on REDD+ to guide and steer REDD+ projects. Pakistan became a member of United Nations REDD+ program (UN-REDD program) in 2011 and World Bank's Forest Carbon Partnership Facility (FCPF) in 2014. The UN-REDD and FCPF are financial mechanisms to support developing countries to undertake readiness activities to become eligible for result-based payments under REDD+. In 2014, FCPF approved a grant of USD 3.8 million for Pakistan and World Bank mission visited Pakistan in December 2014. The FCPF grant for REDD+ readiness will be utilized in the next 3-4 years for preparation of national REDD+ strategy, national forest monitoring system, and a system of economic, social and environmental safeguards to implement REDD+.

Mangroves for the Future (MFF)

The MFF is a multi-donor regional initiative of Asia Pacific region with the prime objective of protection coastal mangroves forests as natural barriers against Tsunamis. Pakistan is a Member of the MFF and International Union for Conservation of Nature and Natural Resources (IUCN) is the implementing agency for Pakistan. Ministry of Climate Change prepared "MFF National Strategy and Action Plan'' and presently MFF is sponsoring five small grants projects.

Implementation of International Agreements

Forestry Wing is the National focal Point of forums on forestry and biodiversity as enlisted below:

- Convention on Biological Diversity (CBD)
- UN Convention to Combat Desertification (UNCCD)
- Convention on International Trade of Endangered Species (CITES)
- Convention on Migratory Species of wild animals (CMS)
- Cartagena Protocol on Biosafety
- Nagoya Protocol on access benefit sharing (to be ratified by Pakistan)
- MOU on Siberian Crane, Marine Turtles, Birds of Prey, etc.
- Asia-pacific Forestry Commission, UN forum on Forests
- Coordination with international NGOs in joint programming

Under the Convention on Biological Diversity obligations, Pakistan's National Clearing House Mechanism (CHM) was established and its 5th National Report was submitted. The ratification of Nagoya Protocol is under process. Similarly, achievement was also made under Convention on International Trade in Endangered Species (CITES) as enlisted below:

- All Pakistan National Report was updated and submitted in time.
- Repatriation of confiscated wildlife species (Turtles) from China achieved.
- Ensured extensive collaboration with provinces to implement CITES.
- Pakistan Trade control of Wild Fauna and Flora Act 2012 notified.
- Members of CITES Management Authority notified and two meetings of CITES Management Authority have been held so far.
- Trophy hunting of wild life like Markhor, Urial and Blue Sheep regulated.

Mountains and Market Biodiversity and Business in Northern Pakistan

Ministry of Climate Change, Provincial Forest Department, Wildlife Departments of Khyber-Pakhtunkhwa and Gilgit-Baltistan are the implementation partners in the Mountains and Market Biodiversity and Business in Northern Pakistan. Global Environment Facility is providing funding. Geographically the project is located in Khyber-Pakhtunkhwa, Gilgit-Baltistan.

The project area spreads across the Hindu Kush, Karakorum and Western Himalayan mountain ranges, Northern Pakistan, which is rich in global biodiversity. Many globally threatened species are still found there, from the snow leopard and lynx to the highly endangered woolly flying squirrel. Although protected areas now cover some eleven percent of the mountains, threats yet remain to the region's unique biodiversity due to poverty and limited options for sustainable sources of livelihood. The Mountain and Market project uses voluntary certification of Non-Timber Forest Products (NTFP) as a tool to promote biodiversity conservation and strengthen existing conservation efforts with innovative market-based mechanisms. The project develops community and institutional capacity for certified production of biodiversity-friendly non timber forest products in Northern Pakistan and stimulates market demand for these products thereby creating new economic incentives for conservation.

The project objective is the sustainable production of biodiversity goods and services through community ecosystem-based enterprises and demonstration conservancies in the northern mountains of Pakistan.

Climate Change

Pakistan is categorized amongst the highly vulnerable countries to the adverse impacts of climate Change due to its diverse topographic and demographic settings. Pakistan's 5000 glaciers are on retreat. They are retreating faster than any other part of the world. The country is vulnerable to a host of natural hazards particularly of hydro meteorological nature, the frequency and intensity of which has increased due to Climate Change. The recurring extreme events that Pakistan has faced in the recent years carried significant climate change footprints. These included flash floods, cyclones, heat waves, droughts, Glacial Lake Outburst Floods and intrusion of saline seawater into the Indus River Delta Region. Pakistan suffered economic losses of more than US$15 billion during floods of 2010, to 2012. The unprecedented floods of 2010 were described by the UN Secretary General as a slow moving Tsunami. More than 20 million people were affected and roughly 300,000 were displaced.

Climate change is severely impacting the development aspirations of almost all developing countries. Although the developing countries do not have the historical responsibility for the present day challenges yet they are taking the brunt of its negative impacts. It even threatens the very survival of the small island developing states. The sustainable development prospects of Pakistan are undermined by the climate change in multiple ways which is already entrenched with numerous economic, security and social challenges. While Ministry of Climate Change is working to avert these challenges for Pakistan, climate change is serving not only as a threat but also a threat multiplier. Above all, it is seriously undermining the gains achieved in this regard. It is inflicting huge losses to human life and property. It is also causing additional stress on the sustainability and access to natural resources both for the present and more importantly for the future generations. The actions to address climate change should ensure the sustainable development and sustained economic growth of the developing countries and the universal elimination of poverty, hunger and disease. In Pakistan alone, additional US $ 6-14 billion are required annually to adapt to the climate change adverse impacts.

Pakistan's greenhouse gas (GHG) emissions are low compared to international standards. In 2008, Pakistan's total GHG emissions were 310 million tons of CO2 equivalents. These comprised: CO2 54% Methane (Ch4) 36%; Nitrous Oxide (N2O) 9%; Carbon Monoxide (CO) 0.7%; and Non- Methane Volatile Organic Compounds 0.3%. The energy sector is the single largest source of GHG emission in Pakistan; it accounts for nearly 51% of these emissions and is followed by processes (6%), Land use, Land Use Change and Forestry (LULUCF) (3%) emissions and waste (1%). As such, the most important targets for mitigation efforts focused on reduction of GHG emissions are the energy and agriculture sectors. In the energy sector, integration climate change and energy policy objectives are particularly important. The buildings and transport infrastructure put in place today should meet the design needs of the future. Therefore, greater attention must be paid to energy efficiency requirements in building codes and long-term transport planning.

Framework for Implementation of National Climate Change Policy-2012

Further to national Climate Change policy-2012, its framework for implementation is developed keeping in view the current and future anticipated climate change threats to Pakistan's various sectors. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, the vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation actions spelled out. These cover actions to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity, health and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global greenhouse gas (GHG) emissions is very small, its role as a responsible member of the global community is very important in combating climate change in mitigation efforts in sectors such as energy, forestry, transport, industries, urban planning, agriculture and livestock. Furthermore, appropriate actions relating to disaster preparedness, capacity building, institutional strengthening; and awareness rising in relevant sectors is also a part of this framework for implementation of National Climate Change Policy which has been developed not as an end in itself but rather a catalyst for mainstreaming climate change concerns into decision making that will create enabling condition for integrated climate compatible development processes. It is therefore, not a stand-alone document but rather an integral and synergistic accomplishment to future planning of the country.

Despite being a low GHG emitter, Pakistan is bearing the brunt of climate change related disasters at a high cost to its economy. It therefore, requires concerted efforts to adapt to the adverse impacts of climate change. Number of measures are in focus to address both mitigation and enhancing various ongoing efforts and initiating new activities such as Adaptation Strategies, Mitigation Strategies, Clean Development Mechanism and Nationally Appropriate Mitigation Actions.

Climate change Vulnerability Assessment of Islamabad

The Ministry of Climate Change and UN-habitat as part of their strategy to develop a model of climate resilience, initiated a climate change vulnerability assessment of Islamabad and Islamabad Capital Territory. This initiative was undertaken on the instructions of the Federal Cabinet to initiate a pilot in Islamabad. It was also decided that, the program would be replicated in one city of each province with the aim to further upscale to other cities. The study was conducted with due support of the Ministry of Climate Change, the Pakistan. Meteorological Department (PMD), Globe Change Impact Studies Centre (GCISC), SUPARCO, Capital Development Authority (CDA) Islamabad Capital territory (ICT) and Capital Administration and Development Department (CADD). A steering committee to spearhead this process is established by the Ministry and is headed by the Secretary and co-chaired by UN-Habitat. The study is now completed and has been shared with Ministry of Climate Change. The Study has been edited and designed as a policy document by UN-Habitat's Regional office in Asia and the Pacific.

Way Forward
Green Climate Fund (GCF)

Green Climate fund (GCF) is the future financial mechanism for the United Nations Framework Convention on Climate Change (UNFCCC). Ministry of Climate Change has started readiness activities. The Ministry is foreseeing to tap the GCF at an appropriate level. Following actions are on priority for near future:

- Establishment of a national designated authority.
- Accreditation of implementing entities.
- Development of strategic framework.

Technology Needs Assessments (TNA)

TNA is a systematic approach for conducting technology needs assessments in technological means for both mitigation and adaptation. It also provides processes and methodologies for uncovering gaps in enabling frameworks and capacities for formulating a national action plan to overcome them, as part of overall climate change strategies. Pakistan has initiated work on TNA to address country needs for clean technologies in the fields of both mitigation and adaptation.

Second National Communication (SNC) & Biennial Update Reports (BURs)

Project proposal of Pakistan's Second National Communication (SNC) on Greenhouse Gases (GHG) emission has been finalized and the same is under process with the United Nations Environment Program (UNEP) for funding. This will be a three years study leading to stocktaking of all GHG emissions in Pakistan with options of mitigation and adaptation actions. BUR is an extended report on National Communications. It describes the status of GHG Emissions and mitigation measures taken by the countries. Work on Pakistan's first BUR is expected to be started soon.

United Nations Conference of Parties on Climate Change (COP-21)

The COP-21 (UN climate talks) to be held in Paris in December 2015 is supposed to produce a global agreement to cut greenhouse gas (GHG) emissions. The agreement will start in 2020-2030, and probably until 2035. Earlier, the developing countries, including Pakistan, were exempted from such obligation; However, COP-21 is likely to bring a Protocol with binding commitments on developing countries such as cutting down or at least slowing down their GHG emission.

Keeping in view the importance of the conference, Pakistan has started preparations on the stance of GHG emission cuts and intended nationally determined contributions.

Activities of Pakistan Environmental Protection Agency (Pak-EPA)

Pakistan Environmental Protection Agency (Pak-EPA) is mandated to enforce the Pakistan Environmental protection act 1997 in the Islamabad Capital Territory. The following major activities are being undertaken by Pak-EPA:

I. Environment Impact Assessment/ Monitoring:

- During the period from 1st july, 2014 to-date (03) Initial Environmental Examination (IEE) reports have been received for review at this agency, while (03) cases are under process.
- The Pakistan Environmental Protection Agency in coordination with International Union for Conservation of Nature, ICUN and other partners had recently conducted the National Impact Assessment program (NIAP). The program aimed to contribute to sustainable development in Pakistan through strengthening the environmental impact assessment process introducing Strategic Environmental Assessment (SEA) in national development planning. Based on the experience of NIAP, it is expected that interventions at the policy level through introduction of SEA, capacity building, development of tools, procedures and mechanisms and improved understanding of impact assessment processes, principles of sustainable development could be introduced into country policies and programs.
- During the same period (03) reports have been received in the agency, while 03 are under process for approval.

II. Lab/National Environmental Quality Standard (NEQS):

- Monitoring of industrial area I-9 & I-10 for air quality monitoring.
- Water quality analysis of treatment plants installed by the CDA.
- Effect of urbanization of water quality in nullah coming from E-11 Islamabad.
- Monitoring of ICT territory catchments area of Rawal Dam, Simly Dam and Korang River.
- Preparation of legal cases for violation of NEQS in the jurisdiction of ICT through regular monitoring.
- Research with the student of International Islamic University and Jinnah University for waste water of Islamabad industrial area.
- Detection of heavy metals in soil of Islamabad industrial area.
- Carried out survey of 48 government & private hospitals of Islamabad and collected the hospital waste management data.
- Industries were directed to undertake campaign for tree plantation.

III. Legal/Enforcement:

- Pak-EPA served 17 notices under section 16 (1) of the Pakistan Environment Protection Act, 1997 to the hospitals, clinics / medical facilities/labs which are violating provisions of PEP Act, 1997 and hospitals Waste Management Rules 2005. They were called to explain the reasons of lapses on their part. They have been directed to ensure proper disposal of infectious waste being generated by their hospitals etc.
- Five steel industries located in industrial area have been monitored and 03 environmental protection orders issued with the direction to stop their activities till compliance of NEQS.
- CDA has been served with environmental protection order with direction to stop open dumping of solid/municipal waste in I-12 near I.J.P Road, Islamabad.
- IESCO was served with environment protection order by directing them to stop the construction of "Grid Station in F-9 Park'' till issuance of environmental approval by Pak-EPA.
- Many other violating environmental laws have been served with notices.
- Draft of compounding of offences rules finalized and sent to Ministry of Law, Justice and Human Rights for vetting and notification.
- Amendment on oxo-biodegradable plastic product regulations finalized and sent to Ministry of Climate Change for notification.
- Environmental Protection Tribunal (EPT) made functional through Ministry of Law, Justice and Human Rights and litigation started for violation of environmental laws by polluters. The EPT has disposed off 60 cases of environmental pollution.

Conclusion

The Government of Pakistan recognizes the importance of environmental concerns and taking strategic adaptation measures at the policy management and operational level to ensure energy security, food security and water security to face the challenges of climate change. In this regard, private sector is also required to play a more active role by making environmental investment, innovations and incorporation of environmental considerations in their operation. Significant initiatives are being taken in collaboration with developed countries to counter the issues of climate change, it is therefore necessary that developed countries should also honour their climate fund pledges as with inadequate resources, developing countries cannot effectively combat the adverse impacts of climate change.