YEAR BOOK

2019-20

Government of Pakistan
Ministry of Climate Change
Islamabad

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MESSAGE FROM THE MINISTER/ SPECIAL ASSISTANT TO THE PRIME MINISTER ON CLIMATE CHANGE

Climate change is expected to have wide-ranging impact on Pakistan: reduced agricultural productivity, increased variability of water availability, increased coastal erosion and seawater incursion, and increased frequency of extreme weather / extreme climate. Addressing these risks requires the mainstreaming of climate change into national strategy and policy; and climate-smart investments in infrastructure, businesses and skills.

Present Government has accorded high priority to these risks by mainstreaming of climate change into national strategy and policy and climate-smart investments in infrastructure, businesses and skills

The Year Book 2019-20 describes comprehensive programs and activities performed by various wings and attached departments of the Ministry of Climate Change during the year to achieve (its) the targets and objectives of the Ministry of Climate Change.

(MALIK AMIN ASLAM)
Special Assistant to the Prime Minister on Climate Change

FOREWORD

The Year Book 2019-20 of the Ministry of Climate Change is an official handbook published in pursuance of sub-rule (2) of Rule 25 of the Rules of Business, 1973, whereby each Ministry is required to prepare a Year Book for information of Cabinet and the general public. The Year Book deliberates activities undertaken by the various Wings of the Ministry, its attached departments and autonomous setup, and accomplishments of the Ministry during fiscal year 2019-20.

I hope this will serve as a useful information resource and reference document for the policy makers, researchers, planners and public on matters relating to climate change. I highly appreciate the efforts of officers and staff of the Development Wing, engaged in compiling the yearbook in time.

Comments and suggestions for improvement of the yearbook would be highly appreciated.

(MS. NAHEED S. DURRANI)
Secretary

FUNCTIONS OF CLIMATE CHANGE DIVISION

Under the Rules of Business, 1973 as amended from time to time, Climate Change Division is assigned with the following functions:

1. Omitted vide SRO 793 (1)/2018 (F.No.4-1/2018-Min-I) dated 25-06-2018.

2. Pakistan Environmental Protection Council.

3. Pakistan Environmental Protection Agency.

4. Global Environmental Impact Study Centre, Islamabad. (Global Change Impact Studies Centre, Islamabad).

6. National policy, plans strategies and programmes with regard to disaster management including environmental protection, preservation, pollution, ecology, forestry, wildlife, biodiversity, climate change and desertification.

7. Coordination, monitoring and implementation of environmental agreements with other countries, international agencies and forums.

8. Policy formulation, coordination and reporting of human settlements including urban water supply, sewerage and drainage.

9. Islamabad Wildlife Management Board.

ORGANIZATIONAL SETUP

Business allocated to the Climate Change Division has been distributed amongst the following Wings:-

i. **ADMINISTRATION WING**
ii. **ENVIRONMENT & CLIMATE CHANGE WING**
iii. **FORESTRY WING**
iv. **INTERNATIONAL COOPERATION (IC) WING**
v. **DEVELOPMENT WING**

ADMINISTRATION WING

Introduction

The Administration Wing performs all core functions like hiring/ recruitment and developing skills of the employees to add value. The Wing is responsible for job analysis, planning, managing salaries, providing benefits incentives, evaluating performance, resolving disputes and communicating with employees at all levels to facilitate them in their service delivery. It also focuses on governance and analysis of quality output of Wings of the Ministry. Besides, imparting knowledge of Rules of Business, Financial Rules, Esta Code and other instructions issued by the Government from time to time to the employees and their compliance to ensure better performance is also taken care of in different ways.

Strength & Responsibilities:-

i). Total strength of the Climate Change Division during the year 2019-20 under report is 192 employees (52 officers and 140 staff members).

The Administration Wing is headed by a Joint Secretary of this Division. The responsibilities of the Administration Wing are as under:-

a. Personnel Administration of the officers / officials of the Division.
b. Personnel administration of officers of the attached departments/organizations / projects.
c. Budgetary (non-development) and financial matters of the Division and its attached department/organizations.
d. Coordination between wings of this Division and with other Ministries/Divisions.
e. Matters relating to hiring of residential accommodation.
f. Reimbursement of medical charges to the serving / retired officers.
g. Maintenance of PER record of all employees of these Divisions and attached departments and maintenance of annual declaration of assets.
h. Processing promotion, pay and pension cases of the officers / officials of the Ministry and its attached departments.
i. Trainings, conferences, seminars and visits abroad.

ii). **Major Challenges:-**

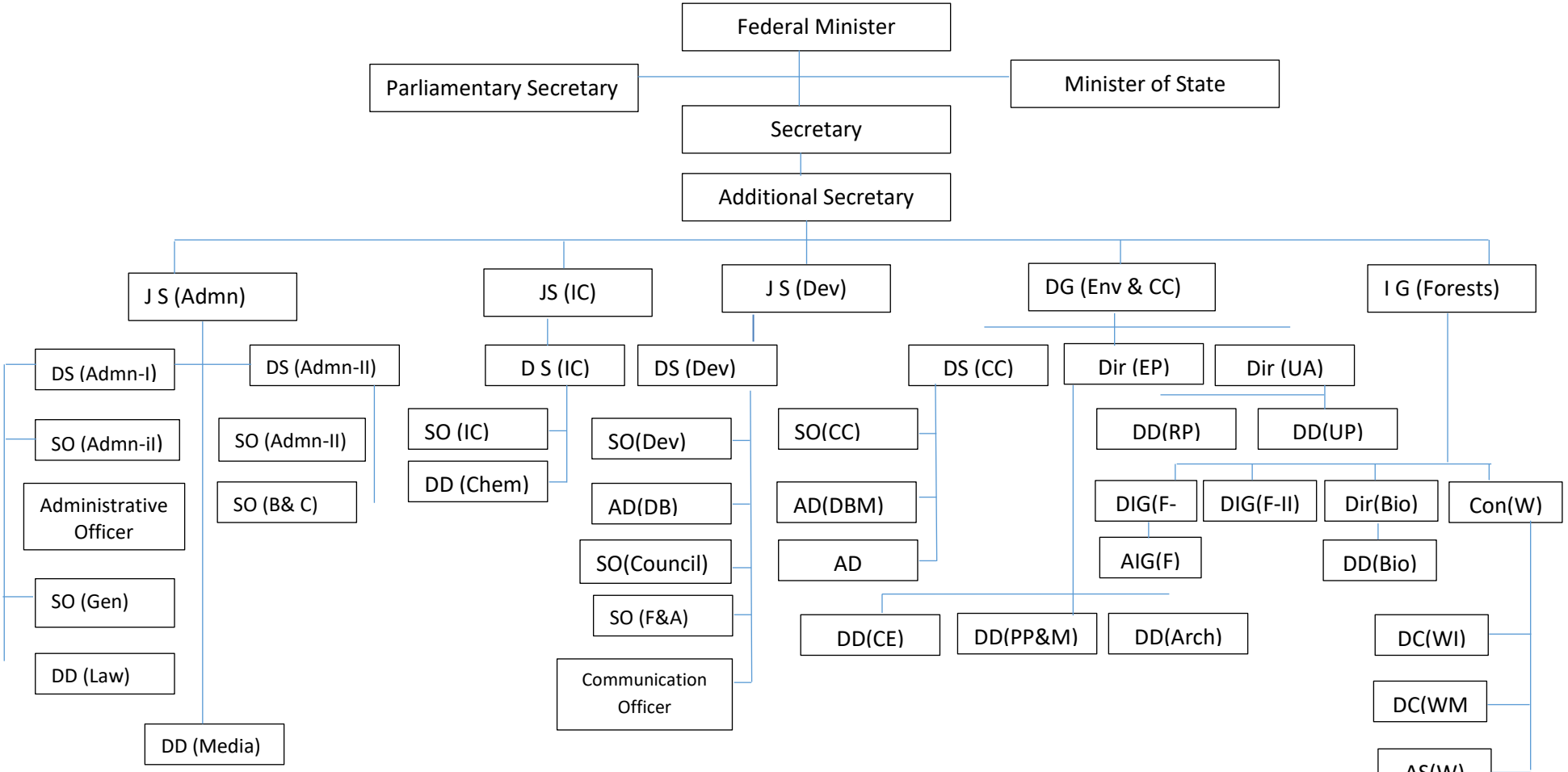
On behalf of Admn-I Section:

Dearth of staff and officers pose a real challenge in human resource management of this Ministry. Therefore, most of the offices are overburdened and over-stretched and hence negatively impact the efficiency in disposal of work.

iii). **Reforms to be included: -**

E-Office is the need of the hour. MoCC is effectively implementing E-office application in the main Ministry with the support of M/o IT. Network infrastructure has been deployed and all wings of the Ministry are using E-Office in order to bring efficiency, effectiveness and transparency.

Organogram of Ministry of Climate Change



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ENVIRONMENT & CLIMATE CHANGE WING

Environment & Climate Change wing of the Ministry performs the following functions:

- National Climate Change Policy;
- Environment Policy;
- Urbanization;
- Water, Sanitization and Hygiene (WASH);
- International Conventions and protocols i.e. United Nation Framework Convention on Climate Change (UNFCCC), Intergovernmental Panel on Climate Change (IPCC), United Nations Environment Programme (UNEP), UNICEF, South Asia Cooperative Environment Programme (SACEP), Shinghai Cooperation Organization (SCO).

2. Pakistan is considered one of the low global greenhouse gases (GHG) emitter. Presently, Pakistan's GHG emission account for less than one percent however, the country is considered extremely vulnerable to the impacts of climate change. Being a responsible member of the global community, Pakistan has responded with a well articulated Climate Change Agenda, consisting of following flagship initiatives:

E-Vehicle Policy

3. During its meeting held on May 17th, 2019, The Prime Minister's Committee on Climate Change during its meeting held on May 17, 2019 approved the minimum mandatory electric vehicle (EV) penetration targets and tasked the Ministry of Climate Change (MoCC) to develop the National Electric Vehicle Policy. After extensive consultations, the draft National Electric Vehicle Policy was firmed-up and placed before the Cabinet for approval. The Cabinet approved the EV policy in principle in its meeting held on 5th November, 2019.

4. This initiative reflects a net benefit in the range of US$ 2.2 billion to US$ 3.7 billion as net savings in oil bills to the national exchequer under different scenarios during 2020 to 2030. Additionally, is a benefit on account of reduction in emissions of gases and air pollution/smog; associated health benefits, larger economic benefits of establishment of local manufacturing facilities and job potential of 35000-40000. This is a flagship initiative of Government of Pakistan which will address climate change issues in the country by deploying 30% of Electric Vehicles on road by 2030.

UN-Habitat

5. The United Nations Habitat programme has been working towards a better urban future. Its mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all. Pakistan is a founding member of UN-Habitat and contributes an amount of US$ 6000 to the Core Budget of UN-Habitat on an annual basis.

6. The Ministry of Climate Change is the focal point of UN-Habitat in Pakistan. With the collaboration of the UN agency, a number of activities have been undertaken in the country. Recently a COVID-19 prevention/response has been piloted in two *Katchi Abadis, Dhok Hassu* and *Dhok Mantaal* of the Rawalpindi District. UN-Habitat in collaboration with MoCC has availed an adaptation fund project for Urban Flooding and Drought Management from GCF for Nowshehra and Rawalpindi. The initiative will be launched soon. Project Management Unit (PMU) will be established in the Ministry of Climate Change to oversee the activities under this project.

7. Besides, the Government of Pakistan is taking measures to formulate its first Pakistan Resilient Urban Policy Framework. A participatory approach is being employed where projects on urbanization are being revitalized to guide the Government in shaping guiding principles for proper implementation of the Urban Policy Framework. Meeting challenges in the 'New Urban Agenda' requires a paradigm shift in the approaches to development not only in Pakistan but also in the world at large. The Government of Pakistan is conscious of the requirement for this paradigm shift and is therefore engaging in a dialogue among stakeholders. The dialogue will also be part of an urban campaign to carry out stakeholders consultations and propose solutions compatible with new evolving ideas of resilient urban development.

Asia-Pacific Network (APN)

8. Asia-Pacific Network for Global Change Research (APN) is a network of 22 Member Countries' that promotes global change research in the region, enhances developing countries' involvement in research, and strengthens interactions between the scientific community and policy makers. Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, United States of America, and Viet Nam are the member state of APN.

9. APN aims to enable developing countries in the Asia-Pacific region to participate increasingly in regional cooperative research, and to benefit fully from such research. The APN

was formally launched in 1996 with its first Inter-Governmental Meeting (IGM) and Scientific Planning Group (SPG) meeting in Chiang Mai, Thailand.

10. The Ministry of Climate Change is the focal point for APN. Global Change Impact Study Centre (GCISC) a research arm of MoCC has undertaken the climate and global research in Pakistan under the various APN programmes. The areas of research include climatology, climate projection models and agriculture as well as other development sectors for GHG inventory. APN also provides capacity-building support to its member states through trainings, workshops and conferences. APN Secretariat has organized numerous capacity building workshops attended by officials from Pakistan.

Clean Green Pakistan Movement

11. "Clean Green Pakistan Movement" has been launched with a vision to drive a nationwide movement by the people of Pakistan for a clean and green environment. A "Clean-Green Cities Index" has been introduced in 20 cities to trigger a shift towards improved waste management and sanitation system in the country. The national campaign underpins behavioral change and institutional strengthening while addressing the five components i.e. tree plantation, solid waste management, liquid waste management, total sanitation/hygiene, and safe drinking water.

Proposed approach

12. The Ministry of Climate Change is in the process of developing the Clean Green Pakistan Index (CGPI). CGPI is initially applicable at city level to rank cities according to their cleanliness and greenery indicators. The National and provincial level consultations will be held with relevant stakeholders to determine the viability and adaptation of the proposed Index along with key indicators. A mobile/online application will be developed to submit the data on the dashboard. The existing dashboard managed by the respective provincial departments will be reviewed to create linkage with the mobile application. This will further furnish a copy of this data to the national CGP dashboard managed by Clean Green Pakistan Unit at MoCC. Based on this data, the cities will be compared based on the performance indicators. In the pilot phase, only metropolitan cities (12 from Punjab and 7 from KPK) are being selected and later on, several other cities shall be taken on board.

13. After initial face-to-face training of focal persons, an online training manual shall be developed and will be made available for respective councils with technical support of CGPI secretariat. A baseline of Household indictors for cities and districts of 1-2 provinces shall be

developed by using the available data i.e. MICS and PSLM Pakistan. Later on, the Union Council indicators shall be added for the selected cities. In consultation with provincial governments, the pilot phase of the programme shall be launched in August 2019. The duration of competition shall be for six (06) consecutive months. After scoring on the basis of marks awarded to different performance indicators for comparisons, the best performers shall be recognized at national level.

14. The Local Councils/Cities Administration will prepare a monthly report on the performance indicators for submission to Provincial Governments. This data will be updated on the Provincial/ Federal dashboards. A District/City Monitoring and Evaluation Committee shall be formed to review the progress against the performance indicators for submission of monthly scores on the prescribed format. The Provincial Inspection & Validation Committee will inspect the cities included in the pilot phase on the basis of cities report for further endorsement. Final ranking and awards will be reviewed and endorsed by WASH Strategic Unit through making final independent assessment/ reports including visits where required.

Way forward

- Provincial Consultation and finalization of Clean Green Pakistan Index
- Selection and finalization of pilot cities i.e. 12 from Punjab and 7 from KPK
- Capacity Development and piloting of mobile application
- Launch of Clean and Green Pakistan Index
- Data Collection and reporting by the participating cities
- Review and recognition of the best cities

Green Economic Stimulus

15. During the current situation of pandemic COVID-19, the Ministry of Climate Change has launched Green Economic Stimulus. The initiative aims at promoting environmental activities which will also have economic impacts. The Stimulus would focus on creating livelihood opportunities for daily wagers in the forestry and waste management sectors. Subsequently, the Ministry has developed a 'Post-Covid-19 Response Plan' which focuses on a just transition towards Greener / environment friendly activities.

South Asia Co-Operative Environment Programme (SACEP)

16. Pakistan is a member state of South Asia CO-Operative Environment Programme (SACEP). It participated in the SACEP's 15th Governing Council meeting held in Dhaka, Bangladesh, on November, 06 2019. Following Programmatic matters have been discussed:-

i. Biodiversity for Food and Nutrition (BFN) project in South Asia beyond 2018.
ii. Strengthening Sustainable Consumption and Production in South Asia.
iii. South Asia Forum on Environment.
iv. Healthy Landscapes: Managing Agricultural Landscapes in Socio-ecologically Sensitive Areas to Promote Food Security, Well-being and Ecosystem Health in Sri Lanka.
v. Waste Management.
vi. Environmental Data and Information Management System for South Asia
vii. Male Declaration on Control and Prevention of Air Pollution and its likely Trans-boundary Effects for South Asia Air Quality.
viii. Sustainable Nitrogen Management for South Asia.
ix. Capacity building of public sector, private sector and civil society stakeholders in SACEP member countries for Sustainable Energy and Road Transport policy, planning and implementation.
x. Post Rio +20 challenges related to environment sustainability with focus on the Sustainable Development Goals and the Paris Agreement.
xi. Adaptation to Climate Change.
xii. Explore possibilities of Accreditation to Global Funding Mechanisms.
xiii. Regional Cooperation for the Conservation and Wise use of Internationally Important Wetlands in South Asia.
xiv. Plastic free Rivers and Seas for South Asia Project

SACEP Strategy 2020 – 2030

17. The Ministry of Climate Change supports the SACEP Strategy for 2020-2030. Main objectives of the strategy are to promote regional co-operation in South Asia in the field of environment, support conservation and management of natural resources of the region in close collaboration with regional, national and international institutions, governmental and non-governmental, as well as experts and groups engaged in such co-operation and conservation efforts.

18. Under the strategy following goals shall be pursued in the region:-

i. Enhance resilience to the impacts of climate change through mitigation and adaptation measures.
ii. Conservation of ecosystem and biodiversity.
iii. Ensure effective waste management at all levels.
iv. Ensure better air quality to safeguard health and well being.
v. Strengthened low-emission development, improved resource efficiency for transition to an inclusive green economy and fostered sustainable and healthy lifestyles.
vi. Strengthen environmental governance for evidence based decision making.

Shanghai Cooperation Organization (SCO):

19. The Shanghai Cooperation Organization (SCO), China is an intergovernmental organization. It was established on 15th June 2001 by the Republic of Kazakhstan, Republic of China, the Kyrgyz Republic, the Russian Federation, the Republic of Tajikistan, and the Republic of Uzbekistan. Pakistan became its member in June, 2017. Main objectives of SCO, inter-alia, include promoting environmental protection and resilience to climate change in the SCO region.

20. The First Meeting of Heads of the Ministries/Agencies of SCO Member States Responsible for Environment Protection was held in Moscow on September 27th, 2019 along with Experts Group Meeting from September 25-26, 2019. The forum(s) have discussed elements of practical cooperation in the field of environmental protection as SCO member states with focus on implementation of events in the field of Environment Protection for 2019-2021. During the meeting, the Programme for Development of Ecological Wellbeing of the cities of the Shanghai Co-operation Organization was signed, and joint communiques were issued.

Conversion of Brick kilns in Zig-Zag Technology

21. There are around 10,000 brick kilns in Pakistan. These Kilns operate on obsolete technologies which contribute to air pollution and smog issues in winter, are energy inefficient with huge health costs.

22. Ministry of Climate Change in collaboration with Federal and Provincial EPAs, Clean Air Coalition of UN Environment, International Centre for Integrated Mountain Development (ICIMOD), National Energy Efficiency and Conservation Authority (NEECA), Pakistan

Engineering Council, Pakistan Brick Kiln Owners Association, academia and other stakeholders has initiated the process of converting conventional brick kilns to Zig-Zag technology. Zig-Zag technology is a brick stacking process which reduces emissions, saves fuel and also improves the quality of finished bricks.

23. The conversion initiative comprises of the following components:

1. Sensitizing the Brick Kiln owners through brick kiln owners association.
2. On-site training of Brick Kiln workers.
3. Exposure visits to regional countries.
4. Arranging soft loans from Banks.

24. On a proposal by Ministry of Climate Change for financing to the Brick Kiln owners for conversion to Zig-Zag technology the Federal Cabinet in its meeting directed that:

> "Brick kilns may be provided easy access to Capital to convert to Zig-Zag Technology. This may be conditional to bricks kilns Implementing NEQ Standards and labor laws. Provincial EPAs and labor departments may be engaged in the process."

25. Detail of conventional and Zig-Zag brick kilns in the country is as follows:-

S #	Federal/Provincial	Total No. of Brick Kilns (Approx.)	Total No. Converted on Zig-Zag	Total No. in pipeline for Conversion on Zig-Zag
1.	Islamabad Capital Territory (ICT)	63	10	15
2.	Punjab	7483	660	112
3.	Khyber Pakhtunkhwa	850	-	02
4.	Sindh	390	-	01
5.	Baluchistan	580	-	-
6.	AJ&K	49	-	-
Total:		**9415**	**670**	**130**

Environmental Impacts of conventional brick kilns vs Zig-Zag technology

26. The major environmental impact of Brick Kilns is on air quality; as such, air pollution has health and financial implications. The Brick sector is responsible for up to 91% of total

Particulate Matter (PM) emissions in South Asia. Brick kilns are also estimated to emit 22 and 37 kt/year of PM2.5 and PM10 respectively.

Parameter	**Zig-Zag Kiln**	**Conventional Brick Kiln**	**Remarks**
Specific Energy Consumption (MJ/kg fired bricks	1.05	1.3	21% reduction compared to Conventional kilns
CO_2 emission (g/kg fired brick)	100.2	131.2	24% reduction compared to Conventional kilns
SPM emission (g/kg fired brick)	0.11	1.18	91% reduction compared to Conventional kilns
% of Class-I bricks	90%	60%	30% more class-1 brick compared to Conventional kilns

Source: case study on cleaner brick production, CCAC and ICIMOD.

27. The table below provides a comparison between a Conventional Brick Kiln and one which has adopted Zig-Zag technology by Punjab-EPA has reported the following parameters according to their Environmental Quality Standards.

Sr. No.	**Description of PEQs Parameters**	**PEQS mg/Nm^3**	**(Conventional Tech)**	**Zig-Zag Technology**
1.	Carbon Monoxide	800	13854.76	2752.32
2.	Sulphur Dioxide	1700	12889.05	1710.68
3.	Sulphur Oxides (Sox)	--	--	9850
4.	Oxides of Nitrogen	400	50.17	105.05
5.	Particulate Matter	500	992.00	141.7
6.	Smoke Opacity	40% or 2 R.S	5 R.S	Below 1 R.S
7.	Temperature	--	60.2	49.2
8.	Analyzer Report	--	2	7
9.	Date of Monitoring	--	2.05.2019	
10.	Excess Air	0%	122.09	155.76

(Source: Punjab EPA study "Assessment of Brick Kilns Emissions for Comparison between Old, New and Modified technologies)

Actions undertaken by the Ministry of Climate Change:

28. The following actions have been undertaken by the Ministry of Climate Change:-

Trainings/Awareness

- Facilitated an exposure visit of Brick Kiln Owners Association members to Nepal under the Kathmandu Declaration on Brick Industries in South Asia.
- On-Site training of Brick Kiln workers in various cities of Pakistan through NEECA and Pakistan Engineering Council.
- Facilitated On-campus training and research.
- Capacity Building of Provincial EPAs through foreign trainings. 4 officials from Baluchistan and Sindh EPAs
- Developed and disseminated guidelines on conversion to Zig-Zag technology in Urdu language to Brick kiln workers and owners.

Access to finance

- Coordinated with State Bank of Pakistan for provision of soft loans. In response the State Bank of Pakistan has announced a subsidized loan at the rate of 6 % with a 10 years payback period.

Coordination with Stakeholders

- Ministry of Energy has been requested to provide dedicated electricity lines to brick Kilns
- Provincial governments have been requested to purchase bricks from Zig-Zag kilns.
- Encouraged the Brick Kiln owners to register this sector with Provincial Industries and Labor Departments and Social Institutions.

Collaboration with Global Green Growth Institute (GGGI), South Korea

29. The Ministry is in the process of finalizing a Memorandum of Understanding (MoU) with Global Green Growth Institute (GGGI), South Korea. MoU aims to formalize a framework of cooperation to promote green growth planning and implementation in Pakistan, which includes:-

- Support in the development of Climate Resilient Growth Strategy; and
- Integrating green growth into public sector development strategy.

30. The Global Green Growth Institute (GGGI) is a treaty-based international organization, which aims to promote green growth, a paradigm characterized by a balance of economic growth and environmental sustainability. The institute would provide support for green economic growth, which simultaneously addresses poverty reduction, job creation, social inclusion, and environmental sustainability and works across four priority areas considered to be essential to transforming national economies, including energy, water, land-use, and green cities. Specific expected outcomes of the MoU include:

i. Support in implementation of Nationally Determined Contributions (NDCs) under the Paris Agreement
ii. Support obligations under the 2030 Development Agenda's SDGs.
iii. Support in the development of green growth plans, policies and regulations, mobilization of green investments, implementation of green growth projects.

31. The Ministry of Climate Change has signed a letter of Intent with GGGI. In this regard a Memorandum of Understanding (MoU) will be signed after the approval of Federal Cabinet.

United Nations Environment programme (UNEP) and United Nations Environment Assembly (UNEA)

32. Pakistan is a member state of UNEP, which has a universal membership of 193 countries. The Ministry Climate Change actively participates in various events of UNEP including United Nations Environment Assembly (UNEA).The assembly is the world's highest-level decision-making body on the environment. The Assembly meets biennially in the UNEP Head Quarters based in Nairobi, Kenya. The assembly sets out priorities for global environmental policies and develops international environmental law. Through its ministerial declaration and resolutions, the Assembly provides leadership, catalyzes intergovernmental action on the environment, and contributes to the implementation of the UN 2030 Agenda for Sustainable Development. The UN Environment Assembly is also the governing body of the UN Environment Programme. Four sessions of the Assembly have so far been held since 2014. The fifth session of the UN Environment Assembly (UNEA-5) will be held in 2021. It will connect and consolidate environmental actions within the context of sustainable development and give significant impetus to more effective implementation. The session will mobilize, motivate and energize member States and stakeholders into sharing and implementing successful approaches and nature based solutions that contribute to the achievement of the 2030

Agenda and the Sustainable Development Goals, particularly the eradication of poverty and the promotion of sustainable patterns of consumption and production.

33. Based on extensive consultations with member states, a theme for UNEA-5 was decided on 3rd December, 2019 as **'Strengthening Actions for Nature to Achieve the Sustainable Development Goals'.** The theme calls for strengthened action to protect and restore nature and the nature-based solutions to achieve the sustainable development goals in its three complementary dimensions (social, economic and environmental).

Development Projects

Following PSDP, projects are being executed.

i) Establishment of Pakistan WASH Strategic Planning and Coordination Cell (Facilitating Achievements of SDG 6.1 and 6.2).

34. The Ministry of Climate Change is mandated for WASH sector coordination at the federal level alongside with the responsibility of reporting progress and sustaining stakeholder dialogue including all federating units as well as international development partners which necessitates establishment of a strategic planning and coordination unit. The project therefore aims to establish Pakistan WASH Strategic Planning and Coordination. The unit will facilitate and fast-track progress towards achievements of SDG 6.1 and 6.2. Which are directly related to WASH sector (water and sanitation) which are required to be met within the stipulated time frame as per following specific laid down targets:-

I. Putting in place an effective coordination mechanism at national level involving all federating units and relevant development partners for developing harmonization, integration and synergies among key WASH stakeholders in WASH sector.
II. Promoting knowledge management, donor support, M&E, and periodic reporting mechanisms for SDGs 6.1 and 6.2 through close liaison with all federating units
III. Nurturing cross-sectoral linkages with other sectors (academia, private sector, CSOs working on themes of health, education, nutrition, DRM etc.) for putting in place a holistic approach for deepening and sustaining WASH sector reforms.

35. Under the project, in-house capacity of Ministry of Climate Change will be augmented to enable it to perform its mandate in line with the Federal Government's international commitments (including SWA,HLM, SACOSAN, SDGs attainment) in a technically sound manner, underscored by political consensus building and stakeholder collaboration. The Unit

will also re-position the Ministry of Climate Change to fully benefit from emerging national, regional and international deliberations and opportunities for augmenting and complimenting efforts of federating units for a robust institutional response to key WASH sector challenges in Pakistan. The Unit will also serve as a federal level nerve center and jointly owned institutional platform for ensuring smooth collaboration and sustaining meaningful dialogue involving federal/provincial governments, civil society, private sector, academia and international development partners having stakes in the WASH sector in Pakistan.

36. Allocation for the year 2019-2020:

1.	**Approved Cost**	40.00 Million (Local)	
2.	**Revised Cost:**	41.136 Million (Local)	
3.	**Allocation 2019-2020**	**Allocation (Local)**	**Expenditure**
		Rs. 16.00 Million	**Rs. 2.306 Million**

Major activities undertaken during 2019-2020:

Establishment of WASH Cell under Ministry of Climate Change:

- Establishment of WASH cell with complete project staff under the Ministry of Climate Change.
- Developed TORs relating to WASH Coordination Committee and notified it.
- Drafted the WASH policy review working paper
- Baseline and Targets for SDG 6.1 and 6.2 have been established and published in the Economic Survey of Pakistan 2019-20. The Strategic Unit of the MoCC on Water, Sanitation and Hygiene (WASH) in collaboration with key stakeholders and relevant provincial departments are rolling out the agenda of SDGs related to safe water and sanitation services.
- **WASH in Healthcare Facilities:** Gap Analysis is under process with Pakistan Bureau of Statistics and WHO.
- **Launched Clean Green Pakistan Index on 25th November, 2019**: The objective of the CGPI is to develop a national campaign to score the performance of various cities on five components relating to tree plantation, solid waste management, liquid waste management, total sanitation/hygiene, and safe drinking water. The CGPI index will promote cleanliness and environmentally friendly practices, ensure citizen participation, empower local councils and create a healthy competitive environment among the cities for sustainable clean and green Pakistan. Twenty (20) selected cities in the two provinces (13 in Punjab and 07 in Khyber Pakhtunkhwa's) have been ranked in terms of cleanliness and greenery standards.

ii) Climate Resilient Urban Human settlements Unit

37. The project aims to achieve the following objectives:-

- Plan and implement the harmonized Action Plans for developing "Climate Resilient safe & Sustainable Cities", in collaboration with the Pakistan Urban Planning & Policy

center at Ministry of PD&R (Planning, Development& Reforms); along with the UN-Habitat (Pakistan); all Provincial Urban Units; and the Line Departments of P&D; Local Governments; Housing & Urban Development of the Governments of Gilgit Baltistan and the AJK.

- To facilitate provincial urban units in launching community-motivated urbanization initiatives and in implementing urban projects; to facilitate their access to external funding with development partners and set aside international funds for adopting actions in developing Climate Resilient cities like the adaptation fund; Global Environment Facility and Green Climate Fund in addition to the increased Government's budgetary allocation.
- To assist Pakistan Urban P&P Centre in the Ministry of PD&R; in implementing Pakistan Vision 2025 strategic initiatives for transforming all urban human settlements into economic growth hubs and eco-friendly sustainable cities through improved governance, effective urban planning, efficient mobility infrastructure, better security & community participation in collaboration with city governments.
- To develop and strengthen the capacity of city administrations to assess the emission targets and adopt low-carbon energy-efficient comprehensive Action Plans to convert their urban-heat islands into "Climate Resilient Cities", towards fulfilling international commitments of the federal government through the focal Ministry of Climate Change.
- To strengthen the city governments' capacity in engaging the line departments and agencies and also the non-state actors to effectively meet the urban development challenges throughout Pakistan, as per the international obligations of Federal Government to meet the UNEP; UNFCCC & UN-Habitat targets under Rio+20 Declaration; New Urban Agenda; and SDGs.
- To strengthen institutional capacity of Provincial Urban Units of GB & AJK by augmenting their technical-knowledge& integrating their working mechanism to streamline future urbanization throughout Pakistan; thus enabling them to develop people-centered "Cities for Life", through efficient service-delivery based on information from an integrated Web-Net Databank of all human settlements scenario including the SDGs (i.e. rural-urban migration and demographics; urban poverty & land-use, GHG emissions& temperatures; informal slums, etc.).

38. **Major activities undertaken under the scheme during 2019-20.**

i. Establishment of CRUHS Unit with complete project staff under the Ministry of Climate Change.

ii. Developed Post COVID-19 response of MOCC and aligned it with urbanization.
iii. Developed links with SDGs, and NDCs, and UN-Habitat for better coordination.
iv. Activity of development of web portal & data banks at 7 hubs for which requirement gathering exercise is under process. In this regard provinces are being contacted for needs assessment.
v. Identified research development and demonstration program to make the cities climate resilient.
vi. Identified program for storm water management and averting urban flooding.
vii. Identified climate resilient low cost housing program.
viii. Identified urban ecology upgradation program.

39. Major objective of this project is to "enhance institutional capacity of the Ministry of Climate Change, through developing a Climate Change Reporting Unit". This would enable the Federal Government/ Ministry of Climate Change (MoCC) on reporting with regards to Climate Change (and other allied subjects), as obligatory under international commitments, particularly the United Nations Framework Convention on Climate Change.

40. Specific objectives of the proposed project are as follows:-

i. To enhance institutional capacity at MoCC for strengthened coordination of MoCC allied Ministries and provincial governments, NGOs and research institutions, for accessing, compiling, reviewing and consolidating relevant data/information with regards to climate change.
ii. To serve as a Secretariat for supporting implementation of 'National Climate Change Policy' and 'Framework for Implementation of National Climate Change Policy (2014-2030) for integrating climate change concerns in other national and provincial sectoral policies.
iii. To serve as Secretariat for improved vertical coordination (federal to provincial), particularly, with the Provincial Climate Change Cells and federal Planning Commission, as a support to strengthen inter-ministerial decision making and coordination mechanisms on climate change and also liaison with international, regional and national institutions, including policy/think tanks, research organizations, NGOs, etc.,
iv. Support the Ministry of Climate Change for preparation and submission of obligatory reports to international forums by Pakistan i.e. United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol etc., of which Pakistan is a Party.

v. To support in development of national capacity for preparation of Biennial Update Reports (BUR), National Adaptation Plan(NAP), National Appropriate Mitigation Actions (NAMAs) Framework and the preparation of the Second National Communication to UNFCCC and other mandatory reports to international forums by Pakistan.

vi. To contribute for the integration of climate change development into the national development process, through strengthening of institutional linkages for cross-sectoral subject of climate change.

vii. Take lead in conducting regular events, including; Consultative Meetings and Awareness Raising Workshops effectively engaging relevant stakeholders and promote climate change agenda in Pakistan, as support to strengthen skills and capacity of institutions.

viii. To support in strengthening climate change diplomacy through supporting continuous dialogue and enhanced representation at international forums.

41. **Benefits on completion of project/ employment generation during and after completion of project**

i. Support in preparation and submission of obligatory reports to international forums regarding Climate Change/ GHG emissions, Mitigation and Adaptation, Technology Transfer, Climate Finance and Capacity Building,

ii. Establish and strengthen coordination and institutional linkages for Climate Change in Pakistan,

iii. Support implementation of intentional instruments, including Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs), etc.

iv. Support and Promote Research and development on climate change,

v. Knowledge/ data management with regards to climate change,

vi. Support in conduction of awareness raising/ sensitization events, publications and capacity building activities.

3) PAKISTAN HYDROMET & ECOSYSTEM RESTORATION SERVICES PROJECT

Name of Project:	**Pakistan Hydro met and Ecosystem Restoration Services Project (PHERSP) For 05 Years**
Sponsoring Agency:	• Ministry of Climate Change (MoCC) • World Bank

Source of Financing:	• The project is proposed to be financed by the Ministry of Climate Change from the World Bank. • Cost US$ 188 Million
Executing Agency:	National Disaster Risk Management Fund (NDRMF)
Location:	All the four Provinces, AJK and G-B

(i) During the 25th Session of Conference of Parties (COP25) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Madrid in December 2019, Ministry of Climate Change (MoCC) announced launching of an Eco-System Restoration Fund (ESRF) to support Eco-System Restoration Initiative.

(ii) This initiative will facilitate transition towards environmentally resilient Pakistan by mainstreaming adaptation and mitigation through ecologically targeted initiatives covering afforestation, biodiversity conservation, attaining land degradation neutrality to generate eco-system services and providing additional support to mitigation of Green House Gases (GHGs) in Pakistan.

(iii) ESRF is proposed to be housed within the National Disaster Risk Management Fund (NDMRF), MoCC to finance the projects and programmes under the ESRI. During the interaction with development partners, World Bank offered to support ESRF through funds available in its already approved project titled "Hydro met and DRM Services".

(iv) The project will develop, support and implement projects and programmes in the field of:-

- Promoting biodiversity and mitigating land degradation
- Protecting the marine environment from land- based activities
- Promoting a blue economy
- Overcoming deforestation and establishing a forest economy
- Preventing high intensity floods through improved flood water management – Recharge Pakistan Programme
- Promoting and establishing sustainable Blue Economy
- Promoting Ecologically Responsible Tourism in Protected Areas
- National Electric Vehicle Policy implementation

42. The Ministry of Climate Change has got approved the concept of the project from DDWP on 3rd March 2020. The project will be executed by NDMRF.

National Disaster Risk Management Fund (NDMRF).

43. The administrative control of NDRMF was taken from the Economic Affairs Division and handed over to the Ministry of Climate Change. The National Disaster Risk Management Fund is a government-owned, not-for-profit, non-bank intermediary funded primarily by the Asian Development Bank (USD 200 Million) and the Government of Pakistan (USD 25 Million) along with other donors. The Fund provides grants for subprojects, which contribute to enhanced resilience against extreme weather and geophysical hazards, and strengthen the government's ability to quickly respond to disasters triggered by natural hazards. The mandate of the NDRMF is to implement the National Disaster Management Plan (NDMP) and the National Flood Protection Plan (NFPP-IV).

44. Pakistan Climate Change Authority (PCCA), under Climate Change Act, 2017. The wing is the secretariat for CCA. Salient features of the authority are as follows:-

a) Pakistan Climate Change Authority was established through an Act of Parliament i.e. Pakistan Climate Change Act 2017.
b) To operationalize the Authority, the Ministry has been able to create 72 new positions through the Finance division.
c) Currently, the Ministry is in the process of finalizing Services Rules of the Authority in consultation with the Ministry of Finance, Law Division and Establishment Division.
d) The Ministry of Finance in principle has agreed to the terms and conditions from a financial point of view, whereas the Establishment Division has partially agreed to the draft services rules.
e) Currently, hiring the legal consultants for drafting and restructuring of the CCA is under process, which will likely to take place in September 2020.
f) Once the Services rules are approved / vetted from the relevant Ministries'/Division, the same will be notified. Accordingly, a recruitment process for the Climate Change Authority will be initiated.

Second National Communication (SNC)

45. As obligatory reporting requirements to the global Climate Change Convention, Pakistan has prepared and submitted its Second National Communication (SNC). The report contains efforts identified and undertaken by Pakistan in different thematic areas related to climate change. It also highlights vulnerabilities of the country and presents an inventory of the

emission sources and sinks. It also encompasses the aspects related to climate change research, technology, capacities/ awareness, besides other areas of climate change communications.

46. The SNC is an outcome of rigorous consultations and expert input by six Technical Working Groups, i.e., i) Greenhouse Gas Inventory, ii) Vulnerability & Adaptation Assessment, iii) Mitigation Analysis, iv) Environmentally Sound Technologies, v) Research & Systematic Observations and vi) Climate Change Education, Training, Information Sharing & Networking and Public Awareness.

47. The report reveals that the projected increase in temperature over Pakistan by the end of the 21st century would be around 1 degree Celsius higher than the expected global average. This means that Pakistan is amongst the most vulnerable countries in the world and climate change would further increase the risks, which it is projected to face.

48. The National Communication on Climate Change also presents that Pakistan is not significantly responsible for causing climate change, as its emissions stand at 406 million tones which is less than one percent of the global emissions. Besides this situation and being a responsible nation, Pakistan has committed to reduce 20 percent of its projected emissions for the year 2030, subject to provision of committed global support for this cause.

49. The process adopted for the preparation of national reporting under UNFCC relies on the existing research and analytical competence of nodal national institutions dealing with the various thematic areas of national communication. Institutional coordination and flow of information have been strengthened to make the reporting process more consistent and coherent. The Ministry of Climate Change has put an effective institutional structure in place to ensure the continuity of the national reporting process under the UN Framework Convention on Climate Change.

50. The preparation of the SNC also enhances general awareness and knowledge on climate change-related issues in Pakistan. It should seek to assist in the process of national planning and policy formulation, especially as it relates to mainstreaming vulnerability, and adaptation and mitigation measures within the work programme of the various stakeholder agencies. In addition, it contributed to the social and economic development of the country by reducing vulnerability associated with climate change and proposing options to do so in the sectors mentioned above.

51. Meanwhile, necessary resources for Pakistan's First Biennial Update Report have been secured and work has been started. The activity is supported by the Global Environment

Facility (GCF) through the United Nations Environment Programme. The objective of the project is to fulfil the decisions of COP 16 & 17, which require developing countries to submit biennial update reports (BURs) containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received.

52. The project components include national circumstances and institutional arrangements, GHG inventory by sources and removal by sinks, mitigation actions and their effects, constraints, gaps and related financial, technical and capacity needs, support received for preparation and submission of biennial update report and information on domestic MRV as well as any other information relevant to the achievement of the objective of the convention including information on gender and climate change.

53. In undertaking these activities it is envisaged that the country will firstly institutionalize various components of climate change, like GHG emissions. Secondly, it will help understand where the country contributes the most to GHG and lastly identify ways on how to reduce the emissions. In understanding this, the country will be in a better position to devise and implement appropriate measures to mitigate and adapt to climate change, including accessing finance and appropriate technology transfer in line with the national policy objectives and guiding principles.

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FORESTRY WING

STATUS OF FORESTS, WILDLIFE & BIODIVERSITY RESOURCES IN PAKISTAN

According to the latest National Forest Reference Emissions Level (FREL) findings, the country is maintaining 4.786 million-hectare (5.45%) area under forest cover. By forest type, dry temperate forests have the largest proportional coverage (36 %) followed by sub-tropical broadleaved shrub (19 %), moist temperate (15 %), chirr Pine (13 %), Riverine (4 %), irrigated plantation (4 %), thorn (3 %), mangrove (3 %) and subalpine forests (2 %).

Unfortunately, climatic conditions, rural poverty, dependence on the natural resources, meager forest cover and high rate of deforestation have rendered the country one of the most vulnerable to climate change effects. According to the Global Climate Risk Index 2020, developed by German Watch, Pakistan has been the 5th most affected country in the last two decades (1999-2018). The forests are under tremendous pressure owing to fuel wood and timber extraction. Such pressure has rendered most of the forests of poor and medium density in need of drastic restocking on war footing.

The overall improvement of the sector in the country will require continuous efforts through a number of initiatives under long term planning and programmes. Existing meager forest resources being crucial to environmental stability demand serious interventions supported with commitment for adequate financial flows to improve and enhance the overall forestry, wildlife and biodiversity sector.

MAJOR ACTIVITIES OF FORESTRY WING DURING 2019-20

1. Ten Billion Tree Tsunami Programme (TBTTP)

The implementation of the TBTTP was initiated in this financial year. The programme was approved by ECNEC on 29-08-2019 with the total cost of Rs. 125.1843 billion on cost sharing basis for four years (2019-2023). The Federal Government is making an allocation of Rs. 71.29 billion and Rs. 10.54386 billion to revive the forestry and wildlife resources of Pakistan respectively.

The main objective of the project is to facilitate transition towards environmentally resilient Pakistan by mainstreaming notions of adaptation and mitigation through ecologically targeted initiatives covering afforestation, biodiversity conservation and enabling policy environment. The Programme is also in line with the UN Development Agenda 2030 and Sustainable Development Goals (SDGs). The Programme is the replication of the

Billion Tree Tsunami Project (BTTAP) model, which was successfully implemented in Khyber Pakhtunkhwa during 2014-17. Like BTTA, TBTTP also adopted a widespread participatory afforestation approach through provincial and federating forestry departments across the country. All segments of society such as students, youth, and farmers are strongly encouraged to participate in the afforestation activities.

During the first phase of the programme (2019-2023), a total of 3.2 billion plants will be planted/regenerated in the country including AJK and GB in nine (9) different forest categories of forests. Besides, the programme also encompasses conservation/management plans to improve the number of wildlife habitats spread all over the country. Other salient features of the Programme include establishment of private youth and women nurseries, creation of urban dense forests, establishment of zoo-cum-botanical garden on 725 acres in Islamabad, and development of 7 modal national parks in the country.

In 2019-20, Rs. 7500.00 million were released from the federal PSDP whereas Rs. 3958.63 million were released from the provincial ADP. As reported by the provinces/territories, 430.5 million saplings were planted/regenerated and about 341 million saplings were raised in the nurseries. During the extraordinary circumstances created by the COVID-19, the provincial Forest and Wildlife Departments, AJK and GB provided about 80,000 green jobs during 2019-20 in the country thereby facilitating 'Green Stimulus'. Province-wise achievement details of 2019-20 are at **Annex I.**

2. Seasonal Tree Plantation Campaigns

The monsoon tree plantation campaign was inaugurated by the Prime Minister in a nation-wide "Plant for Pakistan Day" that was celebrated on 18th August 2019 to create awareness and ensure involvement of the general public. During this season, a total of 93.3 million saplings were planted/distributed throughout Pakistan by the provinces/territories.

Similarly, the spring tree plantation campaign was inaugurated by the Prime Minister in a nation-wide "Plant for Pakistan Day" that was celebrated on 23rd February, 2020. On this day, 1.219 million saplings were planted/distributed throughout the country. During the entire season, a total of 230.855 million saplings were planted/distributed by the provinces/territories throughout Pakistan. Province-wise details of saplings planted/regenerated and distributed during these tree plantation campaigns are presented at **Annex II.**

3. REDD+ Readiness & Preparation Project

'Reducing emissions from deforestation and forest degradation, conservation of existing forest carbon stocks, sustainable forest management and enhancement of forest carbon stocks' (REDD+) is a concept adopted by the countries under United Nations Framework convention on climate change (UNFCCC) in 2010. The concept relates to absorption of atmospheric carbon through forest resource. Due to accumulation of carbon in standing trees their financial value increases. Carbon stocked in forests is traded in carbon markets.

Ministry of Climate Change is implementing REDD+ Readiness Preparation Project with financial grant of USD 7.81 million received under the Forest Carbon Partnership Facility (FCPF) of the World Bank to the complete following four essential elements of the REDD+ in order to fulfill the requirements of accessing result-based payments under REDD+ mechanism.

i. Development of National REDD+ strategy and implementation framework
ii. National Forest Monitoring System
iii. Forests Reference Emission Levels and/or Forest Reference Levels
iv. Safeguards Information System

The project is under implementation for the period from 2015 to 2022. The progress made under the project is as under:

i. National Forest Reference Emissions Level (FREL), based on historical assessment of deforestation during the period 2004 to 2012, was prepared and submitted to UNFCCC on 6th January, 2020 for technical assessment by the panel of UNFCCC experts.
ii. Protocols have been developed for the National Forest Monitoring System (NFMS) and Monitoring, Reporting and Verification (MRV) system.
iii. Framework has been developed for Safeguards Information System (SIS) for REDD+ together with Strategic Environmental and Social Assessment, Environmental and Social Management and Feedback Grievance Redressal Mechanism.
iv. Draft National REDD+ Strategy has been prepared.
v. Design of Payment for Ecosystem Services (PES) has been completed for two ecosystems i.e. Mangroves and temperate forests.

4. National Biodiversity Strategy and Action Plan (NBSAP)

National Biodiversity Strategy and Action Plan (NBSAP) was prepared, submitted and approved by the Prime Minister of Pakistan in November, 2018. The action plan is widely disseminated and is under implementation with the provinces. Considering the mandate of Biodiversity Directorate and agreed actions in NBSAP, a multispecies Action Plan for raptor species is in preparation. A multi-stakeholder dialogue has resulted in a draft action plan. A similar effort for Invasive Alien Species is in process.

The Ministry of Climate Change in collaboration with the Ministry of National Food Security and Research (MNFSR) and CABI has initiated a consultative process for development of the National Action Plan for Invasive Alien Species (IAS). The consultation process will involve participation of diverse stakeholders to include the inputs from various ecosystems and habitats and across the sectors like fisheries, forestry, wildlife and agriculture.

National level consultative and capacity building project on Biosafety Clearing House is already endorsed and approved. This UNEP led process could not be initiated due to the Covid-19 outbreak. Preparation of the 4th National Report on implementation of Cartagena protocol was also accomplished during the year.

5. Finalization and submission of Sixth National Report to CBD

The Government of Pakistan is firmly committed to take necessary steps in fulfilling its obligations on the issues related to Conservation of Biological Diversity. All National Reports including the sixth National Report to the Convention on Biological Diversity (CBD) were prepared and submitted to CBD Secretariat to fulfill Pakistan's obligation as a Party to the CBD. Sixth National Report to Secretariat of Convention on Biological Diversity can be accessed at **https://www.cbd.int/doc/nr/nr-06/pk-nr-06-en.pdf**

The consultation process revealed that Pakistan's efforts towards implementation of the global biodiversity targets remained effective in terms of provision of domestic financial resources, biodiversity mainstreaming and related areas. Relatively slow progress was observed in sectors like protected areas coverage and species conservation. Some wild ungulate species, as well as large carnivores and endemic blind Indus dolphins have witnessed a steady improvement. So is the case of large carnivores and endemic blind Indus dolphin. Conversely, some other species like pangolin and species of least concern have experienced increased pressure due to natural and anthropogenic factors.

6. International Day of Biodiversity

The International Day for Biological Diversity was observed on 22nd May 2020 by the Biodiversity Directorate of Ministry of Climate Change in collaboration with IUCN-Pakistan and other stakeholders. Due to the Covid19 outbreak, the message was delivered mainly through social media and other means of communication.

ANNEX-I

DETAILS OF PLANTS PLANTED/REGENERATED UNDER TEN BILLION TREE TSUNAMI PROGRAMME (2019-20)

(Figures in Millions)

S. No.	Province/Territory	Plants Planted/Regenerated	Plants Raised in Nurseries
1	Khyber Pakhtunkhwa	167.000	190
2	Punjab	45.230	60.625
3	Sindh	28.515	9.986
4	Balochistan	2.489	13.025
5	AJK	79.082	67.197
6	Gilgit-Baltistan	4.000	0.6
TOTAL		**326.316**	**341.433**

ANNEX-II

TARGETS & ACHIEVEMENTS OF TREE PLANTATION CAMPAIGNS (2019-20)

(Plants in Millions)

Province/Territory	Monsoon-2019		Spring-2020		TOTAL	
	Target	**Ach.**	**Target**	**Ach.**	**Target**	**Ach.**
Punjab	9.00	10.50	131.0	86.71	140.00	97.21
Sindh	10.00	30.50	105.00	111.50	145.60	142.00
KP	80.00	71.00	79.318	96.00	159.318	167.00
Balochistan	0.90	0.75	11.90	1.75	12.8	2.50
AJK	4.124	12.00	21.25	57.087	25.374	29.087
GB	1.10	0.51	11.39	4.172	12.49	4.682
Others	0.50	0.50	--	--	0.50	0.50
TOTAL	**105.624**	**125.76**	**290.458**	**357.219**	**396.082**	**482.979**

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INTERNATIONAL COOPERATION (IC) WING

International Cooperation Wing of the Ministry of Climate Change has four sections/ units, which are responsible for performing a range of functions: -

1. Chemical Section is mandated to set ground for implementation of various chemical and waste related Conventions namely Basel, Stockholm, Minamata, Rotterdam Conventions, etc.
2. National Ozone Unit (NOU) was established in 1996 after the signing and ratification of the Vienna Convention and Montreal Protocol on the Substances that Deplete the Ozone Layer by Pakistan. The main objectives of NOU are to control import of Ozone Depleting Substances (ODS) and assist the local industry for phasing out the use of ODS through financial and technical support of the Multilateral Fund Secretariat (MLFS).
3. POPs project was established through the funding of Global Environment Fund (GEF) with the aim of reducing human health and environmental risks by enhancing management capacities and disposal of POPs in Pakistan.
4. The International Cooperation Section is responsible for coordination with international environmental agencies on environmental issues, signing and implantation of MOUs, and handling of matters related to GSP+. Moreover, it also represents Pakistan at international forums with respect to the signed Conventions and Protocols.

During the year 2019-20 all the aforementioned four sections/ projects have performed a number of functions, while keeping in view their main agenda items. Detail of the activities and achievements of IC Wing has been enunciated below: -

1. Chemical Section

The Chemical Section of IC Wing has performed the following tasks during year 2019-20:-

i. Involved in the legislation to Ban on (Manufacturing. Import, Sale, Purchase, Storage and Usage of) Polythene Bags Regulations, 2019. Under these Regulations, polythene bags have been banned in ICT w.e.f. 14th august, 2019. An SRO under the Pakistan Environmental Protection Act, 1997 has been issued on 22nd July, 2019.

ii. Developed Standard Operating Procedures (SOPs) for import of waste under Basel Convention.

iii. Submitted updated National Implementation Plan (NIP) of Stockholm Convention on Persistent Organic Pollutants (POPs) to Stockholm Convention Secretariat on 12th February, 2020.

2. National Ozone Unit

Introduction

Montreal Protocol on the Substances that Deplete the Ozone Layer was signed at Montreal, Canada, in 1987. Pakistan signed and ratified the Protocol in 1992. The National Ozone Unit was established under the devolved Ministry of Environment in 1996 to supervise and ensure implementation of the Protocol. The main objectives of the project are to:-

(i) Control import of Ozone Depleting Substances (ODS) under the provisions of Montreal Protocol.

(ii) Assist the local industry for phasing out the use of ODS through the implementing agencies (UNDP, UNIDO, UNEP and World Bank) with the financial and technical support of the Multilateral Fund Secretariat (MLFS).

Progress / Achievements

Major achievements during the year-2019-20 are as follows: -

(a) Implementation of the ODS Phase Out Projects:

Progress

a. IMPLEMENTATION OF THE ODS PHASE OUT PROJECTS:

i. Pakistan attended the 41st Meeting of the Open-Ended Working Group (OEWG) of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer from 01-05 July, 2019, at Bangkok, Thailand. It is pertinent to mention here that OEWG is the second highest forum of the Ozone Secretariat, which meets once a year to discuss and review the Ozone Depleting Substances related issues and reports of various Technical Option Committees working under the Ozone Secretariat. OEWG meeting also deliberates upon any proposals for adjustment or amendment to the Protocol.

ii. National Ozone Unit (NOU), Ministry of Climate Change (MoCC) Organized inter agency meetings with the UNEP's representative at Islamabad and Lahore from 05-09 August, 2019. Issues related to implementation of the HPMP-II (soft component) and

implementation of the enabling activity project for Kigali Amendment were discussed in detail and future course of actions were decided.

iii. NOU and MoCC organized an inception workshop on implementation of Kigali Amendment in Pakistan at Lahore on August 08, 2019. Enabling activity project was launched in the workshop and stakeholders from Karachi, Lahore and other cities participated in Pakistan. UNEP mission comprising Ms. Liazzat Rabbiosi, Programme Officer and Mr. Andrea Ossi Pretta also participated in this workshop and shared the regional practices and approach toward enabling activities of the Kigali Amendment.

iv. Seminar on International Ozone Day was organized on the 16th September, 2019 at MovenPick Hotel, Karachi. People from different segments of life participated in the seminar. Public was briefed through presentations and speeches about the benefits of using ozone friendly technology and work undertaken by Pakistan for the protection of the Ozone Layer. The seminar was chaired by Dr. Sarosh Hashmat Lodi, the Vice-Chancellor NED University of Engineering & Technology, Karachi. The experts from industries gave presentations on topics relevant to the theme of WOD 2019 with a focus on energy efficiency, Cold chain supply and new refrigerants being introduced in the refrigeration and air conditioning sector.

v. A special newspaper supplement was published in different national dailies on the eve of International Ozone Day-2019 to create awareness among the general public about the protection of the ozone layer. The articles in newspaper supplement remained focused on Kigali Amendment and energy efficiency.

vi. Awareness messages were released on electronic media, which was supplemented by a live program on national radio network. During the program live calls were also entertained and questions were answered.

vii. National Ozone Unit aired the special ozone awareness videos on National Television Channel for the whole Ozone Day on September 16, 2019.

viii. National Ozone Officer (NOO) from Pakistan participated in the radio programme specially designed on the theme of WOD – 2019 and Ozone Layer Protection by the parties. NOO informed the listeners about the role played by Pakistan in ozone layer protection and the milestones achieved by Pakistan.

ix. The highlight of the main World Ozone Day event was the "Global Montreal Protocol Award for Customs and Enforcement Officers" award presentation ceremony to the two officers of Pakistan Customs. This initiative was widely acknowledged by the senior officers of Pakistan Customs and would deter the illegal trade of HCFCs. The awards were presented to Dr. Rahmatullah Vistro, Additional Collector, Pakistan Customs and Mr. Muhammad Asim Awan, Deputy Collector, Pakistan Customs.

x. Thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer was organized in Rome, Ital from 04 -08 November, 2019. Meeting of the Parties (MoP) to the Montreal Protocol is the highest body of the Ozone Secretariat, which meets once a year to make important policy decisions on different ozone related issues. Ms. Zartaj Gul Wazir, Minister of State for Climate Change and Mr. Hammad Shamimi, Sr. Joint Secretary (IC)/NPD (NOU) represented Pakistan.

xi. Assessed the HCFC importers warehousing facility and directed them to maintain their warehouses meant for HCFC storage as per the MSDS.

xii. For smooth implementation of the HCFC phase out programme the industrial/ commercial importers data for HCFCs import was monitored on a monthly basis during the reporting period. National Ozone Unit updates the HCFCs importers regarding the latest requirements of the ODSs storage and maintenance.

xiii. Issued and monitored HCFCs import quota for the year 2020.

xiv. HCFC Quota was issued to the eligible importers of HCFCs on 02nd March, 2020 by taking all the stakeholders on board.

xv. Celebrated World Environment Day on 05th June, 2020. The day was celebrated through a social media campaign due to COVID-19 issues.

xvi. Celebrated World Refrigeration Day on 26th June, 2020. The day was celebrated through webinars and awareness campaigns.

b. ENFORCEMENT OF POLICY / REGULATORY MEASURES:

a. Advertisement for inviting quota requests was published on 03rd January, 2020. Applications received for the quota were minutely examined in a fully transparent way. Quota for 2020 was issued on March 02nd, 2020. The criteria of the Montreal Protocol were followed as per the commitment and practice.

b. In order to phase out the ODSs from the thermoware, PU sandwich panel and air conditioning industries NOU along with relevant implementing agencies is implementing HPMP Stage-II. After that, the remaining industries in Air Conditioning and spray foam would be phased out for which a funding request has been approved by MLFS to prepare and submit the HPMP stage III for Pakistan for the period 2021-2030.

c. To review the implementation of HCFCs quota the NOU organized quarterly review meetings with importers at Karachi and Lahore.

d. NOU improved its presence in field by visiting warehousing of all quota holders and bringing significant improvements

e. Collected, analyzed and submitted Data for Article 7 Report and Country Programme Reports for 2019 well on time to ensure compliance status of Pakistan.

f. To Check the compliance, data was collected from both available sources i.e. FBR and importers. Data provided by the FBR and importers was examined in detail for the illegal / excess status clearance and accordingly the details were submitted to the NPD.

g. Effective compliance of ODS phase out has been ensured and 50% reduction targets of the HCFC phase out on 1st January 2020 has been met and accordingly indicated in HCFC quota 2020. This achievement is over and above the general phase-out target set under Montreal Protocol.

h. Organized training programme for Refrigeration and Air Conditioning (RAC) technicians in different areas of Pakistan and trained 220 technicians from 01st July, 2019 to 30th June 2020. All these technicians were trained by Master trainers.

i. 84th Ex. Com meeting of the MLF held in December 2019 approved the project for the conversion of Symbol Industries from the use of HCFC-142b/HCFC-22 to HFC/CO2/DME in the manufacture of extruded polystyrene (XPS) from boards in the amount of US$ 619,938, plus agency support costs of US$ 43,396 for UNIDO.

- 85th Ex. Com meeting of the MLF held in May 2020 approved the project preparation funding amounting to US$ 150,000/- for HPMP stage III for Pakistan (2021-2030). This project will be implemented by UNIDO and UNEP as implementing agencies.

3. Persistent Organic Pollutants (POPS)

Persistent Organic Pollutants (POPs) are highly toxic chemicals considered as global threat to Human Health and environment. The Stockholm Convention on POPs was ratified by Pakistan in 2008. Global Environment Facility (GEF) sponsored project titled "Comprehensive reduction and elimination of Persistent Organic Pollutants (POPs) in Pakistan" executed by UNDP Pakistan through National Implementation Modality (NIM) involving Ministry of Climate Change (MoCC) as implementing partner was started in 2015. This Project was planned to be completed in 5 years i.e. till March 2020 but received an extension till December 2020 due to satisfactory performance in the last two years. This project aims to reduce risks from POPs on human health and environment by enhancing management capacities and disposal of POPs in Pakistan through:

i. Development and implementation of a regulatory, policy and enforcement system to reduce POPs releases and to regulate POPs waste disposal;
ii. Capacity building to reduce exposure to and releases of POPs;
iii. Collection, transport and disposal of 300MT of PCB and 1200MT of POPS Pesticides;

The main achievements during 2019-2020 around these components are:

- The development of legislation on POPs is being done through development of POPs Rules under Pakistan Environmental Protection Act (PEPA) at federal level. The draft amendments are currently being amended after receiving inputs/suggestions from all the stakeholders. The draft Regulations on POPs at provincial level has also been shared with all the provincial EPAs for their feedback and approval.
- The project worked on development of a standard training manual on POPs pesticides and PCBs. On-site training of trainers based on the same manual in all major cities of Pakistan was completed utilizing the co-financing and in-kind support of government departments for the logistics. The project is working on POPs legislation enforcement mechanism and policy framework in consultation with all the stakeholders.
- The project has installed Gas Chromatography – Mass Spectrometer in Environmental Protection Agencies of all the provinces. The project has also delivered consumables and glassware to all EPAs. The EPAs staff has been trained to perform POPs samples analysis, this would ultimately support the project target to upgrade POPs inventory at national level to enhance the capacity of public sector on POPs exposure and control.
- The Project has completed its end level target of 5000 PCBs sample analyses. Out of 5000 oil samples taken from transformers in all provinces, 81 were found highly contaminated. For this, PMU has requested energy sector through the Ministry of Energy (Power division) for safe collection and disposal of PCBs oil. By doing this, the target of destroying 300 MT of PCBs would be achieved.
- 13 on-site training on Best management practices for POPs were conducted all over Pakistan. These trainings were planned for mid/lower management of government departments (Environment Protection, Health, Customs, Energy, Agriculture and Plant Protection) including operators/workers from different industries (textile, iron and steel, ship-breaking, plastic) and farmer communities on Best management practices (BMPs), Best available technologies (BAT) / Best Environment practices (BEP) for POPs. A total 610 participants benefited from these trainings out of which 52 were females.
- The project is also working on transportation and disposal of remaining stockpiles of POPs Pesticides i.e. 286 MT of POPs Pesticides to be destroyed through high temperature incineration. Out of which 247MT of PoPs pesticides have been disposed-off until now.
- The project had engaged three international experts to work in coordination with all relevant stakeholders to meet the remaining targets for: 1) Adoption and implementation of national technical guidelines on POPs management along with POPs rules in Pakistan, 2) PCBs management plan to control and regulate all PCBs Holders in the country for the elimination and phasing out of PCBs. 3) Feasibility and procurement of PCBs treatment

technology to facilitate the power companies for on-site treatment of PCBs contaminated oil.

- The National Technical guidelines and the National PCBs Management Plan have been shared with all the relevant stakeholders. The outcome of the feasibility report suggested that PCBs free oil to be procured for replacement of PCBs contaminated oil instead of procuring the PCBs treatment technology amidst the Covid-19 situation. The project has initiated the procurement of PCB free oil for the energy sector and collection of PCBs contaminated oil shall be destroyed through co-incineration.

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DEVELOPMENT WING

The role and function of the Development Wing and project-wise activities during the year under reference are as under: -

Functions/Task Assigned:

Development Wing of the Ministry is responsible for following functions/tasks assigned and achievements: -

a. Coordination with regards to the Public Sector Development Programme (PSDP) of Ministry.

b. Examination/preparation of briefs for CDWP/ECNEC/NEC meetings.

c. Representation of the Ministry in quarterly review of Federal PSDP projects held in Planning, Development & Special Initiative Division.

d. Coordination with respective F. A's Organization on PC-Is placed before CDWP & ECNEC meetings.

e. PSDP releases for development projects of Ministry.

f. Administrative control of Pakistan Environmental Protection Agency (Pak-EPA), an attached department of the Ministry.

g. Administrative control of Global Change Impact Studies Centre (GCISC), A Body Corporate established under the GCISC Act 2013

h. The Wing handles normal parliamentary business on behalf of the Ministry through Section Officer (Council & Coord)

i. The Wing handles normal Audit & Finance business on behalf of the Ministry through Section Officer (F&A)

Project-wise activities during the year under reference are as follows: -

1. **PSDP Project Titled "Sustainable Land Management to Combat Desertification in Pakistan (SLMP-II)"**

SLMP-II project was approved by the CDWP in March 2015 at a total cost of Rs. 1666.695 million. The project started its operation from September, 2015. This project is an up-scaling phase of the SLMP pilot phase project to be implemented in 14 dry land districts in 4 provinces. It will assist the Government of Pakistan to achieve the long-term goal – "to combat land degradation and desertification in Pakistan" with the primary objective - "To promote sustainable management of land and natural resources in the arid and semi-arid regions of Pakistan in order to restore degraded ecosystems and their essential services, reduce poverty, and increase resilience to climate change". The project will depend on the strong commitment of the provincial and

Federal Governments of Pakistan and the involvement of key stakeholders, in particular those at the community level. The project will deliver three outcomes: Outcome 1: Strong enabling environment at national and provincial levels supports up-scaling of SLM practices; Outcome 2: Effective, targeted and adaptive implementation of SLM Land Use Planning & Decision Support System; Outcome 3: On-the-ground implementation of climate-resilient SLM activities is up-scaled across landscapes. The project will result in successful application of SLM over an area of 800,000 ha in 14 districts covering more than 200 villages. The integrated activities will be performed in agriculture, forest, irrigation, livestock, rangelands and soil conservation / stabilization sectors.

Project Districts:

Districts in Phase-II	
Punjab:	Chakwal, Bhakkar, Khushab, Layyah
Sindh:	Tharparkar, Umerkot, Sanghar
KPK:	D.I. Khan, Lakki Marwat
Balochistan:	Pishin, KillaSaifullah,Mastung, Kech, Lasbela

Detail of Project fund's donors is given below: (Rs. In Millions)

GEF---UNDP	588.412
Government of Pakistan (Federal PSDP)	105.43
Government of Punjab (ADP)	191.214
Government of Sindh(ADP)	200.4
Government of KPK(ADP)	141.809
Govt. of Balochistan(ADP)	200.00
Community share (in kind)	239.430
G.Total	1666.695

Allocation and Expenditure FY- 2019-20 (Rs. In Millions)

Total PC-I Allocation	**Allocation (2019-20)**	**Surrender (2019-20)**	**Expenditure (2019-20)**
105.43	25.00	3.118	21.097

Major Achievements / work done (2019-20)

S.No	Activities	UoM	Quantity
1	Dryl and afforestation (silvopastures)	Acres	65
2	Energy plantations	Acres	49
3	Farm-based livelihood activities for women	Nos.	7
4	Farmer nurseries (including home-based nurseries)	Nos.	3
5	Farmland water spill-ways	Nos.	8
6	Fruit orchards with pipe irrigation system (water storage and peter engine)	Nos.	11
7	Gated structures on gandis	Nos.	3
8	Inlet structures on farm level	Nos.	20
9	Spurs and retaining walls	Nos.	7
10	Raising Wood Lots	Acres	40

2. Establishment of Geomatic Centre for Climate Change and Sustainable Development

The Geomatic Center for Climate Change and Sustainable Development project in Pakistan Environmental Protection Agency Islamabad is one of the ventures under the Ministry of Climate Change which encourages application of Satellite Remote Sensing (SRS), Geographical Information System (GIS) and Geographical Positioning System (GPS) technologies in environmental monitoring and decision-making. The Geomatic project established mapping sciences, geographic information systems, environmental visualization, geodesy, photogrammetry, remote sensing and surveying.

The Geomatic Centre project developed the inventory and monitoring of natural resources such as glaciers and snow fields, water, forests, biodiversity, deserts, agricultural practices and rangeland, etc. The Centre upgraded the institutional capacity of Pak-EPA, Ministry of Climate Change in the use of SRS, GIS and GPS for environmental monitoring and management.

It facilitated the Federal and provincial governments in disaster risk reduction through vulnerability mapping, information clearing house mechanism and training to use the latest available technologies for risk assessment from various forms of hazards.

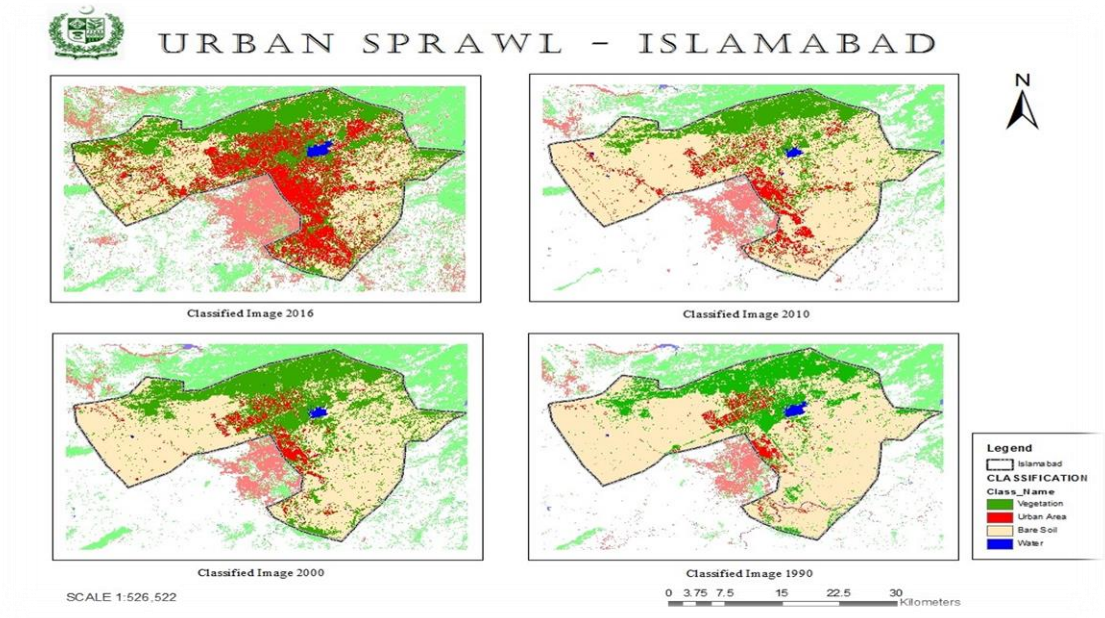
Activities Completed By-June 2020

- Completion and launching of GIS web application on server.
- Preparation and release of Annual National Environmental Report 2018-19.
- Capacity building in GIS / RS of other Government institutes through training.
- Development of Land use / land cover mapping of forest areas of Khyber Pakhtunkhwa and Mapping and identification of potential areas for plantation in Khyber Pakhtunkhwa.

Overall progress of Geomatic project

The centre hired skilled experts and supporting staff in project and made it functional, and established a well-equipped centre of geospatial technologies for environmental monitoring in Pakistan. The Geomatic project established a spatial and thematic database on various environmental issues such as natural resources, natural and anthropogenic hazards, and pollution levels.

- Digital Environmental Atlas of Islamabad indicating resource monitoring of capital city.
- Glacier Monitoring of Pakistan using GIS& RS. Drought Index Mapping of Pakistan.
- Setup of IT infrastructure for GIS-web based application.
- Prepared and launched the National Environment report of the country.



Awareness raising session on Ban on plastic in Islamabad in Roots millennium school F-7 Campus Islamabad

The Geomatic Centre and Pakistan Environmental Protection Agency, has organized an event on "Awareness raising session on ban of plastic bags in Islamabad" at Roots millennium school F-7 Islamabad to spread environmental awareness on hazardous effects of plastic pollution and on ban of use of plastic bags among the children and people.

3. **Project Titled: Establishment of Pakistan WASH Strategic Planning and Coordination Cell (Facilitating Achievement of SDG 6.1 and 6.2)**

Sectorial Overview:

The UN Member States have principally agreed on the Post 2015 development agenda called the Sustainable Development Goals (SDGs). SDG 6.1 and 6.2 are directly related to WASH sector (water and sanitation) which are required to be met within the stipulated time frame as per laid down targets.

Ministry of Climate Change is mandated for WASH sector coordination at the federal level alongside with the responsibility of reporting progress and sustaining stakeholder dialogue including all federating units as well as international development partners. Necessitating establishment of a strategic planning and coordination unit. The present project aims to support establishment of such a unit at the federal level in Ministry of Climate Change. Once established, this Unit is expected to receive technical and material support from international development partners including UNICEF and The World Bank. Establishment of this Unit will facilitate a fast-track progress towards achievement of SDG 6.1 and 6.2 for following specific outputs:

1) Putting in place an effective coordination mechanism at national level involving all federating units and relevant development partners for developing harmonization, integration and synergies among key WASH stakeholders on in WASH sector.

2) Promoting knowledge management, donor support, M&E, and periodic reporting mechanisms for SDGs 6.1 and 6.2 through close liaison with all federating units

3) Nurturing cross-sectoral linkages with other sectors (academia, private sector, CSOs working on themes of health, education, nutrition, DRM etc.) for putting in place a holistic approach for deepening and sustaining WASH sector reforms.

Under the project, in-house capacity of Ministry of Climate Change will be augmented to enable it perform its mandate in line with Federal Government's international commitments (including SWA,HLM, SACOSAN, SDGs attainment) in a technically sound manner, underscored by political consensus building and stakeholder collaboration. The Unit will also re-position Ministry of Climate Change to fully benefit from emerging national, regional and international deliberations and opportunities for augmenting and complimenting efforts of federating units for a robust institutional response to key WASH sector challenges in Pakistan. The Unit will also serve as a federal level nerve center and jointly owned institutional platform for ensuring smooth collaboration and sustaining meaningful dialogue involving federal/provincial governments, civil society, private sector, academia and international development partners having stakes in WASH sector in Pakistan.

- **Allocation for the year 2019-2020:**

1.	**Approved Cost**	40.00 million (Local)	
2.	**Revised Cost:**	41.136 million (Local)	
3.	**Allocation 2019-2020**	**Allocation (Local)**	**Expenditure**
		Rs. 16.00 million	Rs. 2.306 million

Major activities performed during 2019-2020:

Establishment of WASH Cell under Ministry of Climate Change:

- Establishment of WASH cell with complete project staff under ministry of Climate Change.
- Developed TORs relating to WASH Coordination Committee and notified it.
- Drafted the WASH policy review working paper
- Baseline and Targets for SDG 6.1 and 6.2 were established and published in the Economic Survey of Pakistan 2019-20. The Strategic Unit of the MoCC on Water, Sanitation and Hygiene (WASH) in collaboration with key stakeholders and relevant provincial departments are rolling out the agenda of SDGs related to safe water and sanitation services.
- **WASH in Healthcare Facilities:** Gap analysis is under process with the Pakistan Bureau of Statistics and WHO.
- **Launched Clean Green Pakistan Index on 25th November, 2019:** The objective of the CGPI is to develop a national campaign to score the performance of various cities on five components relating to tree plantation, solid waste management, liquid waste management, total sanitation/hygiene, and safe drinking water. The CGPI index will

promote cleanliness and environmentally friendly practices, ensure citizen participation, empower local councils and create a healthy competitive environment among the cities for sustainable clean and green Pakistan. Twenty (20) selected cities in the two provinces (13 in Punjab and 07 in Khyber Pakhtunkhwa) have been ranked in terms of cleanliness and greenery standards.

- **Clean Green Cities Index:** Twenty (20) selected cities in the two provinces (13 in Punjab and 07 in Khyber Pakhtunkhwa) have been ranked in terms of cleanliness and greenery standards and Cities Index report finalized in June, 2020.

4. Project Titled: Climate Resilient Urban Human Settlements Unit.

Sectorial Overview:

Background

To ensure harmonized urban development at national level, and to fulfil relevant international commitments of the Federal Government, a dedicated mechanism to coordinate provincial urban settlements policies has been established in MoCC with the cost of Rs. 59.288 million. It will facilitate in translating and linking the provincial and local urban interventions with national scenarios after the 18thAmendment, and to accordingly synthesize efforts being made to counter the hard impact of unplanned and messy urbanization in the context of demography, economics, socio-cultural and political arena. As per the rules of business and since the inception of UN-Habitat (UN Human Settlements Program) in 1971, the MoCC has also been acting as Focal Point for implementing the Habitat Agenda and Millennium Development Goal Target (7-d) to improve the lives of slum dwellers and in representing the Pakistan Government at UN-Habitat Governing Council. Therefore, to coordinate the Government of Pakistan's efforts regarding the environmentally sustainable urban development and human settlements at federal level, and to establish a ministerial-level mechanism to regularly report the sectorial progress & accomplishments, the present project aims to establish a "Climate Resilient Urban Human Settlements Unit".

Climate Resilient Urban Human Settlements Unit (PSDP Project)

- To plan and implement the harmonized Action Plans for developing "Climate Resilient safe & Sustainable Cities", in collaboration with the Pakistan Urban Planning & Policy Center at Ministry of Planning, Development& Reforms (PD&R), along with the UN-Habitat (Pakistan), all Provincial Urban Units; and the Line Departments of P&D, Local

Governments, and the Housing & Urban Development of the Governments of Gilgit & Baltistan and the AJK.

- To facilitate provincial urban units in launching community-motivated urbanization initiatives and in implementing urban projects; to facilitate their access to external funding with development partners and set aside international funds for adopting actions in developing Climate Resilient cities like the adaptation fund; Global Environment Facility and Green Climate Fund in addition to the increased Government's budgetary allocation.
- To assist Pakistan Urban P&P Centre in Ministry of PD&R; in implementing Pakistan Vision 2025 strategic initiatives for transforming all urban human settlements into economic growth hubs and eco-friendly sustainable cities through improved governance, effective urban planning, efficient mobility infrastructure, better security & community participation in collaboration with city governments.
- To develop and strengthen the capacity of city administrations to assess the emission targets and adopt low-carbon energy-efficient comprehensive Action Plans to convert their urban-heat islands into "Climate Resilient Cities", towards fulfilling international commitments of the federal government through the focal Ministry of Climate Change.
- To strengthen the city governments' capacity in engaging the line departments and agencies and also the non-state actors to effectively meet the urban development challenges throughout Pakistan, as per the international obligations of Federal Government to meet the UNEP; UNFCCC & UN-Habitat targets under Rio+20 Declaration; New Urban Agenda; and SDGs.
- To strengthen institutional capacity of Provincial Urban Units; GB & AJK by augmenting their technical-knowledge & integrating their working mechanism to streamline future urbanization throughout Pakistan; thus enabling them to develop people-centered "Cities for Life", through efficient service-delivery based on information from an integrated Web-Net Databank of all human settlements scenario including the SDGs (i.e. rural-urban migration and demographics; urban poverty & land-use, GHG emissions & temperatures; informal slums, etc.).
- Allocation for the year 2019-20

1.	**Approved Cost**	56.825 million (Local)	
2.	**Revised Cost:**	59.288 million (Local)	
3.	**Allocation 2019-20**	**Allocation (Local)**	**Expenditure**
		20.00million	1.905 million

Major Activities Performed during 2019-20

Establishment of CRUHS Unit under Ministry of Climate Change:

- Establishment of CRUHS Unit with complete project staff under the Ministry of Climate Change.
- Developed Post COVID-19 response of MoCC and aligned it with urbanization.
- Developed links with SDGs, and NDCs, and UN-Habitat for better coordination.
- Activity of development of web portal & data banks at 7 hubs for which requirement-gathering exercise is under process. In this regard, provinces are being contacted for needs assessment.
- Identified research development and demonstration program to make the cities climate resilient.
- Identified program for storm water management and averting urban flooding.
- Identified climate resilient low-cost housing program.
- Identified urban ecology upgradation program.
- Collected data for administrative boundaries of Pakistan.

5. Project Title: "Establishment of Climate Change Reporting Unit"

The major objective of this project is to "enhance institutional capacity of the Ministry of Climate Change, through developing a Climate Change Reporting Unit". This would enable the Federal Government/ Ministry of Climate Change (MoCC) on reporting with regards to Climate Change (and other allied subjects), as obligatory under international commitments, particularly the United Nations Framework Convention on Climate Change.

The specific objectives of the proposed project are as follows:

i. To enhance institutional capacity at MoCC for strengthened coordination of MoCC with federal government (allied Ministries) and provincial governments, NGOs and research institutions, for accessing, compiling, reviewing and consolidating relevant data/information with regards to climate change.
ii. To serve as a Secretariat for supporting implementation of 'National Climate Change Policy' and 'Framework for Implementation of National Climate Change Policy (2014-2030) for integrating climate change concerns in other national and provincial sectoral policies.
iii. To serve as Secretariat for improved vertical coordination (federal to provincial), particularly, with the Provincial Climate Change Cells and federal Planning

Commission, as a support to strengthen inter-ministerial decision making and coordination mechanisms on climate change and also liaison with international, regional and national institutions, including policy/think tanks, research organizations, NGOs, etc.,

iv. Support the Ministry of Climate Change for preparation and submission of obligatory reports to international forums by Pakistan i.e., United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol etc., of which Pakistan is a Party.

v. To support in developing national capacity to prepare Biennial Update Reports (BUR), National Adaptation Plan (NAP), National Appropriate Mitigation Actions (NAMAs) Framework and the preparation of the Second National Communication to UNFCCC and other mandatory reports to international forums by Pakistan.

vi. To contribute to the integration of climate change development into national development process, through strengthening of institutional linkages for cross-sectoral subject of climate change.

vii. Take lead in conducting regular events, including; Consultative Meetings and Awareness Raising Workshops effectively engaging relevant stakeholders and promote climate change agenda in Pakistan, as support to strengthen skills and capacity of institutions.

viii. To support in strengthening climate change diplomacy through supporting continuous dialogue and enhanced representation at international forums.

Benefits on completion of project/ employment generation during and after completion of project

i. Support in preparation and submission of obligatory reports to international forums regarding Climate Change/ GHG emissions, Mitigation and Adaptation, Technology Transfer, Climate Finance and Capacity Building,

ii. Establish and strengthen coordination and institutional linkages for Climate Change in Pakistan,

iii. Support implementation of intentional instruments, including Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs), etc.

iv. Support and Promote Research and development on climate change,

v. Knowledge / data management with regards to climate change,

vi. Support in conduction of awareness raising / sensitization events, publications and capacity building activities.

6. Project titled "TEN BILLION TREE TSUNAMI PROGRAMME 2019-20 (Up to June, 2020)"

Summary of National Achievements

- Federal Govt. launched TBTTP on 2nd September 2018. The project was approved by ECNEC on 29th August, 2019.
- The PSDP amount released to all the four Provinces, AJK & GB in first FY 2019-20 was **Rs. 7.500 billion**.
- Foreign grant funding through GEF projects of **US$ 14.01 million** and **US$ 43.000 million** from the World Bank have been aligned with TBTTP objectives to bridge finance shortages under the PSDP allocation of FY 2019-21.
- Hiring of 164 staff members has been completed. The staff will be stationed throughout Pakistan for Monitoring and Evaluation of the TBTTP activities.
- Saving of Rs. 55.000 million from public funds in respect of procurement for TBTTP as per approved PC-1.
- 06 new projects initiatives have been designed under TBTTP.
- Only 03 project employees were available in the first FY 2019-2020 and JS (A) looked after the work of NPD.
- Increment of area of PAs by 1.4% since launch of Ten Billion Tree Tsunami Programme.
- Approx. 5500 more green jobs to be generated through PA initiative under Ten Billion Tree Tsunami Programme.
- During the uncertain circumstances created by COVID-19 pandemic, the Forest and Wildlife Departments provided green jobs to **83,224** daily wagers.
- **280 million** plants were planted / regenerated.
- **312 million** plant seedlings were raised in nurseries.
- **1.3** million Fruit plants were distributed in KP, GB and AJK. Major species are apple, walnut, apricot, cherry, orange, guava etc.

(Figure in Million)

Province/ Territory	Plants planted/ Regenerated	No. of plants raised in nurseries		Funds Released (Rs. In million)		No. of Daily Wagers	
	Number	Acreage (Acres)		PSDP	ADP	Total	
Khyber Pakhtunkhwa	140	0.25	190	2139.451	1665.473	3804.924	19353
Punjab	40.9	0.0448	40	2150.966	1899.931	4050.897	21000
Sindh	28.5	0.031	9.9	480.331	441.563	921.894	6500
Balochistan	1.9		9.8	703.673	200	903.673	17600
AJK	64.536	0.088	62.27	1292.807	--	1292.807	11871
Gilgit-Baltistan	4.0	0.003	--	545.691	--	545.691	6900
NSSU/ZSP	--	--	--	187.082		187.082	
Total	**280.00**	**0.416**	**312.00**	**7500.00**	**4206.967**	**11706.97**	**83224**

Special Initiatives

- Green Stimulus was launched for improvement of National Parks and Afforestation activities in the country with an estimated funding of US$ 42 million through NDRNF.
- Landscape improvement of Islamabad shall be initiated with an estimated cost of Rs. 1.2 billion.
- Improvement of seven national parks shall be initiated with an estimated cost of Rs. 3.8 billion.
- Feasibility to establish a botanical garden on 725 Acres shall be completed.

Achievements of Provinces/Territories

1. **Khyber Pakhtunkhwa**

A. TBTTP

- Against the planting target of **100 million** plants, **140 million** plants were planted/regenerated.
- **190 million** plants have been raised in the nurseries; 447 private nursery units were engaged whereas **668 ha** of bedded nurseries were developed.
- Total number of daily wagers engaged is **19,353.**

B. BTAP

- During implementation of BTAP (2014-15 to 2019-20), **1.2** billion plants were planted/regenerated against the target of 1.00 billion over an area 593,292 ha.
- Tree cover increased on 6.3 % of the total land of KP
- 180 million seedlings on 577 ha were raised.
- 332 million seedling on 13,260 private nursery units were raised.

2. Punjab

- **41**million plants have been planted.
- Total number of daily wagers engaged is **21000**.
- **0.65**million plants were planted over an area of **500** acres at Baloki Head works area.
- Preparation of Management Plan to improve Namal Lake is being done by WWF-Pakistan

3. Sindh

- **38** million plants have been planted.
- **10** million plants have been raised in the nurseries.
- **9.8** million Plants over an area of **22,500** acres have been planted in mangrove forests; and large planting activity on a single location was **10,000** acres in Raeesan Waro creek near Shah Bandar.
- **15** million plants over an area of **4300** acres were planted in Riverine forests.
- **1.2** million plants were planted over an area of **1,050** acres along Lyari River in Karachi.
- Total number of daily wagers engaged is **6,500.**

4. Balochistan

- **2.6** million plants have been planted.
- **13** million plants have been raised in the nurseries.
- **0.8** million plants have been planted in mangrove forests at Gwadar and Lasbela.
- **1,000** acres of cluster plantation in various districts have been achieved.
- Total number of daily wagers engaged is **4,500.**

- With respect to urban forestry activities, **180** Av. Km at Divisional Headquarter have been achieved.

5. Azad Jammu & Kashmir

- **64** million plants have been planted/regenerated; major planting activity on 380 Acres was carried out at Saloon Nakyal.
- **62** million seedlings have been raised in the nurseries.
- **0.3** million fruit plants have been distributed/ planted.
- 85 Nos. (5.9 million Plants) of Community nurseries were developed whereas 11 Nos. (1.6 million Plants) of women nurseries were developed.
- Total number of daily wagers engaged is **4500**.
- With respect to urban forestry activities, 180 Av. Km at Divisional Headquarter have been achieved.

6. Gilgit-Baltistan

- 4 million plants over an area of **3300** acres have been planted/ regenerated.
- 60 Nos. of private forest nurseries of 5 Kanals each have been established.
- 0.8 million fruit plants including other species have been distributed through the Agriculture Department.
- 0.9 million plant shoot cuttings have been distributed through AKRSP.
- Total number of daily wagers engaged is 6900.

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ATTACHED DEPARTMENTS AND AUTONOMOUS BODIES

I. PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (PAK-EPA)

Pakistan Environmental Protection Agency has been created under Pakistan Environmental Protection Act 1997 and is mandated for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto.

In order to efficiently carry out its mandated duties, Pak-EPA is organized into the following:

1) Directorate of Laboratory/National Environmental Quality Standards (Lab/NEQS)
2) Polythene Bags Regulations, 2019
3) Hospital waste management
4) Directorate of Environmental Impact Assessment/Monitoring (EIA/Monitoring)
5) Directorate of Administration/Legal/Enforcement (Admn/Legal)
6) National Biosafety Centre
7) Geomatic Project

During 2019-20, the following major activities were undertaken by different directorates and wings of Pak-EPA:

1. Directorate of Lab/NEQS

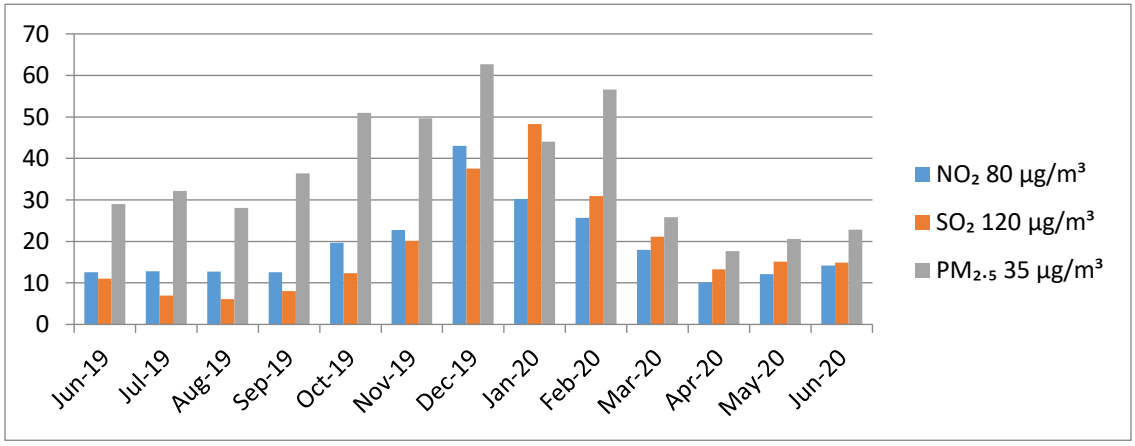
During 2019-20, the following major activities were undertaken by Lab/NEQS directorate:

a) Air quality monitoring
b) Air Quality Control & Prevention of Air Pollution
c) Air Pollution level In Islamabad after COVID 19
d) Water Quality Monitoring & Control
e) Drinking water quality control
f) Municipal and industrial Waste-Water Quality & Control
g) Internships and research work in EPA
h) GC-MS Addition in EPA analytical Lab

a. Air Quality Monitoring

Air quality monitoring is the first and foremost step in regulating air quality and preventing air pollution. For this matter, Pak-EPA has established an active and reliable monitoring system to routinely monitor important parameters of air quality and urban pollution that are defined in the National Environmental Quality Standards (NEQS). Through its fixed monitoring station located in H-8, Islamabad, Pak-EPA measures the following air pollutants in ambient air: nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), carbon dioxide (CO_2) and particulate matter ($PM_{2.5}$ and PM_{10}), which are air pollutants smaller than 2.5 and 10 micrometers, respectively . The main sources of SO_2 are power plants. NO_2 comes from the burning of fossil fuels (like gasoline). The main sources of NO_2 are cars and trucks. Sources of Particulate Matter ($PM_{2.5}$ and PM_{10}) include coal/dust, combustion, dust, pollen and organic matters. Data on these is gathered and analyzed on a 24-hour basis, and is disseminated to the public through Pak-EPA website (wwww.environment.gov.pk) and official social media accounts. Pak EPA conducted meetings and awareness sessions with the brick kilns association. In the federal capital, the kilns were closed till December to January 15, 2019. It is visible in the table of June 2019 – June 2020 that high concentrations of particulate matter were recorded in the winter months, i.e. September 2019 to February 2020 due to the thick smog season. During the "smog season" running from October to February, poor fuel quality, uncontrolled emissions, and crop burning worsens the air quality, and creates an unhealthy environment in ICT. On the other hand, low concentrations were recorded in the summer months i.e. March to August.

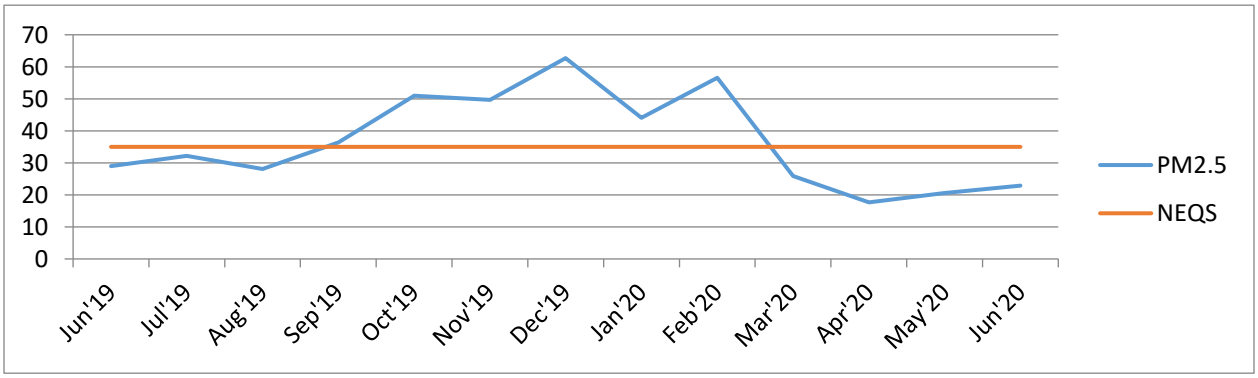
Monthly Average of Main Air Quality Parameters (June 2019 - June 2020):



Monthly Average of Air Quality Parameters Recorded by Pak-EPA (June 2019 – June 2019):

Monthly average	**Temperature**	**Humidity**	**NO_2**	**SO_2**	**$PM_{2.5}$**
NEQS Value			***80 µg/m³***	***120 µg/m³***	***35 µg/m³***
Jun-19	27.54	34.3	12.59	11.03	29.018
Jul-19	30.73	45.47	12.81	6.94	32.15
Aug-19	29.30	60.87	12.70	6.08	28.05
Sep-19	29.21	74.48	12.58	8.03	36.40
Oct-19	25.80	79.49	19.70	12.34	50.95
Nov-19	17.83	68.64	22.77	20.16	49.65
Dec-19	13.37	73.10	43.06	37.52	62.71
Jan-20	7.36	65.16	30.22	48.27	44.04
Feb-20	16.72	56.56	25.72	30.90	56.59
Mar-20	17.15	71.70	17.97	21.16	25.84
Apr-20	19.50	58.89	10.13	13.29	17.67
May-20	26.66	48.08	12.14	15.14	20.63
Jun-20	32.7	38	14.2	14.87	22.86
Annual average	22.605	59.59	18.96	18.90	36.06
PM	*Particulate Matter*				
NEQS:	*National Environmental Quality Standards*				

The graph below shows the concentration of $PM_{2.5}$ in comparison with NEQS to elaborate the variation with respect to the permissible limit.



The graph clearly shows that the concentration of $PM_{2.5}$ have been less in summer months and has stayed within the permissible limits while in the winter months, the concentration of $PM_{2.5}$ has increased above the limits set by NEQS. This is primarily because of the seasonal changes.

b. Air Pollution level In Islamabad after COVID 19

In early March 2020, the World Health Organization declared the COVID-19 as a pandemic, and a lockdown was ordered by the Pakistan government in late March 2020. In response to the pandemic, ICT administration imposed a partial lockdown and sealed sectors, sub sectors and rural areas. Pak EPA analyzed the data from a fixed air quality station in Islamabad, and air pollutant concentration variations during the partial lockdown. The partial lockdown has contributed to a positive impact on Islamabad air quality.

Pak EPA measures airborne fine particulate matter (particulates are less than or equal to 2.5 microns in diameter) around their premises. Overall, drastic reductions in $PM_{2.5}$ (up to −40.2 - 42 %), concentrations were observed, during the partial lockdown compared to the February 2020 – March 2020 values respectively, if we compared to the month before the lockdown. Observed data was compared to the last year monthly mean as well as to the after partial lockdown implemented in ICT.

According to the latest data from the June monthly mean (till 24th June, 2020) with regards to all functional industries, construction work, and limited transport still $PM_{2.5}$ is (22.74 $\mu g/m^3$). The Environmental Protection Agency's (EPA) reported the positive impact of the lockdown on the environment; lockdown improved Islamabad's air quality to the satisfactory levels. In comparison to the same period in 2018 and 2019, particulate matter, Nitrogen Dioxide (NO_2) and Sulphur Dioxide (SO_2) levels declined during the lockdown.

c. Air Quality Control & Prevention of Air Pollution

Pak-EPA monitors emissions from major industries in Islamabad. This data is gathered in the form of monthly reports that industries submit to Pak-EPA at the end of each month. Pak-EPA also monitors visible emissions from steel furnaces through real-time CCTV monitoring of stacks/chimneys, which can be accessed from Pak-EPA's Data Surveillance Room.

Before the covid-19 lockdown in February, 2020, the highest monthly average of $PM_{2.5}$ recorded was 56.59 µg/m³, which then decreased to 4.16 µg/m³. The lockdown had a positive impact on the air quality in Islamabad, as $PM_{2.5}$ concentrations were reduced between 35-50%. $PM_{2.5}$ ratio dropped to a single digit value of 4ug/m3 during the daytime as most of the schools, universities colleges and offices were shut down, and there was a decrease in traffic. Virtual lockdown shows a major decline in pollution in Islamabad. This is mainly due to a cut down in traffic. Large bus fleets of public and private offices, schools, colleges and universities are one of the major causes of increased harmful air pollutants.

d. Water Quality Monitoring & Control

Understanding that pollutants in water can impact human health and the environment, Pak-EPA has developed and notified National Environmental Quality Standards for preventing and controlling water pollution in the following areas:

e. Drinking Water Quality & Control

In May 2020, Pak-EPA carried out chemical and microbiological analyses of drinking water samples collected from twenty-five (25) CDA filtration water plants in ICT. Pak-EPA also collected surface-water samples from natural water bodies (Rawal Lake, Simly Dam, Soan River, Korang River, etc.) in ICT. Pak-EPA also established an Integrated Surveillance System to monitor Islamabad's natural streams and rivers. Water samples were collected and analyzed, along with samples from the nalah and sewerage system of ICT.

In July 2019, the Pak-EPA team conducted water sampling under the supervision of Dy. Director Labs/NEQS to ascertain the causes behind death of fish in Rawal Dam. Reports of poison being mixed in the water were unsubstantiated and were dismissed as mere speculations. According to a Pak EPA report, WASA's managing director informed that water samples taken from the lake had been analyzed at various laboratories and found safe for marine life. The EPA water laboratory had attributed the fish mortality to low dissolved oxygen (DO) levels (below 3mg/liter), and a sudden rise in water temperature. Parameters tested included turbidity, pH, COD, TDS, conductivity, SO_4, NO_2, NH_3-N, Cd, AS and CN. Water samples collected from seven different locations of Rawal dam, spillway, kinara restaurant, Korang side, cresh naIlah side, lake view side, boat point and Korang nallah (Bani Gala).

Pak EPA team inspected the Sanday mar dam site and collected 3 water samples for quality testing. The wastewater of Sectors E-16 and E-17 and Tarnol area of Islamabad is polluting the Sanday Mar Dam, causing serious problems for agriculture and fishing. Drainage of wastewater into the natural stream of Sanday Mar Dam without treatment has turned out to be a major health hazard and environmental disaster. Drinking water in adjoining areas is obtained through hand pumps etc., and seepage from Sanday Mar Dam into the groundwater table poses a serious threat to public health. Therefore, it must be made mandatory for housing societies to install their own water treatment plants. Between 2019-20, almost 100 water samples from various locations were collected and tested in Pak-EPA's laboratory along with a few samples received from the public.

f. Municipal and Industrial Waste-Water Quality & Control

CLEAN Laboratory of Pak-EPA also collected and analyzed samples of municipal and wastewater that were collected from various industries located in ICT. Samples were also collected from CDA's Sewerage Treatment Plant in I-9 to ensure environmental compliance with NEQS standards. During 2019-20, wastewater samples were collected from different areas (steel industries, cement industries, housing societies, and filter plants etc.) and analyzed in EPA, during routine environmental monitoring.

g. Internships and research work in EPA Lab

Technical training, laboratory & research facilities and summer internships were offered to 86 students (including PhD, MS, and BS students) of Quaid-e-Azam University, UET, NUST, FJWU, ARID Agriculture University, IIUI, AIOU, UOP, COMSATS, Bacha Khan University, Bahria University, Forman Christian College, Lahore and Faisalabad agriculture university in 2019 - 2020 . UET students requested to access to the brick kilns and marble industries on the subject "recycling of marble waste into various useful products to reduce environmental contamination". Students used EPA real time air quality data for their thesis. FJWU students performed practical research work in the EPA microbiology lab.

h. GC-MS Addition in EPA analytical Lab

GC-MS is provided by the UNEP POPs project, and was added in the CLEAN lab for contaminated POPs samples testing in 2019.

2. Polythene Bags Regulations, 2019

In July 2019 Pak-EPA notified new regulations under S.R.O. no. 92(KE)/2019 titled "Ban on (Manufacturing, Import, Sale, Purchase, Storage and Usage) Polythene Bags Regulation, 2019" whereby a complete ban on polythene flat bags had been imposed in the federal capital.

To ensure compliance of the Regulations, Pak-EPA inspected more than 1,300 retails shops, restaurants, bakeries, plastic bag factories, fruit vendors, etc. and recovered about 3,100 kg of illegally used polythene plastic bags. In total, penalties of Rs. 18,40,000 were imposed upon violators for non-compliance of the Regulations.

Additionally, 19 applications for authorization to manufacture/import/use polythene flat bags were received by the Agency.

Awareness-raising activities

Pak-EPA organized more than 50 public awareness-raising events in 2019-20 on plastic pollution and plastic-bag ban at public and private institutions. There events were held in Islamabad at the Prime Minister's Office, headquarters of the National Highway Authority, and Ministry of Railways, Centaurus Mall, and public and private schools and colleges. On routinely basis, Pak-EPA also used social media on a routine basis to raise awareness about environmental issues among the public.

In February 2020, a flash mob and large public gathering was organized in Centaurus Mall in collaboration with Hashoo Group in order to raise awareness about plastic pollution. The Minister of State of MoCC, Madam Zartaj Gul, also attended the plastic awareness campaign.

Environmental Complaints

The Prime Minister's Pakistan Citizen Portal was launched in fall of 2018 for the redressal of citizen grievances. In 2019-20, a total of about 600 public complaints were received at Pak-EPA through the Portal. In lieu of this, more than 230 site inspections were carried out, and legal action was taken against the violators reported in 47 complaints. The site inspections covered violations against plastic bag ban, brick kilns, housing societies, industries, factories, poultries feeds and farms, pharmaceuticals, EIA project sites, wedding marquees, etc.

3. Hospital Waste Management

As per the Hospital Waste Management Rules notified by Pak-EPA in 2005, all hospitals and health care facilities in ICT are to ensure that hospital waste is segregated into infectious and non-infectious waste. In ICT, 97 Health Care Facilities under observation of Pak-EPA. In total, 23 health care facilities submitted compliance reports to Pak-EPA in 2019-20. Additionally, 43 violations were reported and 89 Site Inspection/Visits were conducted to ensure compliance of Hospital Waste Management Rules. A total of 8 EPOs were issued to health facilities for non-compliance, and 04 are under litigation in the Environmental Protection Tribunal. 08 incinerators

are operational in Islamabad's hospitals to dispose of infectious hospital waste safely. Pak-EPA was successful in pursuing the installation of two more incinerators in hospital premises in ICT. Total reported waste generated by health facilities of Islamabad during the period from July 2019 –July, 2020 is as follows: -

S.No	Waste	Non-Infectious Waste	Total Waste
1	847,149.852 kg	1792.498.78kg	2639,648.632 kg

During the novel coronavirus epidemic spread, Pak EPA tackled the public health safety on priority and directed all Health care facilities in Islamabad Capital Territory. Pak EPA ensured that medical waste collected from COVID-19 designated hospitals in ICT, should immediately be transported to a designated place for hazard-free disposal, as a part of the efforts to control the spread of the disease.

In public health emergencies, EMT equipped with PPEs, visited the hospital during the pandemic and checked the handling, and disposal of infectious medical waste. As per international practices, COVID-19 medical/infectious waste disintegrated and incinerated immediately at a temperature of about 1,150 degrees Celsius. Dump trucks should be fully enclosed and leak-proofed in order to transport infectious COVID-19 medical waste. Meanwhile, the situation in ICT must be closely monitored in order to prevent environmental risks and contribute to the battle against the virus.

4. Directorate of Environmental Impact Assessment (EIA/IEE)

During the period 2019-20, Eleven (11) Initial Environmental Examination (IEE) Reports have been received for review at this Agency, Two (02) Approval of EMP has been granted, Four (04) cases are under process and five (05) cases have been rejected as per following details:-

S. No.	Name of the Project	Status
01.	Initial Environmental Examination (IEE) Report of Asphalt Mixing Plant at Sector H-10, Kashmir Highway, Islamabad.	Approval of EMP Issued

02.	Initial Environmental Examination (IEE) Report of D-Tech Waste Solutions Facility, Hummak, CDA Industrial Triangle, Islamabad.	Approval of EMP Issued
03.	Initial Environmental Examination (IEE) Report of New State Bank of Pakistan Building at Sector G-5/2, Islamabad.	Under Process
04.	Initial Environmental Examination (IEE) Report of Zameen Ace Mall, DHA Phase-II, Islamabad.	Rejected The proponent has been advised to submit a detailed EIA Report instead of IEE Report.
05.	Initial Environmental Examination (IEE) Report of Bahria Lifestyle Project, Islamabad Expressway, Lohi Bher, Zone-V, Islamabad.	Rejected The proponent has been advised to submit a detailed EIA Report instead of IEE Report.
06.	Initial Environmental Examination (IEE) Report of River Garden (Extension) Zone-V Islamabad.	Under Process
07.	Initial Environmental Examination (IEE) Report of Naval Housing Scheme, Zone-V Islamabad.	Rejected
08.	Initial Environmental Examination (IEE) Report of Bahria Town Phasse-7 (Extension) Zone-V, Islamabad.	Under Process
9.	Initial Environmental Examination (IEE) Report of AHAD Residencia at Sector E-11, Islamabad.	Rejected
10.	Initial Environmental Examination (IEE) Report of Fortune Empire Apartments at Sector E-11, Islamabad.	Rejected
11.	Initial Environmental Examination (IEE) Report of Builders Mall Project, Mouza Bangreel Kalan, Zone-V, G.T. Road, Islamabad.	Under Process

During the same period, Nine (09) EIA Reports have been received in this Agency, which are under process.

S. No.	Name of the Project	Status
01.	Environmental Impact Assessment (EIA) Report of Gulberg Residencia (Revised & Extended) Zone-V, Islamabad.	Letter of advertisement for Public Hearing has been issued. Due to COVID-19 the hearing could not be conducted.
02.	Environmental Impact Assessment (EIA) Report of Incinerator at IMC NESCOM, at Sector H-11/4, Islamabad.	Under Process
03.	Environmental Impact Assessment (EIA) Report of Landfill Site at Sangjani, Islamabad.	Under Process
04.	Environmental Impact Assessment (EIA) Report of Bahria Enclave-II Agro Farming Scheme, Zone-IV-D, Islamabad.	Under Process
05.	Environmental Impact Assessment (EIA) Report of Technology Park Development, Chak Shahzad, Islamabad.	Under Process
06.	Environmental Impact Assessment (EIA) Report of Construction of Housing Foundation Tower at Sector G-13, Islamabad.	Under Process
07.	Environmental Impact Assessment (EIA) Report of Pakistan Research Ractor-3, (PARR-3) at PINSTECH, Nilore, Islamabad.	Under Process
08.	Environmental Impact Assessment (EIA) Report of Construction of Mall of Arabia, Zone-V, Lohi Bher, Islamabad.	Under Process

09.	Environmental Impact Assessment (EIA) Report of Traffic Management Solutions (TMS) for Rawal Chowk and Park Road, Islamabad.	Under Process

During the same period, Three (03) Petrol Pumps cases have been received, 01 approval has been issued and 01 case is under process and (01) case is rejected. Five (05) Monitoring visits have been carried out.

S. No.	**Name of the Project**	**Status**
01.	M/s Attock Petroleum At Plot No. 63-C, Sector F-7, Blue Area, Islamabad.	Environmental Approval Issued
02.	M/s HASCOL Petroleum Private Limited at Khasra No. 82, 42, 34, 11, 12, 10 Khewat No. 348, 167, 105, 119 and Khatooni No. 573, 299, 164, 194, 193 at National Park Road, Village Tama Tehsil and District Islamabad.	Under Process
03.	M/s HSD Outlet At Plot No. 07, Admeasuring 3000 SQ.YDS Approx. Situated at Anchorage Boulevard Block-A, Naval Anchorage, Islamabad.	Rejected

5. Directorate of Legal/Enforcement

Finalized and notified the Pakistan Environmental Protection Agency Ban on (Manufacturing, Import, Sale, Purchase, Storage and Usage) Polythene Bags Regulations, 2019 after approval of Federal Cabinet. Approximately 150 field visits conducted by the Enforcement Team(s) of Pak-EPA for the implementation of Pak-EPA Ban on Polythene Bags Regulations, 2019. Approximately eighteen hundred-thousand and forty-thousand rupees. 18,40,000/- fine was imposed upon accused persons on usurpation of Pak-EPA Ban on Polythene Bags Regulations, 2019.

80 notices of personal hearing/compliance were served to upon Brick Kilns, Hospitals, Industries, users of polythene bags under the Pakistan Environmental Protection Act, 1997. Legal directorate 16 Environmental Protection Orders issued including Brick Kilns, Steel Industries, hospitals, Service Stations and Godam. During the smog season, 10 Brick Kilns were sealed for non-compliance of PEPA Act, 1997 NEQS & Environmental Protection Orders.

Pak EPA is monitoring the 07 Steel Industries of I-9/I-10 Industrial area of Islamabad. These industries installed an online dust monitoring system and connected with the surveillance room of Pak-EPA in compliance with for of National Environmental Quality Standards (NEQS) and EPO's. Punjab Oil Mills Kahuta Triangle was sealed in violation of PEP Act, 1997 & NEQS. 12 Cases/Complaints were filed in Environmental Protection Tribunal on violation of Environmental Laws.

18 Reply/Para wise comments were submitted in Hon'ble High Courts in different Writ Petitions/Appeals relating to Environmental Issues. 03 Reports submitted before Hon'ble Supreme Court of Pakistan on the directions of Hon'ble Court.

6. National Biosafety Centre (NBC)

Pakistan has been a party to the Cartagena Protocol on Biosafety (CPB) under Convention on Biosafety (CBD) since May 31, 2009. It is obligatory to devise an implementation mechanism for regulating Genetically Modified Organisms (GMOs) and their products. In exercise of the powers conferred by section 31 of Pakistan Environmental Protection Act (PEPA) 1997, Pak-EPA drafted and notified Pakistan Biosafety Rules, 2005 vide S.R.O. 336 (1)/2005 on 21st April, 2005 to provide legal cover for regulating GMOs. National Biosafety Guidelines were notified in October 2005 for the facilitation of the applicants to follow the procedures for the implementation of the Biosafety Rules in the country.

National Biosafety Centre (NBC) under a development project was established at Pak-EPA in April, 2006. The center provides implementation setup for biosafety rules to regulate the activities related to import, use and propagation of the GMOs and their products. The regulatory activities are necessary to offset the impacts of modern biotechnology on food, health, environment, and socio-economic progress of the country.

Under section 6 of Pakistan Biosafety Rules, 2005, Technical Advisory Committee (TAC) comprised of 22 members including Director General Pak-EPA as Chairperson and Director NIBGE, Faisalabad as Vice Chairperson. Similarly the National Biosafety Committee (NBC) comprised of 17 members including Secretary, Ministry of Climate Change as Chairperson. The TORs of the both committees defined in Pakistan Biosafety Rules, 2005. The approval process for the Genetically Modified Organisms (GMOs) involves three tiers of forum i.e.

i. Institutional Biosafety Committee (IBC), Chaired by Head of concerned Institution.
ii. Technical Advisory Committee (TAC), Chaired by DG Pak-EPA.
iii. National Biosafety Committee (NBC), Chaired by Secretary MoCC.

All cases of GMOs either for laboratory manipulation work, field trials, import or commercial release required approval from all three committees.

A total of 21 numbers of National Biosafety Committee (NBC) meetings and 26 numbers of Technical Advisory Committee (TAC) meetings have been convened so far to approve or otherwise the GMOs related cases. Since July, 2019, a total of forty nine (49) cases of Genetically Modified Organisms (GMOs) related activities have been decided by the forum. Among these one (01) case was of laboratory genetic manipulation work, four (04) cases were of field trials and four (04) cases of commercialization.

7. Establishment of Geomatic Centre for Climate Change and Sustainable Development

Geomatic Center for Climate Change and Sustainable Development project in Pakistan Environmental Protection Agency Islamabad is a venture under the Ministry Climate Change which encourages application of Satellite Remote Sensing (SRS), Geographical Information System (GIS) and Geographical Positioning System (GPS) technologies in environmental monitoring and decision-making. The Geomatic project established the mapping sciences, geographic information systems, environmental visualization, geodesy, photogrammetry, remote sensing and surveying.

The Geomatic project developed the Inventory and monitoring of natural resources such as glaciers and snow fields, water, forests, biodiversity, deserts, agricultural practices and rangelands,

etc. The project upgraded the institutional capacity of Pak-EPA, Ministry of Climate Change in the use of SRS, GIS and GPS for environmental monitoring and management.

The Geomatic Facilitated the Federal and provincial governments in disaster risk reduction through vulnerability mapping, information clearing house mechanism and training to use latest available technologies for risk assessment from various forms of hazards. As per administrative approval issued on 19th March, 2020, the project has been granted extension till June 2020. The project has a slight cost overrun due to increase in pay package of PSDP project employees under Finance Division as per OM No. F.4 (9) R-14/2008 dated 19th July 2017. The project has total a expenditure of **Rs. 45.403 million** till date from total cost 48.885 million. Throw forward left with project from total cost is **3.48 million**. Project needs Rs. **5.8 million** as additional demand with current allocation for clearance of liabilities before closure till 30th June 2020.

ACTIVITIES IN PROGRESS TO BE COMPLETED BY-JUNE 2020

- Completion and launching of GIS web application on server.
- Preparation and release of Annual National Environmental Report 2018-19.
- Capacity building in GIS / RS of other Government institutes through training.
- Development of Land use / land cover mapping of forest areas of Khyber Pakhtunkhwa.
- Mapping and identification of potential areas for plantation in Khyber Pakhtunkhwa.

FINANCIAL YEAR WISE PHASING AND EXPENDITURE DETAILS TILL FEBRUARY 2020. **Rs. In millions**

Serial No.	Year	Original Budget	Surrender	Expenditure
1	2013-14	Supplementary grant		
2	2014-15	10,800,000	4,903,000	335,731
3	2015-16	8,596,000	6,877,000	1,269,858
4	2016-17	10,000,000	1,469,492	7,875,440
5	2017-18	33,828,000	0	17,169,504
6	2018-19	18,205,000	3,228,000	14,861,793
7	2019-20	3,200,000	0	3,893,792 (30.12.19)
	Total	**84,629,000**	**16,477,492**	**45,406,118**

FINANCIAL SUMMARY OF PROJECT

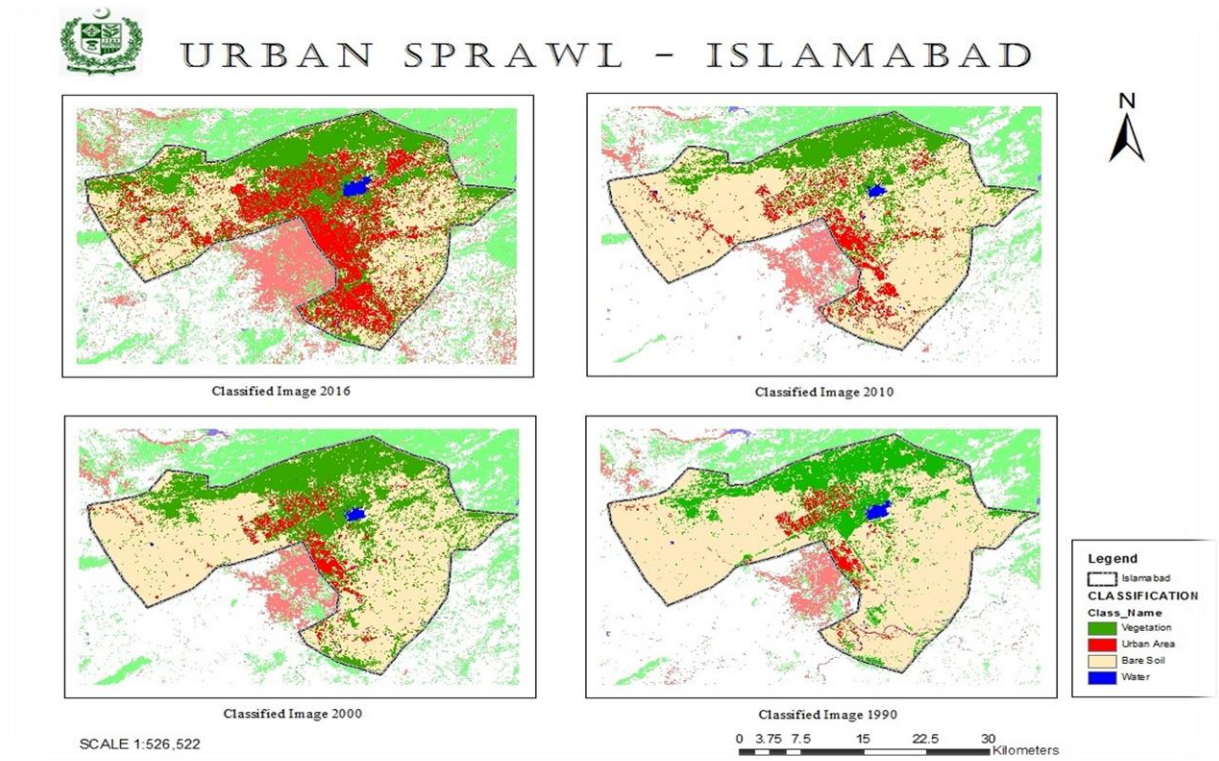
Detail	Amount
Expenditure till June 2019	41,512,326
Expenditure till Dec 2019	45406118
Throw forward 1.01.2020 from total cost	3478882
Amount needed to continue till June 2020	7278000
15% of total cost of project 48.885 million	7.33275

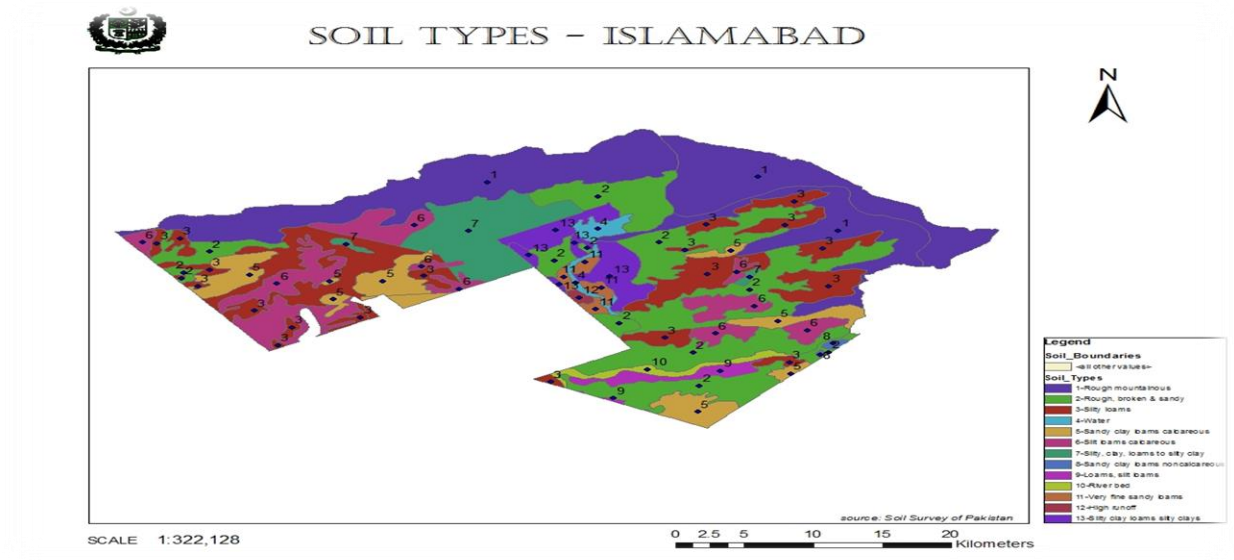
Overall progress of Geomatic project

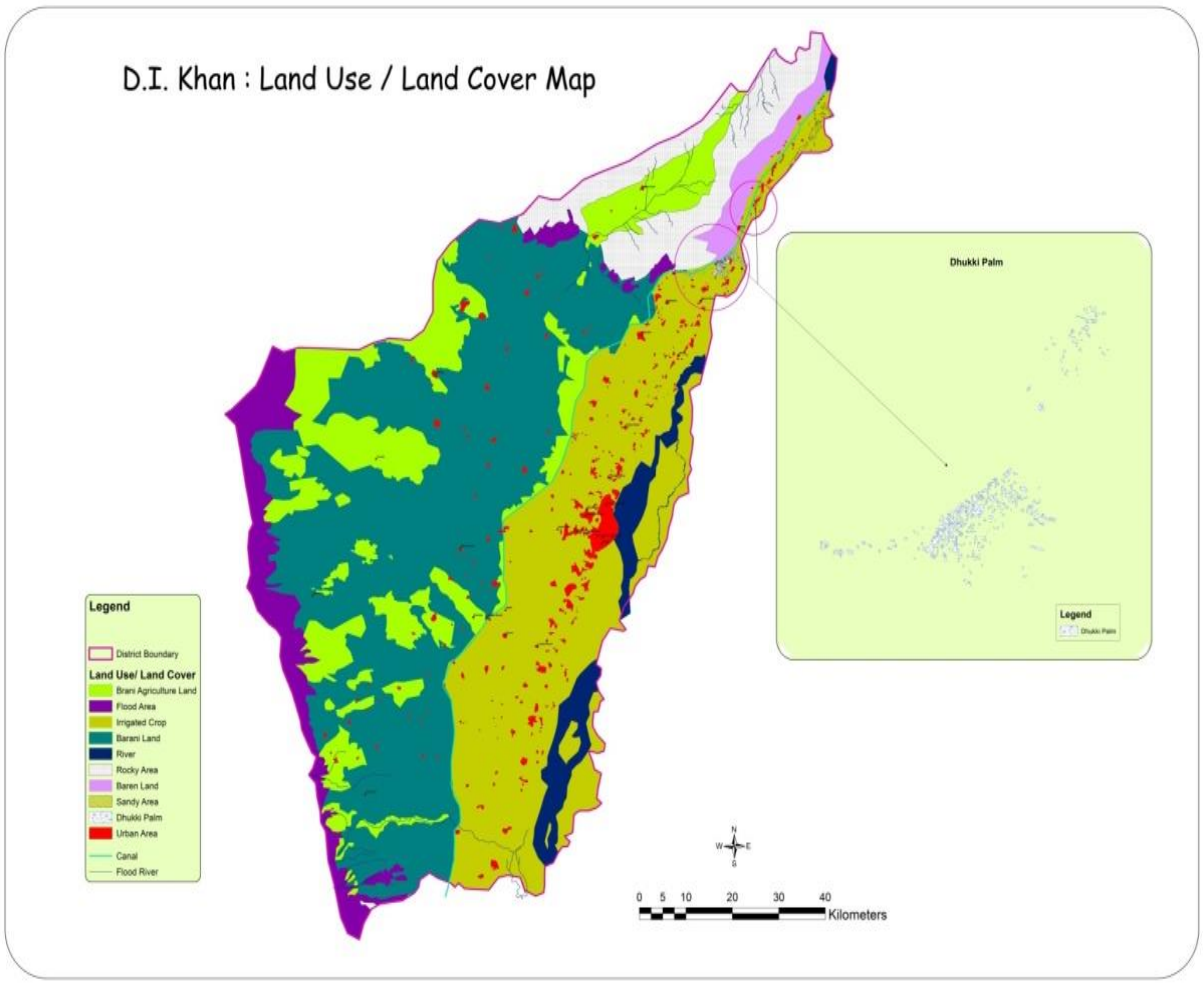
The project hired skilled experts and supporting staff, and established a well-equipped centre of geospatial technologies for environment monitoring in Pakistan. The project is establishing a spatial and thematic database on various environmental issues such as natural resources, natural and anthropogenic hazards, and pollution levels.

- Digital Environmental Atlas of Islamabad indicating resource monitoring of capital city.
- Glacier Monitoring of Pakistan using GIS & RS.
- Drought Index Mapping of Pakistan.

- Setup of IT infrastructure for GIS-web based application.
- Prepared and launched the National Environment report of the country.







Awareness raising session on Ban on plastic in Islamabad in Roots millennium school F-7 Campus Islamabad

Geomatic and Pakistan Environmental Protection Agency organized an event on "Awareness raising session on ban of plastic bags in Islamabad" at Roots millennium school F-7 Islamabad to spread environmental awareness on the hazardous effects of plastic pollution and on ban of use of plastic bags.

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II. ZOOLOGICAL SURVEY OF PAKISTAN (ZSP)

Zoological Survey of Pakistan (ZSP) is one of the key federal agencies involved in policy making for wildlife conservation in the country. The mandate of ZSP is to monitor the current status and distribution of wildlife in Pakistan. Besides these objectives, ZSP is also mandated to maintain standard zoological collections for reference from different parts of the country and impart education and raise awareness among the masses for biodiversity conservation.

The specific objectives of Zoological Survey of Pakistan are as follows:

- To obtain information on distribution, population dynamics and status of animal life in the country.
- To undertake research on the ecology and biology of wild populations of Pakistan.
- To set up and maintain standard zoological collections for reference.
- To advise the Government on all zoological matters, including conservation, management and trade in wildlife.
- To impart training and create public awareness about wildlife conservation.

Achievements of Zoological Survey of Pakistan during 2019-20 are as follows:

Studies on Endangered Animals

1. **Survey of Great Indian Bustard (*Ardeotis nigriceps*) in Cholistan Desert Punjab**

The Great Indian Bustard (GIB) is globally listed as Critically Endangered on the IUCN Red List, 2017. The GIB has a very small estimated population that has undergone an extremely rapid decline due to multiple threats, including habitat loss and degradation, hunting and various anthropogenic activities. The total global population of Great Indian Bustard was estimated approximately 300 in 2008, indicating that it is likely that there are less than 250 mature individuals remaining, hence placing them in the band of just 50-249 mature individuals. The species are included in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITIES) and Convention on the Conservation of Migratory Species of Wild Animals (CMS) appendix I and annex A of EU Wildlife Trade Regulations.

(Great Indian Bustard at Cholistan desert)

This species is endemic to the Indian Subcontinent (Pakistan and India) and is resident in Cholistan in the Punjab province of Pakistan with an estimated population of about 25-30 individuals in Pakistan. It is listed in the THIRD SCHEDULE (protected throughout the year) in the Punjab Wildlife (Protection, Preservation, Conservation and Management) (Amendment) Act, 2007.

Objective of the survey

The main objective of the current survey was to confirm the presence of Great Indian Bustards in Cholistan, assessment of its number, sex composition and habitat preference. The subsequent objective was to see the protection measures, presence of checkpoints and threats to its survival.

Achievements

A total of 15 (fifteen) GIBs were sighted in the area during the survey from March 2-6, 2020. The presence of GIB was recorded in the grassland habitat mostly in pairs, however, it was also observed in single and triplet. In addition to adult birds, three sub-adult birds were also

recorded. The observed birds were recorded in areas of cattle grazing which apparently was not disturbing them. However, the presence of cattle in their habitat may be a threat for their nests/eggs.

2. Houbara bustard (*Chlamydotis macqueenii)*

Houbara Bustard (*Chlamydotis macqueenii*) is one of the globally threatened bird species, which annually visits its wintering grounds in Pakistan. This bird enters Pakistan from north-west crossing a broad front through Baluchistan and Khyber Pakhtunkhwa and can be observed in all arid zones of the country. The first arrivals are usually noted in early October and birds leave their eastern winter range from late February and begin to return north-westward. This bird is a desert adapted species that utilizes open or shrubby, level or undulating arid plains uninhabited by man. It typically occurs in areas receiving 140mm-230mm annual rainfall with a temperature range of 4-34°C.

(Houbara Bustard at Rajanpur District)

The current survey was undertaken with teams of Punjab Wildlife and Parks Department and WWF-Pakistan. Primarily, three survey teams were formed to assess the population status in three districts of Punjab province i.e. Rajanpur, Bhakar and Rahim Yar Khan.

Achievements

Populations of Houbara observed in sampled transects (direct counts) and estimated populations have declined in the Punjab province over the three years period from 2017-19.

General Studies of Department

Annual Mid-Winter Waterfowl Census

Mid-winter waterfowl census is an annual activity of the department since 1982 carried-out in the second week of January. During the current FY (2019-20), following wetlands of Punjab were visited for waterfowl census:

Kalarkahar Lake, Namal Lake, Chashma and Jinnah Barrages, Ucchali Wetlands Complex, and Head Marala

During the current year following wetlands of KPK were also visited;

Tanda Dam Kohat, Tanedar wala Dam District Banu and Khanpur Dam district Haripur

(Migratory Water birds at Ucchali Lake Wadi e Soon Sakesar District Khushab)

Achievements

During the current mid-winter waterfowl census 2020, a total of 55704 water birds have been recorded at all the important wetlands of Punjab and KPK. These consist of 60 species of water birds both migratory and resident at the surveyed wetlands. Ucchali lake has the largest population (27107) of migratory water birds and Khabekki lake was least populated i.e. 598 birds only. As usual the Common Coot (*Fulica atra*) was found to be the most abundant species with the highest population at almost all the wetlands i.e. 21637 individual birds. While, Mallard (*Anas platyrhynchos*) was found second abundant (4980) birds at the wetlands followed by Common teal (*Anas crecca*) 4703 birds

Publications

The department is regularly publishing scientific Journal "Records Zoological Survey of Pakistan", brochures and charts etc.

During 2019-20, the following journal was published.

i. Records Zoological Survey of Pakistan Vol.24.

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III. GLOBAL CHANGE IMPACT STUDIES CENTRE (GCISC)

(A Body Corporate established under the GCISC Act 2013)

Global Change Impact Studies Centre (GCISC) was first established as a development project in April 2002, with the mandate to undertake research on climate change and its impacts and potential remedies. Subsequently, GCISC's status was formalized through the passage of the GCISC Act 2013 by the Parliament (notified vide Gazette of Pakistan on 26 March 2013 as Act No. XVII of 2013). The Act defines GCISC as a body corporate governed by an independent Board of Governors (BoG), which is chaired by the Federal Minister in-charge of the concerned Ministry dealing with the subject of climate change.

1. Mission Statement

To undertake scientific investigations of the phenomenon of climate change at regional and sub-regional levels and study its impact on various sectors of socio-economic development in order to prepare the country to meet threats to its water resources, agriculture, ecology, energy, health, bio-diversity etc.

2. Main Functions

Under the GCISC Act, the Centre is tasked with three functions, namely research, capacity building, and outreach and awareness:

a. **Research**: the research program is driven by national policy goals, namely protecting people against the impacts of climate change, promoting economic growth and sustainable development in a climate-constrained future, and honoring Pakistan's international commitments. To these ends, research is organized in three groups:

   - ***Climatology*** **and Environment**: using climate system models to predict future climate behavior in Pakistan, including monsoons, temperature, precipitation, and climate extremes.
   - ***Water Resources*** **and Glaciology**: using glacio-hydrological and water models to assess future behavior of glaciers, aggregate and seasonal flows in the Indus River System, and changes in the hydrological extremes across the country.
   - ***Agriculture, Forestry & Land Use****:* use of crop simulation models to predict the impact of projected changes in temperature, precipitation, and water availability on agriculture and food security of the country along with assessing the impacts on Forestry, Land Use.

b. **Capacity building**: imparting technical and communication skills to GCISC staff as well as students and climate scientists at other national research organizations and universities.

c. **Dissemination of research findings**: to the scientific community, planners, policymakers, and to the public at large, in order to raise awareness of climate change among policymakers as well as the citizenry.

3. Ongoing Research Activities

I. Climatology & Environment Section

The key research activities of Climatology & Environment Section revolve around following themes:

- Assessment of past climatic changes;
- Development of future climate projections for Pakistan by employing state-of-the-art high resolution Climate Models;
- Scientific Investigation and Prediction of Climatic Extremes by using modeling as well as statistical techniques;
- Simulation modeling to study monsoon dynamics and its associated impacts;
- Intra seasonal to inter decadal climate predictions;
- Development & Updating of GHG Inventory of Pakistan for Energy & Industrial Processes Sectors;

II. Water Resources & Glaciology Section

- Climate change analysis for the high elevation Karakoram region;
- Analysis of early 21st century changes in Kabul Basin Hydro-glaciology;
- Spatio-temporal assessment of climate change impacts on the UIB- cryosphere and variability of flows based on high resolution climate model data;
- Analysis of climate impact on the frequency and intensity of hydrological extreme events;
- Plausible Adaptation strategies to ensure country's water security under the umbrella of Climate change and Water policies.

III. Agriculture, Forestry and Land Use Section

- Assess impacts of projected climate change on productivity of key agricultural crops in different climatic zones using crop models;
- Assess impacts on related areas, including productivity of forestry, grasslands, rangelands and fragile ecosystems (i.e., mountains, wetlands, coasts, and arid areas); livestock; and land degradation and deforestation, insect-pest infestation dynamics;

- Assess food security in the face of future climate change and especially under reduced availability of irrigation water;
- Devise adaptation measures, including smart agriculture;
- Studies on water, food, energy nexus;
- Updating GHG emissions from agriculture, forestry and land use and watesectors.

4. Achievements and Progress of GCISC:

During the year, GCISC made significant contributions to the international scientific literature in the field of climate change and its associated impacts, and provided tangible inputs in

a number of research projects. It also organized a number of workshops/seminars for information dissemination and awareness. The following is a summary of the accomplishments in 2019-20:

- Publication of key research findings in scientific journals = 24
- Contribution towards technical reports = 6
- Contributions in research projects = 6
- Organization of scientific activities/workshops/seminars for information dissemination and awareness = 4
- Effort on capacity building of GCISC young scientists through academic and specialized trainings and participation in conferences, workshops etc at International level (Nos) = 19
- Effort on capacity building of GCISC young scientists through academic and specialized trainings and participation in conferences, workshops etc at National Level (Nos) = 115
- Provision of training to university students across Pakistan in the field of climate change through summer internship program = 20
- GCISC experts delivered lectures as resource persons and imparted trainings to the researchers of various organizations = 51
- Muhammad Arif Goheer, Principal Scientific Officer/ Head- Agriculture and Coordination elected as Chair in UNFCCC's Consultative Group of Experts(CGE).
- Contributions to Pakistan's 1st Biennial Update Report to be submitted to UNFCCC.
- Two scientists from GCISC are contributing as Lead Author for IPCC 6th Assessment Report.
- One GCISC scientist contributed as "Reviewer" to the GEO report on Cities.

A. Salient Research Findings:

a) Variability and Predictability of Summer Monsoon Rainfall over Pakistan

Devising effective strategies to ensure sustainable development in Pakistan requires that monsoon rainfall be predicted on an inter-annual time scale. One study was performed focusing on prediction of inter & intra-annual variability of monsoonal rainfall over Pakistan. Observed and estimated rainfall also feature a close agreement, except for a few extremely wet years Fig 1. It is concluded that intra-annual predictability is dependent on monthly rainfall variability, as high variability in rainfall affects the model's predictability skills. This study is useful for policy making and associated planning purposes, as the intra- and inter-annual variability of monsoon rainfall has a huge impact on the socio-economic sectors and enhanced predictability of rainfall can help in better planning of water resource management for the agricultural sector. Agriculture contributes around one quarter to Pakistan GDP and is tied up with the annual cycle of rainfall variability. Hence, the model proposed in this study provides a step forward in solving the problem of medium to long term rainfall predictability.

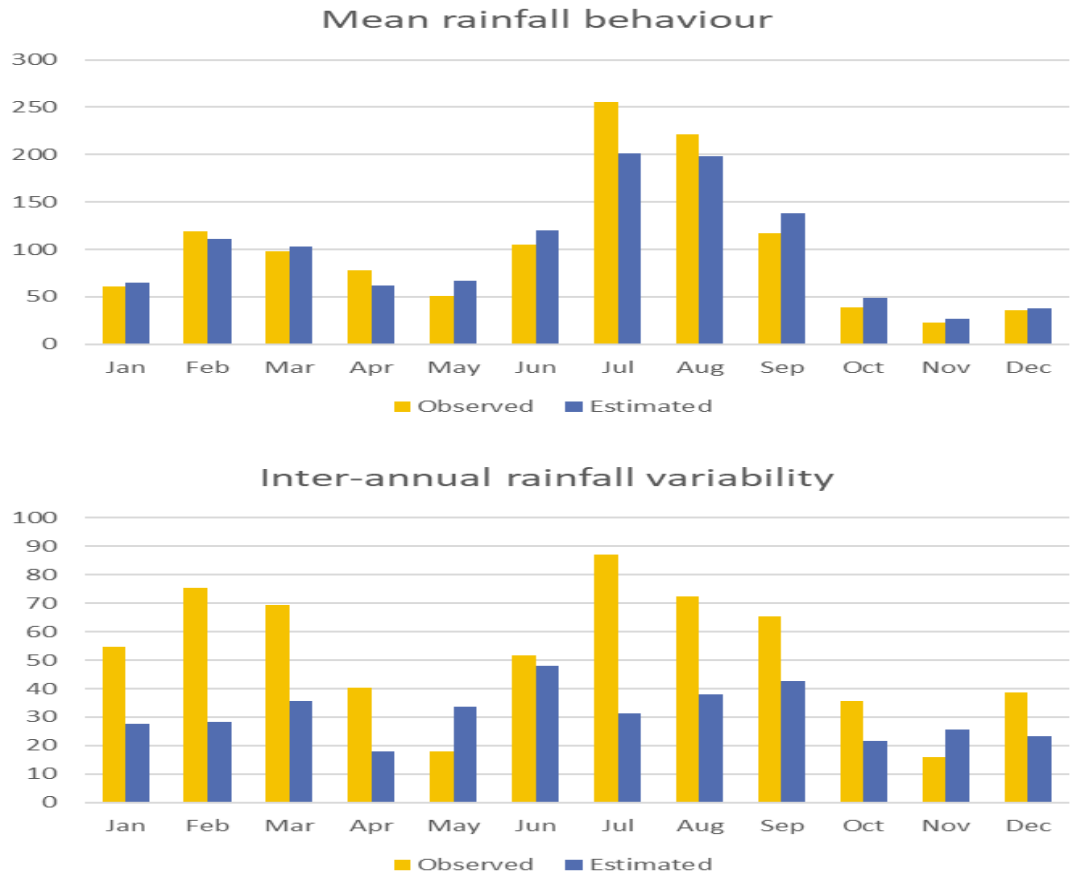

Fig. 1: Mean and inter annual rainfall behavior over monsoon dominated region of Pakistan.

b) Joint Effect of East Asia-Pacific and Eurasian Teleconnections on the Summer Precipitation in North Asia.

The research has been performed on the relationship between global teleconnection patterns (e.g., ENSO, IOD and NAO, etc.) on the monsoon system. It has been observed that ENSO and the Indian Ocean Dipole (IOD, also known as the Indian Niño) have pronounced global and regional circulation effects that in turn modify the global monsoon system, especially, the Asian and African monsoons. The IOD-ENSO relationship at different timescales is temporally non-uniform, which is important to understand the monsoon phenomenon in order to evaluate its socioeconomic impacts.

c) **Identifying hotspots cities vulnerable to climate change in Pakistan under CMIP5 climate projections.**

The hotspots cities vulnerable to climate change in Pakistan under CMIP5 climate projections have been identified in one study carried out this year. Hotspot cities where extreme climate, (that is the hottest, driest and wettest) were also identified. Hyderabad will likely become the hottest city of Pakistan by the end of the century with the highest average temperature reaching 29.9°C under RCP4.5 and 32.0°C under RCP8.5 followed by Jacobabad, Bahawalnagar, and Bahawalpur. Most of the hottest cities are detected in areas on the southern side of Pakistan. On the other hand, the wettest cities, Murree, Balakot and Muzaffarabad, are located in the monsoon region. Dry conditions are likely to be prevalent in Dalbandin followed by Khanpur and Jacobabad under both RCPs.

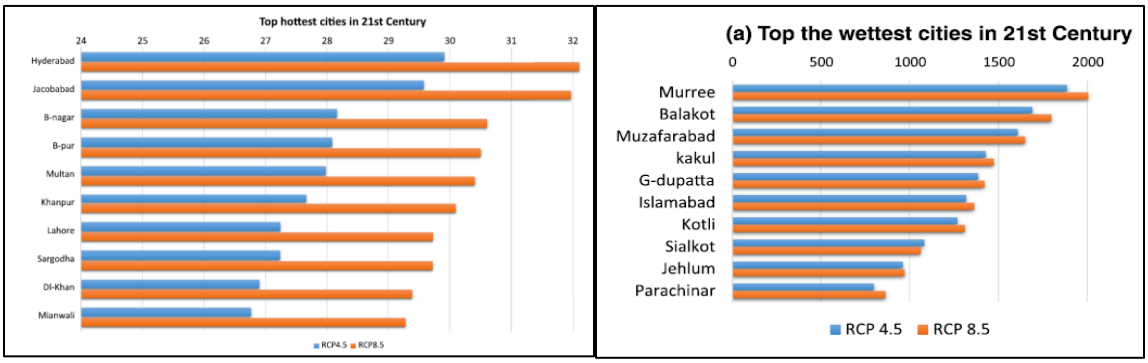

Fig. 2: Top hottest and wettest cities of Pakistan in 21st Century under RCP4.5 and 8.5

d) **Assessment of climate extremes in future projections downscaled by multiple statistical downscaling methods over Pakistan.**

The study assesses climate extremes in future projections downscaled by multiple statistical downscaling methods over Pakistan. In case of temperature, the results indicate a projected increase in frequencies and magnitudes for warm extremes, while it is decreasing for cold extremes in the 21st century (fig. 2). The corresponding trends of maximum and minimum temperature extremes are greater than the mean temperature trend; where the frequency and magnitude of minimum temperature extremes is higher than maximum temperature extremes over Pakistan particularly over North in last half of the 21st century for both RCPs. In the case of

precipitation extremes, most of the sub-regions across Pakistan show a higher increase in total annual precipitation and intense precipitation events. However, numbers of consecutive dry days (CDD) are increasing while consecutive wet days (CWD) are decreasing which can give rise to drought conditions particularly in Sindh.

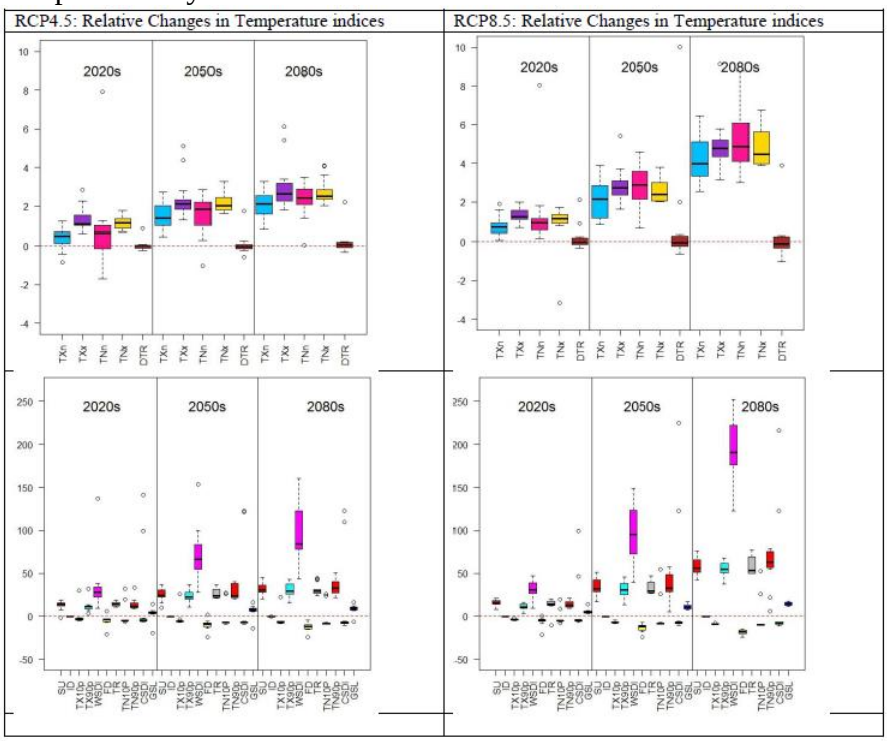

Fig. 3: Relative changes in maximum and minimum temperature-related extreme indices by projections from GCMs for RCP4.5 and RCP8.5 over Pakistan

e) Drought monitoring and prediction in climate vulnerable Pakistan: Integrating hydrologic and meteorological perspectives

In Pakistan, surface water flows predominantly originate from the transboundary Upper Indus sub-catchments of Chenab, Jhelum, Indus and Kabul rivers. Hence, the impact of droughts manifested through water deficits in these catchments are strongly felt by downstream users. Use of different drought indicators is limited in Pakistan's operational drought monitoring system. This study aims to explore the relationship between meteorological and hydrological droughts in the Upper Indus catchments of Pakistan using the Standard Precipitation and Evaporation Index (SPEI) and the Standard Streamflow Index (SSI). Since there are no previous studies for the Indus that compare different distributions for SSI computation, we compare five distributions to adequately compute SSI values at catchment outlets. Our most crucial contribution in this study is analysis of seasonal cross-correlations and lagged cross correlations between SSI and SPEI for the above-mentioned four catchments. The cross-correlation analysis shows strong lagged (with up to 2 lag months) cross-correlations between SPEI and SSI for Chenab, Jhelum and Kabul catchments in early Kharif months. These correlations may be used in operational drought monitoring and forecasting systems, and also in reservoir planning and operations (for Mangla reservoir in Jhelum)

in drought conditions. We strongly believe that the findings of this study can be used in future to collectively explore hydrological and meteorological drought perspectives in Pakistan and to successfully incorporate multiple indicators into operational drought management.

The combined use of the Standard Precipitation Evaporation Index (SPEI) and the Standard Streamflow Index (SSI) was investigated to analyze their capability in monitoring and early detection of droughts in the four key upper catchments of the Indus Basin of Pakistan, i.e., Chenab, Jhelum, Indus and Kabul. Our combined indicator-based drought analysis shows that both SPEI and SSI are able to identify historical hydrological droughts and streamflow deficits at the outlets of these catchments. Moreover, a brief analysis of two key drought characteristics, duration and severity, shows that there is a high correlation between drought duration and severity. Moreover, empirical distribution plots of drought duration were also analyzed and visual coherence between SPEI-based and SSI-based drought duration statistics (and respective empirical distributions) was also observed.

Since a key purpose of this study was to analyze coherences between SPEI and SSI, in order to unearth new insights for improvement of existing Drought Early Warning Systems (DEWS), we also analyzed cross-correlations and lagged cross-relations between SPEI and SSI. When seasonality was not considered, weak cross-correlations were observed between SPEI and SSI for all catchments. In order to incorporate seasonality into our analysis, we also computed monthly cross-correlations between SPEI and SSI. Strong cross-correlations (i.e., r > 0:7) were observed for Chenab, Kabul and Jhelum catchments, especially in late winter and early spring months.

f) Under predicted climate change: Distribution and ecological niche modelling of six native tree species in Gilgit-Baltistan, Pakistan

This study presents the tree species distribution and habitat suitability maps in Gilgit-Baltistan, Pakistan at 1 km spatial resolution. This study is based on bioclimatic and topographical variables and 440 samples of six native trees species: *Abies pindrow*, *Betula utilis*, *Cedrus deodara, Picea smithiana, Pinus wallichiana,* and *Quercus ilex. Data is* collected through field survey. Exclusively for each tree species, a multicollinearity test was performed among 24 independent or environment variables (21 bioclimatic and 3 topographic). The highly correlated independent variables ($r \geq 0.9$, Pearson correlation coefficient) were eliminated from the independent variables list. In this study, we employed the Maximum Entropy (MaxEnt) model to produce current (2015–2016) as well as RCP4.5 and RCP8.5 climate-change scenarios by 2050 for tree species spatial distribution results. The jackknife test was carried out to depict the importance of variables with the highest gain and it was observed that overall elevation, precipitation, and temperature are the factors with the highest gain. The results of the MaxEnt model for each tree species were satisfactory with ROC (receiver operating characteristic) AUC (area under the curve) curve training and testing values greater than 0.9 and 0.84 respectively. Based on 10-percentile training presence threshold-dependent values, the overall accuracy of True Skill Statistics (TSS) was more than 80%. The maximum area coverage of all tree species existed under "inadmissible natural surroundings (0–0.2 probability)" and the least area fell under

"exceptionally appropriate environment (0.6–0.7 probability)" to "profoundly reasonable living space (0.7–1.0 probability)". A tree species diversity map prepared through equal weighted average overlay analysis, using all six developed tree species probability outputs. The field observation might possess certain limitations because it was difficult for the field crew to access the areas with rough terrain, long distances, harsh weather conditions, and locations of forest in steep, narrow valleys. Overall, this study contributes to enlarge tree species distribution research datasets applicability in Pakistan and over the Hindu Kush Himalayan (HKH) mountains region. It may also provide interesting insight, which could be used for the habitat corridor suitability modelling of endangered species, and ground intervention to protect and expand tree species distributions.

g) Emission profile of Pakistan's agriculture: past trends and future projections

Reducing greenhouse gas (GHG) emissions is a global concern after the Paris Agreement (PA). Identification of GHG emission sources and accurate and precise estimation of the corresponding emissions is the first step to meet reduction targets under PA. Increasing share of agricultural emissions in the global concentration has raised concerns on this sector. Now, reducing agricultural emissions without compromising food security is a real challenge. The present study was aimed to provide the current emission profile of Pakistan's agriculture, historical emission trends and future projections under agricultural growth scenarios according to prescribed guidelines of Intergovernmental Panel on Climate Change (IPCC) for national GHGs inventory development. In this study, GHG emissions were estimated using United Nations Framework Convention on Climate Change (UNFCCC) Non-Annex-I Inventory Software (NAIIS), version 1.3.2 as per prescribed Revised 1996 IPCC Guidelines. In these emission estimations, tier-1 approach (which employs default emission factors) was used in accordance with national circumstances and data availability in the country. The emissions baseline was projected for 2030 under business as usual (BAU), food security (FS) and enhanced consumption pattern (ECP) scenarios. The agriculture sector emitted 174.6 million tons (Mt) of carbon dioxide equivalent (CO_2-equivalent) emissions, of which 89.8 Mt is methane (CH_4) and 83.7 Mt is nitrous oxide (N_2O). Carbon monoxide (CO) emissions were found to be 1.07 Mt of CO_2-equivalent. Emission from agricultural soils constituted 45.5% of the total agricultural emissions followed by 45.1% from enteric fermentation and 6.5% from livestock manure management. The rest of 1.7% of the emissions were from rice cultivation followed by 1.1% from burning of crop residue.

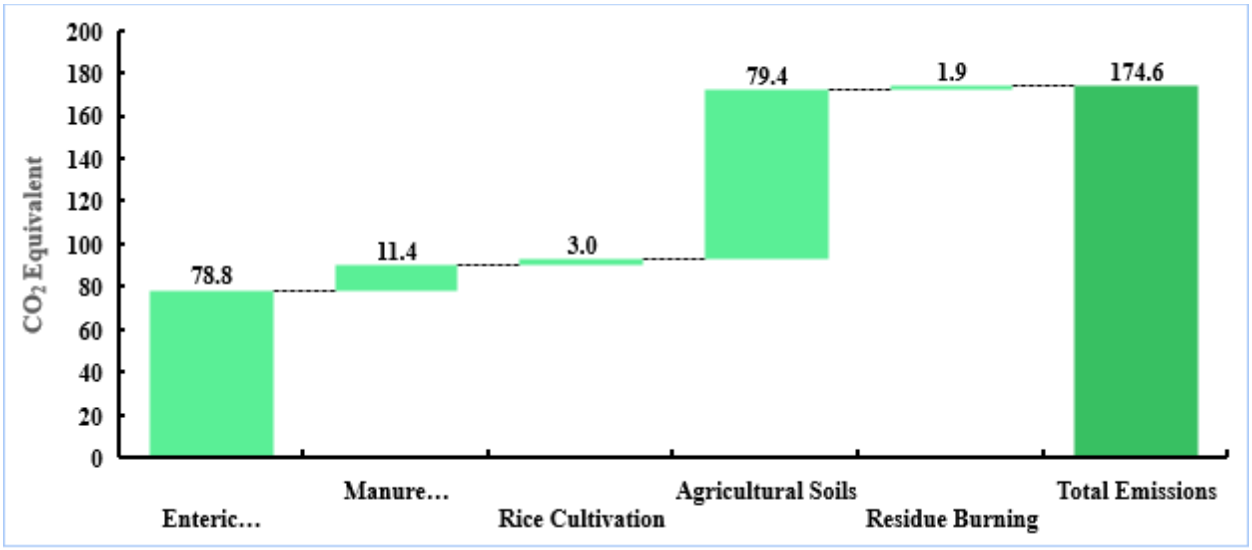

Figure 4: Sub-sectoral emissions from agriculture sector (Mt of CO_2-equivalent)

Historical emission trends showed that the agricultural emissions grew from 71.6 to 174.6 Mt of CO2-equivalent from 1994 to 2015, a 143.8% increase over the period of 21 years. Emissions baseline projections were found to be 271.9, 314.3 and 362.9 Mt tons of CO2-equivalent under BAU, FS and ECP scenarios, respectively (Fig.5) .

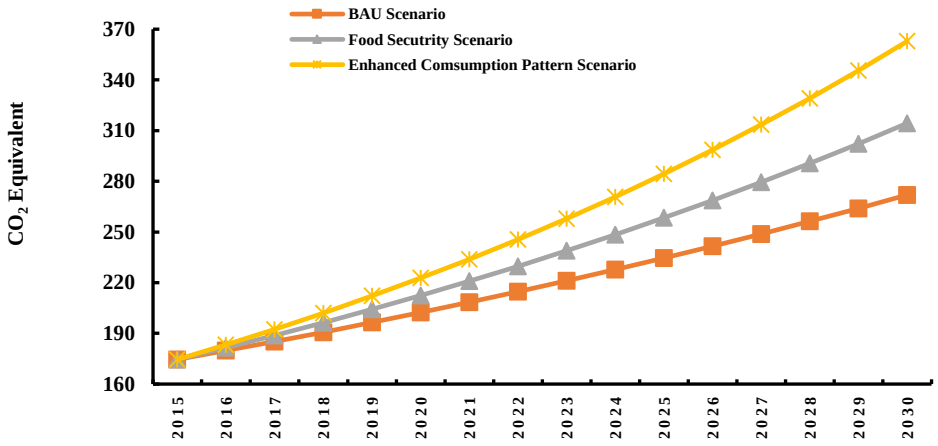

Figure 5: Overall agricultural emissions under BAU, FS and ECP Scenarios

h) Mapping and Monitoring of Glacier Lake Outburst Flood (GLOF) Using Geospatial Modeling Approach of Darkut Valley, Pakistan

Climate change and human activities have resulted in the receding of glaciers throughout the world including Pakistan. Glacier lake outburst floods (GLOFs) are amongst the most common climate-change-induced hazards in northern Pakistan. In the present study, GLOF mapping and

modelling was carried out using remote sensing and geographical information system techniques coupled with ground-truthing. The study aimed to assess and analyze the dynamics of glacial lakes and to develop a model of possible GLOFs using RS and GIS technology coupled with HEC-RAS and field assessments and surveys. The objectives of the study were (a) to analyze temporal changes in the glacial lake using time series (1991–2015) RS data (Landsat) and (b) to develop GLOF scenarios and identify downstream inundation zones. The depth of the lake was estimated to be 81 m and the volume of the lake was calculated using a digital terrain model and extracted as 9.79 × 106 m^3. The glacial lake extent has increased from 0.045 to 0.154 km^2 in the last two decades. Two GLOF scenarios (peak and extreme flood) were developed on an existing volume of water in the study. There are 14 households exposed to medium flood and 10 to low flood risk while one helipad and one school are also in the low flood zone in the first scenario (i.e., peak flood) based on 87.84 m^3. s^{-1} of water (Table Below). The second scenario (i.e., extreme flood) was executed on 3,128 m^3. s^{-1} of water, in which 14 households are at high flood risk, eight at medium and 35 in a low flood zone, as well as one school, a helipad and a community stockpile which are exposed to low flood (Table Below). The outcomes of the study will help in the development of risk management plans, preparedness strategies and risk reduction from GLOF hazard.

Table: Elements at Risk of Peak (P) and Extreme (E) GLOF

Settlement	Facilities Name	High (P)	High (E)	Medium (E)	Medium (E)	Low (P)	Low (E)
Darkut	Helipad	0	0	0	0	1	1
	House	0	14	14	8	10	35
	School	0	0	0	0	1	1
	Stockpile	**0**	0	0	0	0	1
Total		**0**	**14**	**14**	**8**	**12**	**38**

Monitoring Agricultural Drought Using Geospatial Techniques; A Case Study of Thal Region of Punjab, Pakistan

Thal region of Punjab experiences often experience dry weather conditions with extreme variability in rainfall at spatiotemporal scale during Rabi cropping season. The current study assesses the impacts of agriculture drought on wheat crop for 2000-15. The main objectives of the study were: (i) To develop drought risk map based on meteorological (SPI) and vegetation indices for selected period (dry and wet period over Thal region); (ii) To develop relationship between meteorological and vegetation indices to shows the impacts of meteorological variable (SPI and rainfall) on wheat crop yield in Thal region for selected period and (iii) to develop a combined drought risk map. The results indicate that the wheat Rabi cropping seasons of the years 2000–02 experienced extreme agricultural drought, with a spatial difference in severity level caused low and poor yield, while the years 2011 and 2014 were almost normal among all the years leaving varied impacts on wheat yield. The combined agricultural risk map (Figure6) generated by integrating the agricultural and meteorological droughts severity maps indicate that total Thal area can be classified into slight, moderate and no drought covering 28.12%, 12.76%, and 59.12% respectively of the total area.

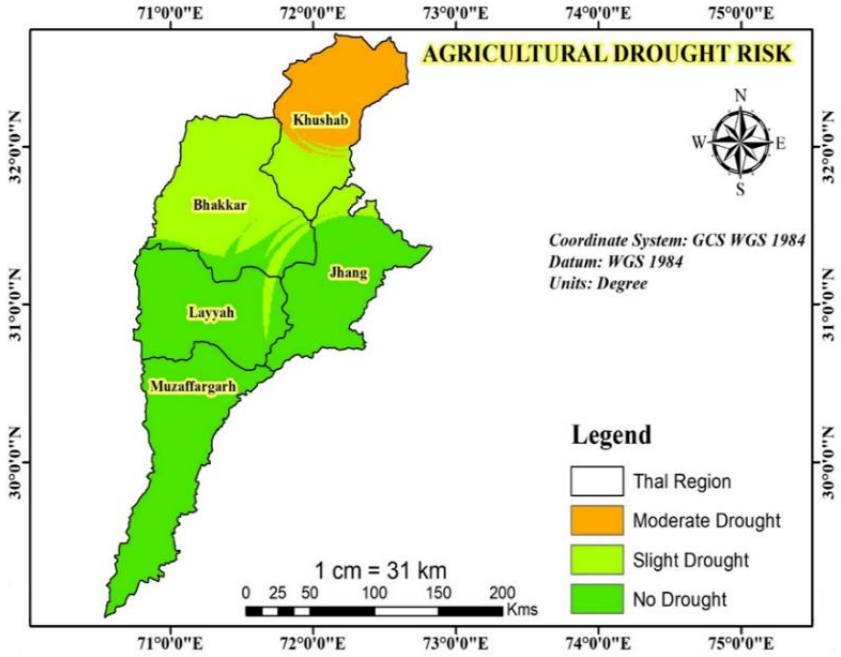

Figure 6: Overall Agricultural Drought Map

j) Growth and Yield Response of Turnip to Different Deficit Irrigation Levels and Sowing Dates under the Agro-Ecological Conditions of Khyber Pakhtunkhwa

Due to climate change, irrigated agriculture take place under water-scarce conditions, at present and more so in the future. Inadequate water supply for irrigation will be the usual rather than the exception, and irrigation management will shift from emphasizing production per unit area towards maximizing the production per unit of water consumed. This field experiment was carried out to assess growth and yield responses of turnip to different deficit irrigation levels and sowing dates at the research farm situated at The University of Agriculture, Peshawar. The purpose of the study was to determine the effect of different irrigation levels and sowing dates on the growth and yield parameters of turnip. The study reported that delay in sowing have significantly reduced the turnip yields. Similarly, even a 10% reduction in full irrigation have significant effect on the productivity. The study necessitates the need of early sowing in the month of November with full irrigation levels.

k) Modeling and Monitoring Wheat Crop Yield Using Geospatial Techniques: A Case Study of Potohar Region, Pakistan

In a country like Pakistan, whose economy greatly depends on agriculture and predominantly crop production, the estimation of crop yield before harvesting is very important. The objective of the study is to evaluate the possibility of MODIS derived vegetation indices using GIS & RS to estimate pre-harvest wheat yield in the Potohar region, Pakistan. Results interpret

that overall the percentage average difference between the actual and predicted yield was within -1.986%. The average % difference between actual yield and predicted yield for Rawalpindi, Jhelum, Chakwal, and Attock are -0.46, -4627, -0.741 and -2.116 respectively. Average RMSE and MAE values ranged from 34.28 to 76.50 kg/ha and 108.09 to 129.99 kg/ha respectively. The MBE value ranged from 7.20 to 62.80 kg/ha. The results concluded that accurate wheat yield prediction can be made almost two months before harvesting using geospatial techniques along with the statistical modeling approach.

l) GIS Based Spatiotemporal assessment of forest cover change and carbon sequestration

Forests play a significant role in the ecosystem's balance and climate of a country. During the last decade, District Abbottabad of Pakistan has undergone extensive land-use changes due to accelerated development, urbanization and agriculture. This study highlights the forest cover change due to environmental factors using satellite imageries (Landsat, Sentinel), and classifying them via supervised classification and finally applying the post-classification change detection technique in GIS over the past three decades (1986-2019). The result shows an overall significant increase of 3.17%, 17.24% and 7.24% in the forest, vegetation and build-up areas respectively, whereas water-bodies and others (barren land) have decreased significantly by 0.69% and 26.96% (Figure 7). This study also assists in assessment of carbon stock incline from the forest cover over the period of the study mentioned above. Carbon sequestration between 1986 – 2019 was increased by 17.19%.

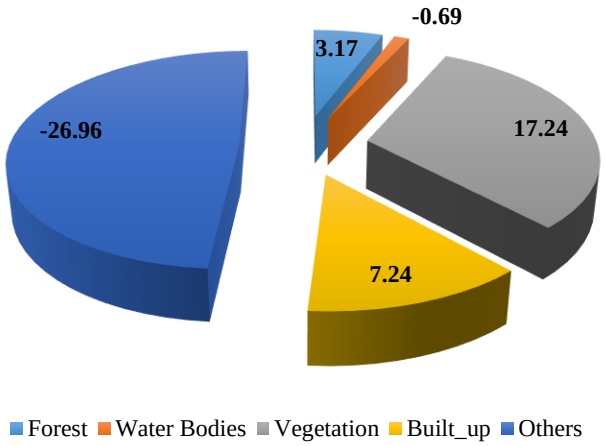

Figure 7: LULC net % change (1986 – 2019)

n) Pakistan's First Biennial Update Report (BUR1)

The Ministry of Climate Change is implementing the Project on 'Preparation of Pakistan First Biennial Update Report (BUR1) under United Nations Framework Convention on Climate

Change (UNFCCC), with financial support from Global Environment Facility (GEF) through United Nations Environment.

GCISC has been assigned to contribute to the chapters on Greenhouse Gas Inventory, National Circumstances, Information on domestic Measurement, Reporting & Verification and Information of Technical support needs and provided and Gender and Climate Change.

The work is in progress. Muhammad Arif Goheer, Head-Agriculture & Coordination is coordinating this effort with MoCC on behalf of GCISC.

o) Preparation of National GHG-Inventory (2017-18)

Last Greenhouse Gas Inventory (2014-15) was prepared by GCISC in 2017. New inventory for the year 2017-18 has been planned to be prepared as per part of BUR1 and Revised NDCs.

The work on the Inventory has been started and the data on the following sectors has been collected from various Government institutions:

- Energy
- Transport
- Industrial Processes and Product Use (IPPU)
- Agriculture, Forestry & Other Land Use (AFOLU)
- Waste

The inventory is being prepared using first time the IPCC 2006 Guidelines and standardized QA/QC procedures.

p) Revision of Nationally Determined Contributions (NDC)

Pakistan submitted its 1ST NDC in November 2016 which commits to reduce up to 20% of its 2030 projected GHG emissions, subject to the availability of international support.

Under the PA, countries revise their NDCs every five years to cut GHG emissions to limit Earth's temperature rise and implement solutions to adapt to the effects of climate change.

The updating of NDCs presents countries with significant opportunities to align their climate and development agendas to promote sustainable growth, but also presents challenges in reinventing policies and operations and mobilizing enough investment.

In August 2019, Pakistan submitted CAEP application to NDCP for NDC revision desiring support for a no. of activities including;

- Greenhouse Gas Inventory and its projections, capacitating for consistent and credible reporting with updated emission factors;
- Mapping of Pakistan’s vulnerabilities in key sectors of economy and strengthening resilience;

- Assessment of adaptation needs, mitigation potentials
- Economic valuation of cc impacts and development of marginal abatement cost curves,
- Analysis and estimation for emission from refrigerant gases,
- Carbon market mechanism, etc.

Ministry of Climate Change has declared GCISC as the Secretariat for the NDC Revision and Muhammad Arif Goheer, Head-Agriculture & Coordination will serve as the Coordinator of the Secretariat. The Secretariat will liaise with other organizations and development partners to collect the information required for the revised version of NDC in the light of activities pitched in CAEP application.

q) Collaborative Climate Change Related Research Studies

GCISC is pursuing collaborative climate change related studies with various Universities and Research institutions on the aspects of (a) future scenarios in Pakistan for different degrees of global warming (i.e., 1.5 degrees, 2 degrees, 3 degrees, etc.); (b) Action on Pakistan's INDC's consistent with national goals and objectives; (c) disaster management under the impact of climate change; (d) climate finance; and (e) from climate policy to implementation. In the context above, forty studies (40) with nineteen (19) institutes have been carried out.

B. Capacity Building:

Capacity building is an important component of GCISC's activities. Climate change still is an evolving science. The new concepts, tools and methodologies for impact assessment emerge quite frequently. Strengthening the capacity of the Centre's researchers as well as other institutions with upcoming technologies and skills is imperative for quality research and action.

During 2019-20, the Centre's scientists participated in a number of national/ international training workshops and acquired new skills ranging from climate science, climate modeling, seasonal forecasting, early warning systems, drought monitoring and assessments, hydrological, crop simulation and water management modeling, water surface runoff analysis, water-food-energy nexus, to earth observation systems, space technology and RS/GIS tools. In some of the workshops GCISC's scientists also contributed as resource persons. The acquired skills are being used for the ongoing and planned research activities at the Centre.

Given the complex and evolving nature of the climate change subject, the international mentorship of the Centre's scientists is very much essential. To fill this gap, the Centre has declared some world renowned scientists, majority of whom are Pakistani expatriates, as Senior Fellows. GCISC's researchers are engaged in various research studies.

Twenty (20) students from National University of Science and Technology (NUST), Islamabad, Bahria University, Islamabad, PMAS-Arid Agriculture University Rawalpindi. University of Agriculture, Faisalabad and University of Engineering & Technology (UET)

Peshawar attended GCISC as Interns for a period of 2-3 months. The Centre's researchers provided them orientation lectures on climate science, modeling and other analytical skills and supervised them for various studies assigned to them by their university teachers.

The Centre is also organizing a series of lectures called as 'Friday Seminar' in which GCISC's own as well as researchers from other institutions deliver lectures on the latest ongoing research and present studies on the aspects of climate sciences, sectoral impacts and response strategies. During 2019-20, Eighteen(18) seminars were organized at GCISC.

C. Mass Awareness / Media Appearance:

The Centre's scientists published several news articles in the leading national newspapers on the various aspects of climate science and its associated impacts on water, agriculture, and forestry. In a Live Radio Programme "Raabta", GCISC's scientists discussed the issues of climate vulnerabilities in the agriculture sector and how ordinary farmers can adapt to minimize the risks and increase resilience. Scientists also provided interviews and responses on the ongoing issues of glacier melting, locust havoc, wheat crisis, effective irrigation water management and other allied issues pertaining to climate change.

D. Inputs for parliamentary Business

GCISC, being the research arm of the Ministry of Climate Change, is frequently engaged in providing technical inputs on climate change, impacts and response strategies for parliamentary business. In this regard, GCISC provides answers to National Assembly and Senate questions and also contributes to the proceedings of the standing committees on the concerns of climate change. During 2019-20, GCISC provided responses to five (5) NA/Senate starred questions and provided inputs (presentations/ briefs) for NA Standing Committee on Climate Change on the aspects of Climate Change, Agriculture and food security. GCISC also provided technical inputs to various reports and submitted responses to various queries reading Joint and Inter Ministerial coordination meetings and memorandums etc.

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IV. ISLAMABAD WILDLIFE MANAGEMENT BOARD (IWMB)

The Federal Government had issued the Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance, 1979 (Ordinance) to protect the wildlife and environment in the Islamabad capital territory (ICT). As provided for in the Ordinance, the government notified the Margalla Hills National Park (MHNP) in 1980. The park covers an area of 67 sq. miles and included the Margalla Hills in the Islamabad capital territory, as well as the Rawal Lake and Shakar Parian areas. As also provided for the Ordinance, the federal government notified a Wildlife Management Board in 1981. The Board was chaired by the Chairman CDA and included officials of CDA as well the federal government. *The Board remained dysfunctional and never met, and the CDA continued to manage the MHNP through its Environment Directorate without an oversight and direction from the Board as provided for in the law*.

On September 30, 2014, Prof. Z B Mirza, a prominent zoologist and field expert, filed a petition in the Islamabad High Court (IHC) maintaining that the MHNP was facing severe degradation due to lack of attention from CDA.

The Cabinet Division held a meeting with the petitioner, members of the Committee, and the CDA to solicit their views on the constitution of the Board, and forwarded its recommendations to the federal government. The Board was finally notified by the federal government on July 7, 2015. Thereafter via a Cabinet Division notification No. 6/9/2015-CDA-II dated August 10, 2015 Dr. Anis-ur-Rahman was appointed Chairman of the Board with immediate effect till further orders.

After its declaration as a protected area in 1980, the Margalla Hills National Park was managed by the Capital Development Authority (CDA). However, in 2015, the Islamabad Wildlife Management Board (IWMB) was set up under Section 4 of the Islamabad Wildlife (Protection, Preservation, Conservation and Management Ordinance 1979, Government of Pakistan). The Board was officially notified on 7th July 2015 by the Prime Minister of Pakistan.

The IWMB is the legal custodian of the Park and is involved in its protection, conservation and management of the Margalla Hills National park. The aim is to minimize anthropogenic impacts on the ecological resources of the national park through a park protection programme from

threats such as illegal extraction of park wood, exploitation of wildlife species, forest fires, illegal construction and encroachment. In addition, the IWMB is working with the local communities of the Park to raise their environmental awareness, educate them and improve their living conditions.

The Islamabad Wildlife Management Board is in the process of building capacity to fulfill its mandate for management of wildlife in the Islamabad Capital Territory. The IWMB has the following objectives:

- To protect and manage Islamabad's unique and outstanding natural beauty for generations to come, through international standards while engaging local communities
- To preserve, protect and enhance the indigenous flora and fauna (biodiversity) in Islamabad and create open space to enrich the quality of life for present and future generations in a safe and secure environment.
- Management and Control the illegal trade of wildlife species in ICT.
- Development and maintenance of physical infrastructure inside the MHNP such as roads and buildings. Consistent with legislation, all plans related to roads and buildings need to be shared and approved by the IWMB before implementation.

2. MARGALLA HILLS NATIONAL PARK:

Margalla Hills National Park lies adjacent to the capital city of Islamabad. To the northwest is the incipient industrial center of Taxila. Encroachments from these urban areas pose serious threats to the integrity of the wilderness of the Park. However, the foremost and most serious threat to the Park is from the communities living inside the Park which have increased in population over the years. These local communities allow their livestock to graze freely and this destroys the vegetation cover and tramples young seedlings. In addition, the locals cut trees for fuel, gather fodder for their animals, and divert natural water streams to cultivated plots near their homes. Some residents even hunt native animals such as hares and birds for food and sport. Solid and liquid waste is not disposed of adequately with consequent negative impacts for the environment and ecological resources.

There are a number of rock mining quarries in the Park where the habitat is severely degraded. Quarries operate on lease arrangements made by the Planning Directorate of the CDA.

Some leases were granted after the park was established but public pressure brought mainly by a citizen's group "*The Margalla Hills Society*", forced the termination of such leases. The CDA ordered the closure of all mines on 31 July 1991. Most of the quarries have discontinued operations and others are expected to be closed in the near future. The Fecto Cement company's 30-year lease for mining limestone, granted in 1983 is however, not included in this order.

Fires are a fairly common occurrence in the Margalla Hills and require significant expenditure and manpower to extinguish. Eighty-five per cent of these fires occur during the dry May-June period preceding the monsoon rains. The number of fires averaged 43 per year between 1986 and 1991. Most of the fires occur on the upper slope or ridge top sites on southern aspects and tend to be manmade.

Alien invasive vegetation species out compete native species and grow at an alarming rate, negatively impacting the delicate balance of the park ecosystem. The unscientific introduction of exotic vegetation like Paper Mulberry, *Parthenium Spp.* and *Lantana Spp.* has not only impacted the vegetation balance but also led to an increase in incidence of allergies.

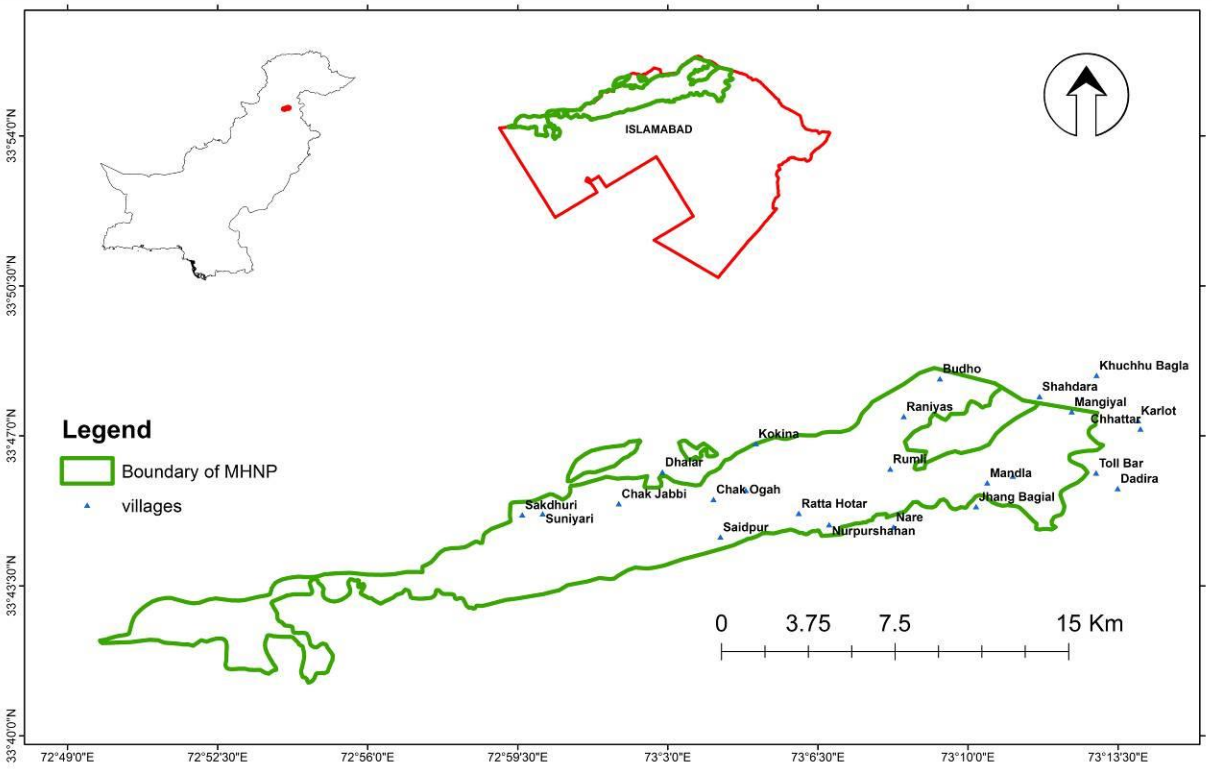
2.1 AREA:

The Margalla Hills National Park (MHNP) is located in the foothills of the Himalayan range. It contains the hill ranges immediately to the north of the Federal Capital of Islamabad and the adjacent areas of the Rawal Lake and Shakar Parian Hills. The geographical coordinates of Margalla Hills and Rawal Lake are 73°7'3.32"E, the geography of the area is rough, with several valleys and numerous steeps. The climate and terrain of the area are excellent for hiking. The best season for the activity is February to April.

The Margalla Hills range between 456 m and 1,580 m in altitude. The topography is rugged, with numerous valleys and steep slopes. Rocks have been observed to date back to the Jurassic and Triassic ages, limestone being characteristic of the region (though shale, clay, and sandstone are also present). Soils is dark, with a high mineral content, and are capable of supporting good tree growth despite being shallow. The hills are an extension of the Himalayan range and form the northern boundary of the Potohar plateau. The area is drained by the River Kurang and its tributaries, which flow into the Soan River.

The climate is subtropical semi-arid. The region lies in the monsoon belt and experiences two rainy seasons. Winter rains last from January until March, and summer rains from July to September. Temperatures range from 1-15 °C in winter and 20-40 °C during the summer. Annual average rainfall is 1,000 mm. There have been occasional incidents of light snowfall in severe winters.

There are at least 38 species of mammals, 218 species of birds reported from the Margalla Hills Range within the MHNP. Out of these, 82 residents, 32 summer visiting and breeding species, 73 winter visitors, and 31 transit migrants have been reported. There are 32 species of reptiles and 9 species of amphibians reported in this park



Map of Margalla Hills National Park

3. GOVERNING BODY:

In pursuance of approval of the Prime Minister, conveyed vide Prime Minister's Office No. 2426/SPM/2015 dated 03.08.2015, Dr. Anis-ur-Rahman, Himalayan Wildlife Foundation (HWF) was appointed as the Chairman of the Islamabad Wildlife Management Board and in exercise of the powers conferred by section 4 of the Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance, 1979 (LXX of1979) read with sub rule (a) of rule 2A

of Islamabad Wildlife (Protection, Conservation and Management) Rules, 1983, Federal Government reconstituted a Board of Wildlife Management on July 7, 2015 consisting of the following members, namely;

3.1 EX.OFFICIAL MEMBERS

01.	Representative of Minister-in-charge of the cabinet division	Member
02.	Mayor of ICT Metropolitan Corporation.	Member
03.	Chairman- CDA	Member
04.	Member, Environment, CDA, Islamabad	Member
05.	Inspector General of Forest & Wildlife, Ministry of Climate Change, Islamabad	Member
06.	Secretary, Wildlife Department, Government of the Punjab.	Member
07.	Secretary, Environment (Wildlife) Department, Government of the Khyber Pakhtunkhwa.	Member

3.2 NON-OFFICIAL MEMBERS:

1.	Dr. Tariq Fazal Ch., MNA	Member
2.	Maryam Aurengzeb, MNA	Member
3.	Mushahid Hussain Syed, Senator	Member
4.	Dr. Zahid Baig Mirza, Biodiversity Specialist	Member
5.	Mr. Aitzaz-ud-din, Margalla Hills Society	Member
6.	Mr. Vaqar Zakria, Himalayan Wildlife Foundation	Member
7.	Dr.Anis-ur-Rehman, HWF	Member
8.	Dr. Ghulam Akbar, WWF	Member
9.	Dr. Tariq Hassan, Advocate Supreme Court	Member

3.3 ORGANIZATIONAL STRENGTH:

The IWMB has a team of 26 members that are working for the conservation and protection of wildlife species and National Park in Islamabad. The detail of strength is given below;

Sr.#	Designation & Scale	Sanctioned	Working	Vacant
01.	Manager Operations (BPS-18)	01	0	01
02.	Assistant Director (Information & Outreach) (BPS-17)	02	01	01
03.	Assistant Director (Community Relations) (BPS-17)	02	0	02
04.	Assistant Director (Accounts & Finance) (BPS-17)	01	01	0
05.	Admin Officer (BPS-16)	01	0	01
06.	Assistant (BPS-15)	01	0	01
07.	Wildlife Guard (BPS-07)	14	06	08
08.	Wildlife Watcher (BPS-05)	02	01	01
09.	Peon (BPS-02)	02	01	01
Total		**26**	**10**	**16**

3.4 COMMITTEES IN IWMB:

The IWMB has five Committees, Protection Committee, and Scientific Committee, Legal Committee, HR Committee, Accounts and Finance Committee. Each committee has a Chairman and three members who look after their respective tasks.

3.4.1 Protection Committee:

Protection committee is chaired by Mr. Rab Nawaz (WWF-Pakistan) and is involved in making policies and plans for the protection of the wildlife and Margalla Hills National Park in Islamabad. Protection committee of IWMB stopped the illegal activities in the park. The guards of IWMB are involved in the routine patrolling from Margalla road to the top of the Monal, they look for the encroachment, illegal hunting, illegal trading, poaching, wood cutting etc.

3.4.2 Scientific Committee:

The Scientific Committee chaired by Professor Zahid Baig Mirza (Biodiversity Specialist) is involved in drawing plans and policies for carrying out the research and scientific studies in the MHNP. The Scientific Committee of IWMB has initiated the camera trap study to know about the mammalian fauna of the park, Grey Goral study to know about the Grey Goral in the park, the area of the Park was searched for many days for any signs of Grey Goral, however no direct observation or any signs could be seen. MHNP Flora Study has been initiated in Margalla Hills National Park to know about the vegetation and plant species of the park.

3.4.3 Legal Committee:

Legal committee chaired by Dr. Tariq Hassan (Advocate Supreme Court) looks after the legal issues of the board. Legal committee of IWMB has drafted the new Islamabad Wildlife Protection, Preservation, Conservation and Management Rules 2018 and has approved it in the Board meeting and the new drafted rules are submitted in the Capital Administration and Development Division for approval.

3.4.4 HR Committee:

The HR committee of IWMB chaired by Mr. Vaqar Zakaria (Himalayan Wildlife Foundation) has drafted the recruitment and service rules for the employees, these rules are approved in the Board meeting and are submitted to the CA&DD for the approval.

3.4.5 Accounts and Finance Committee:

This committee is chaired by Mr. Vaqar Zakaria (Himalayan Wildlife Foundation) makes the budgets and accounts related tasks of the IWMB. The committee has approved its Accounting procedures and has opened the bank account in the name of Islamabad Wildlife Management Board. The committee reviews the accounts on a quarterly basis before submission to the CA&DD and AGPR for the next installment.

4. ACTIVITIES FOR CONSERVATION AND PROTECTION:

4.1 PROTECTION

Private settlements, quarries, construction of roads, water contamination and introduction of exotic plant species are some of the factors affecting biodiversity in Margalla Hills National Park (MHNP).

"Illegal construction and encroachments by individuals and private housing societies, quarries and cutting of trees are not only disturbing the ecological system, but also robbing MHNP of its natural beauty," The Margalla Hills National Park was transferred to the Islamabad Wildlife Management Board after its formation on July 7, 2015 and the Board is the legal custodian of the National Park. Currently 33 protection staff members are involved in looking after 12 valleys, trails and features of MHNP. Currently overall Protection is being conducted in following five methods

- Patrolling by Guards in their assigned areas
- Patrolling by supervisors to monitor the protection activities
- Joint patrolling with Pakistan Navy staff
- Intelligence based raids/operations
- At random Field visits by Protection officer

2 x dedicated guards have been assigned for intelligence gathering in order to ensure following,

- Keep an eye on encroachments, timber mafia, poaching, hunting and forest fire.
- Check violations by any culprits and report in time
- Report fire incidents in AOR
- Keep vigilant on the selling/purchasing of wildlife in local markets.

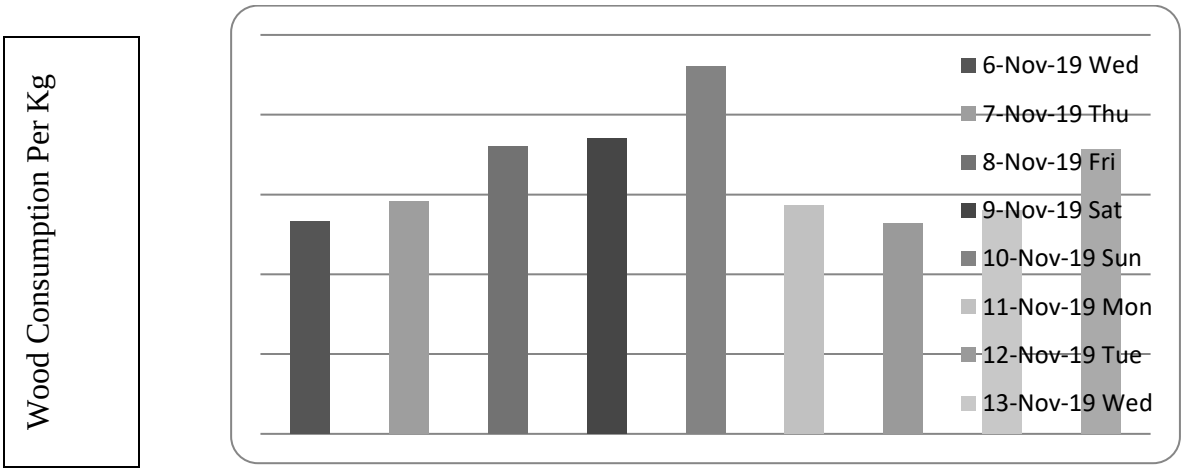
4.1.1 Wood Cutting

The importance of plants to humans and just about all other life on Earth is staggering. Life as we know it would not be possible without plants. They are the main source of food for all animals, they are source of oxygen, medicine, fuel, furniture etc. for humans but the current percentage of plants on earth is decreasing due to deforestation and illegal wood cutting.

Fire wood consumption at Bari Imam Shrine in past decade was used for the wood of Margalla Hills National Park, causing immense loss of tree cover in Nurpur range of national park. One IWMB staff was appointed only for vigilance on Degh house. As a result, wood consumption from MHBP was controlled and now they used fuel wood purchased from timber wood store is used insted. The given below list of wood cutting cases have been reported carrying young trees and branches from the park, which result in severe loss of young trees and also habitat for wildlife.

Sr#	Detail of Culprits	Number
01.	Head Loads	122
02.	Motorcycle Wood load	42
03.	Corolla Car (Fuel Wood)	12
04.	Suzuki Pickups loaded with fuel wood	05
05.	Camel loaded with fuel wood	01
06.	Suzuki Bolan loaded with fuel wood	02
Total Violations		**184**

Note: *The woodcutting culprits were apprehended by IWMB team and handed over to MCI Forest officer for fine. IWMB staff does not have powers in rules to fine the culprits.*



Firewood consumption at Degh house Nur Pur near Margalla Hills National Park

4.1.2 Removal of Invasive Plant Species

For conservation of natural habitat and preservation of national parks, it is of ultimate importance to remove alien invasive species and replace them with indigenous plants in MHNP. The IWMB protection team was involved in such removal of Lantana along the trail numbers 3, 5 and 6 one by one. Lantana species have been removed from the National Park and replaced with local plants like, pine, wild pomegranate and Kachnar etc.

In MHNP, a number of indigenous species of plants are under competition with the invasive plant species in MHNP. These invasive plant species release hormones under the soil that deteriorate the hyphae present in the roots of these indigenous plant species. These hormones also affect on the regeneration of new saplings that naturally grow in the MHNP.

To overcome this issue IWMB every year selects areas that have these invasive species and new saplings at that place growing naturally. The natural growth of indigenous plant is self-generating and this activity support these sapling to become trees in their growth. This initiative is in line the with clean green program of the Govt. of Pakistan. Through this initiative, the entire ecosystem of the MHNP will be preserved and will help in promotion of a healthy natural ecosystem.

Similarly to raise awareness on the importance of indigenous trees for local ecosystems and to offer support to Government of Pakistan's vision of "Clean and Green Pakistan Programme" Islamabad Wildlife Management Board with the collaboration of University students "Plantation of indigenous trees and removal of invasive alien species from the Margalla Hills National Park".

Under this project selected areas of the plant removed from Alien Invasive Species mostly *Lantana camara (were be removed from selected areas)* leading to promotion of growth of local indigenous trees of MHNP and increased awareness amongst citizens and others stakeholders with regard to the presence and impacts of *Lantana camara* in Islamabad has been achieved. *Parthenium spp*, has also been removed from that area.

4.1.3 Ecological Tree Plantation:

IWMB facilitated in development SOPs for the plantation in the Margalla Hills National Park **"Ecological Tree Plantation"** by the Prof. Z. B. Mirza.

Steep Slope: Where contour lines are closer to each other.

Gentle Slope: Where contour lines are further apart.
One Acre = 4046.86 square meters or 43560 square feet.

Step 1: Select plantation site. Try to select an area adjacent or near to natural or successional (it is also natural) tree growth. (Avoid earlier haphazard tree plantations)

Step 2: Judge the gradient of the selected site.

Step 3: Look for natural or successional tree growth on same gradient of plantation site, with the same aspect of the slope (north facing or south facing or south-east facing or south-west facing) at about the same elevation.

Step 4: Take total one-acre area of (8 or 10) samples of:

i) Trees &
ii) Shrubs Note down number of species per acre of the samples.

Step5: Calculate relative abundance of species and plant trees and bushes with the same relative abundance and as much as possible in the same pattern of growth.

Step 6: Grow a nursery of trees and bushes with the same ratio of relative abundance for the next season's plantations, at least a year ahead. Future plantations should be planned now. Future plantation sites should be selected now with all the field work to be started now. Do not spoil the ecology of MHNP with unwise plantations.

Issues:

- Shortage of staff is also a major issue to control the invasive species.
- Scientific study required to control the invasive plants in MHNP.
- Latest technology required to remove the alien invasive plant species.
- Lack of awareness in Public about the native plant is also an issue to control alien invasive plant species.

4.1.4 Campsite Development at Trail-05

Due to large numbers of visitors on Trail 5, the trail gets crowded very often and people start lighting cooking fires and do barbeque in the prohibited areas. To avoid this situation the new children campsite has been constructed on trail 5. Lantana in the area has been thoroughly removed; however, some paper mulberry trees are still present. A sit out has been constructed as a sample in the new campsite.

This site is now developed for camping of tourists in Margllah Hills National Park to encourage the ecotourism.

4.1.5 Tourist Management at Trails

In order to sustain Margalla Hills National Park, environment and improve the quality of living in human settlements, IWMB commit to sustainable patterns of production, consumption, transportation and settlement development, pollution prevention, respect for the carrying capacity of eco-systems, and the preservation of opportunities for future generations.

The number of tourists in Margalla Hills National Park is increasing day by day and IWMB staff monitoring the number of visitors on trails.

4.1.6 Plastic Free Park (Say No to Plastic Bag):

A ban on bottled water in 23 national parks prevented up to 2m plastic bottles from being used and discarded every year. That is equivalent to up to 326 barrels of oil worth of emissions, 419 cubic yards of landfill space and 111,743lb of plastic, according to a study. Keeping this in mind IWMB aims to make the MHNP plastic free, so any plastic or disposable bottles or foodstuff entry in the park is prohibited.

Protection staff control the plastic pollution in the Park, in 2019-2020 Margalla Hills National Park declared as a plastic free park. The staffs present on the trails makes sure that no plastic is taken in the park. They also inform the visitors about the consequences of plastic for wildlife. The cleanup activities were also carried out by the staff.

ISSUES:

- Shortage of staff is also an issue to control littering in National Park especially on Damn-e-Koh road.
- Lack of awareness in Public and non-cooperation with staff.

- Power of Challan/fine should be given to IWMB that plays an important role to declare MHNP plastic free.

4.1.7 SMOKE FREE TRAIL:

Smoking is a practice in which a substance is burned and the resulting smoke breathed in to be tasted and absorbed into the bloodstream. Most commonly, the substance used is the dried leaves of the tobacco plant, which have been rolled into a small square of rice paper to create a small, round cylinder called a cigarette. IWMB with the help of tobacco control cell declare all the trails smoke free. If any person is found with a cigarette on trail, the smoking material confiscate by the staff to make smoke free hiking trails.

ISSUE:

- Islamabad Wildlife Management Board does not have the authority to fine any culprits. That is the major issue that hinders the protection work in ICT territory.
- Federal Govt. should appoint IWMB officers as an authorized officer to control the illegal activities through challan and penalties.
- Shortage of staff is also a major issue to declare the smoke free trail in MHNP.
- Lack of Awareness among visitors about smoking is also an issue in MHNP.

4.1.8 Fire Management:

The fire season starts every year from April and continues till August in Margalla Hills National Park. The fires in Margalla can erupt due to several reasons such as rising temperatures, burning of garbage or dried leaves or even due to the discarding of burnt cigarettes in the forest area.

4.1.8.1 IWMB-Fire Management to Protect Margalla Hills National Park, Islamabad

Forest fires have many implications for biodiversity. At the global scale, they are a significant source of emitted carbon, contributing to global warming which could lead to biodiversity changes. At the regional and local level, they lead to change in biomass stocks, alter the hydrological cycle with subsequent impact on plant and animal species' functioning.

4.1.8.2 Background:

As many as 320 fire incidents occurred in the protected Margalla Hills National Park in last seventeen years (from 2001 to 2017) in which tree cover measuring over 500 acres were damaged despite prompt steps taken by the civic agency. According to the official record of the Capital Development Authority (CDA), 75 percent of forest fires lasted for 1-4 hours; 15 percent of fires prolonged for 4-8 hours; and only 1 percent lasted for a day or more than 24 hours. The data showed that the most 71 fire incidents occurred in the Margalla Hills National Park in 2003 while 62 and 41 such incidents happened in 2003 and 2006 respectively (The News, 2018).

4.1.8.3 Islamabad Wildlife Management Board Fire Protection Plan:

Islamabad Wildlife Management Board (IWMB) is protecting and preserving scenery, flora and fauna of Margalla Hills National Park in its natural state under Section 21 of Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance, 1979. There are 38 species of mammals, 350 birds' species, 32 species of reptiles and 09 species of amphibians recorded in this national park. IWMB protects these species in its natural habitat through existing IWMB staff. But fires in MHNP every year provoke the result of mischief that causes immense loss of the forest, wildlife and greatly disturbs the citizens of Islamabad. The major effect of the forest fire is on ground nesting birds, soil biodiversity and flora in National Park. The fire cases mostly occurred during the breeding season of these birds. The breeding success of these birds was severely affected due to fire (acuing a severe effect). A huge number of ground nests are lost every year affects threatnening their existence of birds in MHNP.

In this regard, the IWMB management formulated a 'Fire Protection Plan', to protect the valuable and visible forested part of the MHNP. Shortage of supervisory staff does not permit an area extension for protection. It is suggested that the remainder of the Park for fire management should be the responsibility of MCI but to protect the ground nesting birds this protection plan was helpful to save their clutch from forest fire. IWMB protects the habitat of these species in its natural state.

4.1.8.4 Fire Watch Area:

The following fire watch area established in MHNP to monitor the fire incidents by IWMB staff that are;

1. Kalinjir Gali
2. Sandoori (Chowki)
3. Budho Ban
4. Khoen Da Dana (Fire Chowki)
5. GujjarBarhi
6. Saidpur View Point
7. MakhialaChauki (Fire Chowki)
8. B4 Ranger Chowki
9. Murad Gali (Chowki)

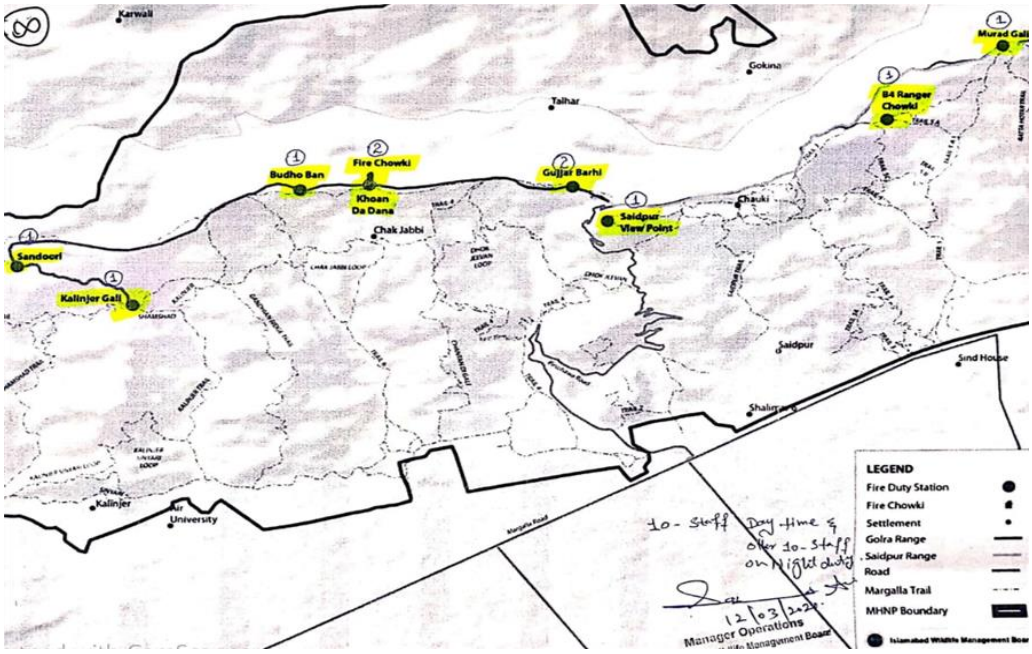


Figure: Map showing the fire watch points in Margalla Hills National Park

Staff is deputed at place to protect the MHNP from fire, 24 hours spent in the duty station with two shifts that are daytime and nighttime. Four fire chowkis were established to resolve the monitoring issue, and fire duty staff are aided with communication devices, which are linked with the control room at trail-06. Meanwhile the IWMB staff present on the trails also in contact with

the fire duty staff for strict monitoring of the area. Staff present on trails also create awareness about fire among the visitors/tourists to protect the national park. The patrolling staff on the road also helps in creating creates awareness among the tourists to prevent fire hazards in MHNP.

4.1.8.5 Duties of IWMB Staff:

There are 38 (Thirty-Eight) staff members involved in fire protection duty and they are deputed on their designated duty station. The staff deputed on the fire duty responsible for the designated area and answerable to the supervisor. The supervisors is accountable to fire protection in-charge and the in-charge respond to manager operations for further necessary action. IWMB protects the MHNP from fire through the funds allocated by itsparent ministry, the Ministry of Climate Change.

4.1.8.6 Staff Training:

Most of the staff is hired for 3 months on daily labor basis, the fire protection in-charge gives a brief training on control of fire incidents in which includes;

- Hands on practice making of fire beater
- Basic First Aid
- How to control the fire in the forest

4.1.8.7 Cooperation with Law Enforcement Agency:

One staff has been designated to cooperate and coordinate with law enforcement agencies (police station) and if any culprit (involved in manmade arson) is found during the patrolling in MHNP, he will be handed over to police and FIR will be lodged against him. This also play important role to protect forest from local communities, which are involved in manmade arson.

4.1.8.8 Awareness & Education:

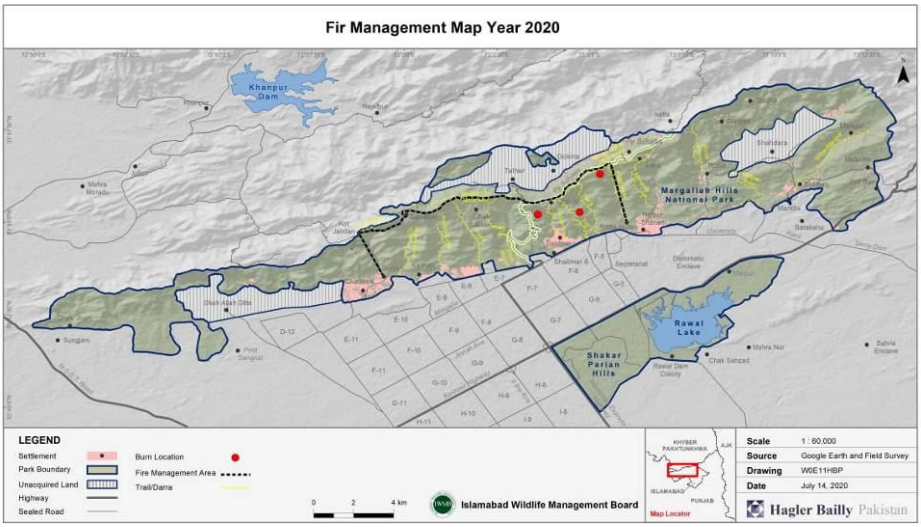
Awareness & education is also an important part of the fire protection plan in which awareness among the visitors/tourists and local communities is carried out. The awareness plays an important role to protect MHNP from fire.

4.1.8.9 Volunteer force of IWMB:

IWMB launched a volunteer registration program in March-2020 to involve citizens in the protection of MHNP from fire. The volunteers were registered and involved in various training sessions arranged by fire protection in-charge. These volunteer forces were on call when fire incidents happened, then in-charge informed all volunteers to control fire in MHNP.

1.1.8.10 Conclusion:

The result of this fire management plan is that most of the area under the control of IWMB team protect from fire in this year. There were fire incidents that erupted in Margalla Hills National Park and (fortunately were controlled) staff controlled these fires immediately to save the habitat of wildlife in this park. The given below map also showing the fire area.



5. Illegal trade of Wildlife in Islamabad capital territory (ICT)

One of the major threats that the park is facing is illegal wildlife trade. A few examples of illegal wildlife trade in the park are well known, for example pangolin which is one of the most illegally traded mammals on the planet and leopards which are illegally traded for their skins and bones.

Stamping out wildlife crime is a priority for IWMB because it is a direct threat to the future of many of the world's most threatened species. It is second only to habitat destruction in overall that threats against species survival.

In the year 2019- 2020 following wild animals were confiscated and released in natural habitat and in wildlife sanctuary;

Sr #	**Name of Species**	**Scientific Name**	**Number**	**IUCN Status**
01.	Common Leopard (Skin)	*Panthera pardus*	01	Vulnerable
02.	Himalayan Ibex (Trophy)	*Capra ibex*	01	Least Concern
03.	Markhore (Trophy)	*Capra falconeri*	01	Near Threatened
04.	Rhesus Monkey	*Macaca mulatta*	12	Least Concern
05.	Indian Pangolin	*Manis crassicaudata*	01	Endangered
06.	Rose Ringed Parakeet	*Psittacula krameri*	47	Least Concern
07.	Alexandrine Parakeets	*Psittacula eupatria*	01	Near Threatened
08.	Grey Partridge	*Francolinus pondicerianus*	03	Least Concern
09.	Black Partridge	*Francolinus francolinus*	12	Least Concern
10.	Chukar	*Alectoris chukar*	02	Least Concern
11.	Spotted Munia	*Lonchura punctulata*	368	Least Concern
12.	House Sparrow	*Passer domesticus*	3468	Least Concern
13.	Common Quail	*Coturnix coturnix*	04	Least Concern
14.	Baya Weaver	*Ploceus philippinus*	2564	Least Concern
15.	Bank Myna	*Acridotheres ginginianus*	1890	Least Concern
16.	Common Myna	*Acridotherestristis*	253	Least Concern
17.	Common Starling	*Sturnus vulgaris*	390	Least Concern
18.	Red Headed Bunting	*Emberiza bruniceps*	1679	Least Concern
19.	Rock Pigeon	*Columba livia*	06	Least Concern
20.	Indian Rock Python	*Python molurus*	01	Near Threatened
21.	Indian Black Pond Turtle	*Geoclemys hamiltonii*	14	Endangered
22.	Brown Roofed Turtle	*Pangshura smithii*	28	Near Threatened
23.	Indian Roofed Turtle	*Pangshura tecta*	15	Least Concern

24.	Indian Flap Shell Turtle	*Lissemys punctata*	08	Least Concern
25.	Monitor Lizard	*Varanus bengalensis*	08	Least Concern
26.	Grey Wolf	*Canis lupus*	04	Least Concern
27.	Golden Jackal (Rescue)	*Canis aureus*	01	Least Concern
28.	Black Kite (Rescue)	*Milvus migrans*	03	Least Concern
29.	Skin of different Animals (In Shape of garments)		52	
Total Population of Confiscated Species and Specimen			**10837**	

6. ENVIRONMENTAL EDUCATION & AWARENESS

Environmental Education (EE) refers to organized efforts to teach how natural environments function, and particularly, how human beings can manage behavior and ecosystem to live sustainably.

6.1 OBJECTIVES OF EDUCATION PROGRAM MHNP

The objectives are clear and bold,

1. To educate the **TEACHERS** and **STUDENTS** of institution around the Margalla Hills National Park
2. To educate the **PUBLIC** in respect to the nature and quality of the Margalla Hills National Park
3. To use **EXISTING PROMOTIONAL** and **EDUCATIONAL SYSTEMS** so as to produce a wide result.
4. To **ASSOCIATION IN ONE ATTENTION** the sympathy and activity of schools, colleges and citizen organizations in Margalla Hills National Park
5. To study **BACKGROUND LITERATURE AND SCIENCE** of Margalla Hills National Park and collect data for future use.

6.2 Concept Map of Environmental Education Awareness Program of Islamabad Wildlife Management Board (IWMB)

Sr#	Activity		Time for Activity	Area
1.	Introduction of Margalla Hills National Park (MHNP)		10 minutes	Outdoor Education Center
2.	Field Based Activities		120 minutes	Field area of MHNP
	2.1	Birds Watching Activity		
	2.2	Pug Mark Survey		
	2.3	Foot Print Casting		
	2.4	Pond Dipping		
	2.5	Soil Making Activity		
	2.6	Seed Ball Making Activity		
3.	Carcass Investigations		30 Minutes	MHNP
4.	Tree Identification		15 Minutes	MHNP
5.	Find Direction without Compass		10 Minutes	MHNP
6.	Food Web Activity		20 Minutes	MHNP
7.	Tent Pitching		30 Minutes	Camping Site of MHNP
8.	Guided Trek		50 minutes	Trails of MHNP
9.	Concluding Remarks/Answers & Questions		15 minutes	Outdoor Education Center

6.3 Details of the Awareness Activities

The activities are discussed in detail and how they make an interesting activity related to environmental education during the year July-2019 to June-2020. The detail of the activities is given below;

Detail of the activities:

6.3.1 INTRODUCTION OF MARGALLA HILLS NATIONAL PARK

The presentation about the introduction of Margalla Hills National Park (MHNP), which include;

- Biodiversity of MHNP

- Wildlife hotspots of MHNP
- Plant species of MHNP
- Introduction of Islamabad Wildlife Management Board

Total time of presentations session is 30 minutes, which includes a question answer session too.

6.3.2 FIELD BASED ACTIVITIES:

Islamabad Wildlife Management Board (IWMB) provides an opportunity to students to be involved in our practical field based activities. Through these activities students are involved and they look, observe and write on activity sheets. Sample of activity sheets are given below;

6.3.2.1 Birds watching Activity:

Focal birds tally sheet that has a pictorial view of common birds of Margalla Hills National Park. Students are observe through binoculars and the observation is noted on activity sheet.

Bird species include, Kalij Pheasant, Eurasian Sparrow Hawk, Spotted owlet, Jungle Babbler, Blue throated barbet, Spotted Munia, Common Myna, House Crow, Black Francolin, Grey Francolin, Asian Koel, Hoopoe, White cheeked bulbul, Great Tit, Purple Sunbird, and Oriental white eye.

6.3.2.2 Pug Mark survey/Casting

Pug mark survey include; foot prints of mammals (Common Leopard, Barking deer, Wild boar) and birds, exploration during the survey and their observation is noted on activity sheet.

6.3.2.3 Foot Print Casting:

Foot Print Casting is a an interesting wildlife awareness activity in which students first of all find fresh foot print of any wild animal in the field. Then Plaster of Paris mix with water and make a paste and put into the live foot print area. When plaster of Paris dried the casting ready and students come back to station with foot print. This activity develop interest among the students about the knowledge of biodiversity and their importance.

6.3.2.4 Pond Dipping:

This activity also known as invertebrate survey that include; Pond skater, larvae, insects, tadpoles, fresh water crab, water spider and fishes present in small ponds that are found in Margalla Hills National Park. Students or participants explored during the survey and noted their observation on activity sheet.

6.3.2.5 Soil Making Activity:

In this activity students are practically involved, how soil formed on the mountains after the friction and collision of stones. This soil is very important for the flora of the mountain. If this soil is not protected through plants the mountains will be barren.

Students take two stones on their hands and forcefully produce a friction. This friction force will provide a very small and fine powder form soil. After 20 minutes, students are able to form one teaspoon of soil. As a result of this activity, students are made aware of the importance of soil from mountains.

"Seed balls Making Activity":

This activity enhanced the students to make Pakistan green. The slogan of this activity is "**Seed Ball Creating Forest**".

In this activity students of schools and colleges make soil for seed balls. First of all a lecture on seed ball making will be delivered and the process will be demonstrated. After that students will be involved in this activity practically and make seeds ball. This activity is totally practical based and participation of each participant necessary.

6.3.2.6 CARCASS INVESTIGATION /NATURE SCAVENGER HUNT:

Divide the students into groups and then explain about the carcass. Let them search the game parameter with their checklists and tick off each item they collect. The group to complete the hunt or check off most items wins.

6.3.2.7 TREE IDENTIFICATION:

In this activity students with their data sheets collect the data of trees they identified. A maximum of five tree species must be written on the data sheet provided. Identification assistance will be provided from time to time during the activity

6.3.2.8 FINDING DIRECTIONS WITHOUT COMPASS:

It becomes very difficult to find your way out if you get lost in a forest. In this activity, students will learn how to navigate without using a compass by using the movement of the sun in the sky to determine cardinal directions. To conduct this activity, two sticks and stones are required. Students will pin one stick in the soil and place a stone at the end of the shadow cast by the stick. After 15-20 minutes, the position of the shadow will change, and another stone will be placed to mark the new position. A stick will then be placed between the two rocks, which will help determine East and West; the first stone marks West, and the second stone marks East. The second stick will be placed perpendicular to the first, and will denote North and South.

6.3.2.9 FOOD WEB ACTIVITY:

One specie from different animal groups (mammals, reptiles, etc.) will be assigned to each student. The students will then stand in a circle and introduce themselves as the animal they represent. Each student will then identify the predators and prey of their assigned specie from within the circle. As each predator or prey is identified, the students will extend threads between them to represent a predator-prey relationship in a food chain. Once the activity is completed, the network of threads will represent a food web. This will help practically demonstrate how species in an ecosystem are linked to each other, and how a natural ecological balance is maintained through food webs.

6.3.2.10 TENT PITCHING:

Sometimes spending a day in the wilderness isn't quite enough to truly capture the feeling of a special place. Sure, you see some amazing views or go on an unforgettable hike. But to get the full experience, you yearn to see the dark, starry skies. To listen to the howling of jackals and bark of barking deer. To watch the sun rise on a silent, dewy morning with birds singing.

Camping in the great outdoors transforms a regular old road trip into an epic experience. So pack up your tent or hitch up the fifth wheel, adventure awaits for you at trail#05 of Margalla Hills National Park under the administration of Islamabad Wildlife Management Board (IWMB).

During this activity, students will be involved in the tent pitching activity at camping site of trail #05. Students are also practically involved and pitch their tent on their own.

6.3.2.11 GUIDED TREK:

An almost 2km guided trek from VIC trail #5 will inform students about the Margalla Hills National Park. During the trek, students and visitors will be taught to identify pugmarks, fecal pellets, and plant, mammal and bird species. Additionally, participants will be involved in clean-up activities and collect trash found on the trail during the trek.

6.3.2.12 CONCLUSION & QUESTION ANSWER OF THE SESSION:

All participants will gather in the outdoor education center and share feedback regarding the field visit. Any questions asked by the participants will be answered.

6.3.3 AWARENESS SESSIONS DURING THE YEAR:

Between July 2019-June 2020, there have been a total of 52 awareness sessions with 2080 participants. These participants mainly included:

1. Local Schools Located in MHNP
2. Universities
3. Departments; NGOs
4. General Public/ Visitors of MHNP.

6.3.4 Duke and Duchess of Cambridge's maiden trip to Pakistan

The Duke and Duchess of Cambridge's maiden trip to Pakistan aimed to boost bilateral ties and address challenges such as climate change and women's education. The royal couple then headed to Margalla Hills for an event to highlight the impact of global warming among students. There are local school students, who were involved in various environmental outdoor educational activities. There are 60 students who participated in this education program. Activities including painting; scavenger hunt; seed ball making and storytelling.

6.3.5 WORLD WILDLIFE DAY

Venue: Visitor Information Center Trail-05

Dated: 03rd March 2020

Day: Tuesday (02:30pm to 04:00pm)

Organized by: IWMB-Awareness & Education Team

6.3.5.1 INTRODUCTION:

Islamabad Wildlife Management Board (IWMB) is working for the wildlife of Marghalla Hills National Park & ICT under Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance 1979.

On 3rd March of every year, **"World Wildlife Day"** is celebrated. In this regard IWMB arranged an awareness raising program for students, researchers, photographers and general public at Trail-05 Margalla Hills National Park to share practical experiences from throughout Pakistan.

6.3.5.2 PROGRAM DETAIL:

The detail of program is given below;

SR#	PROGRAM	PRESENTED BY
01.	Recitation of holy Quran	Ehtisham-ul-Haq

02.	Naat	Muhammad Zubair
03.	Welcome to all Participants	Mr. Sakhawat Ali
04.	Sustaining all Life on Earth	Mr. Rab Nawaz
05.	Margalla hills National Park for future generation	Mr. Sakhawat Ali
06.	Plastic free Margalla Hills National Park	Mr. Tassdaq Malik
07.	Flora of Margalla Hills National Park	Dr. Ibrar Shinwari
08.	Display of Submitted entries	Judges
09.	Prize & certificate distribution	Chief Guests
10.	Vote of thanks to Chief Guests	Mr. Sakhawat Ali
11.	Refreshment	

6.3.5.3 CONTEST DETAIL

The event comprised of the following categories:

1. STUDENTS PAINTING

Students submit paintings; stories; essays & Working Model "Sustaining all life on Earth"

The following schools participated in this event;

- **A.** Islamabad Model School for Girls Shahdhra
- **B.** Islamabad Model School Rumli
- **C.** Islamabad Model School for Girls Nurpur Shahan
- **D.** Mashal Model School, Nurpur Shahan
- **E.** Asif public School, Nurpur shahan
- **F.** Sultan Model School, Nurpur Shahan
- **G.** Usmania Technical Model School, Nurpur Shahan
- **H.** Islamabad Model School for Girls Saidpur
- **I.** Behbud English Medium Primary School, Saidpur
- **J.** Islamabad Model School for Girls Shah Allah Ditta

There were **5** entries submitted by each school to participate in the competition on painting, essay and stories. There were three (3) winner;

- 1st Position: Jazib Ali (Mashal School)
- 2nd Position: Iqra Bibi (Behbud School)
- 3rd Position: Areeba Kazmi (IMSG Shahdhra)

2. WILDLIFE PHOTOGRAPHY

For the wildlife photography competition, the following photographers submitted their photos:

A. Mohibullah Naveed (Islamabad)
B. Muhammad Shahzaib (Islamabad)
C. Abdul Hadi Raja (Islamabad)
D. Hafiz Azhar (Haripur)
E. Kashif Saleem (Rawalpindi)
F. Nabeel Ahmed (Islamabad)
G. Umar Waqas (Rawalpindi)

There were **29** entries submitted by the photographers and displayed on the wall. Following are the winner of the competition:

Professional Category:

- 1st Position: Kashif Saleem
- 2nd Position: Mohammad Shahzaib
- 3rd Position: Umar Waqas

Amateur Category:

- 1st Position: Abdul Hadi Raja
- 2nd Position: Hafiz Azhar

3. RESEARCHER (Poster Presentation)

Research Students submitted their research poster regarding their research on wildlife i.e., Mammals, birds, reptiles and amphibians. Following research poster submitted by the researchers on following topic;

A. Avian assemblage, monitoring and bio assessment of Margalla Hills National Park, Islamabad

Authors: Abdul Hadi, Muhammad Rais, John Worthington, Maria Zafar and Ifrah Muddasir

Department of Wildlife Management

Pir Mehr Ali Shah Arid Agriculture University Rawalpindi Pakistan

B. Herpetofaunal Assemblage across Hiking Trails and Undisturbed Areas of Themargalla Hills National Park Islamabad

Authors: Jamal Ahmad and Muhammad Rais

Department of Wildlife Management

Pir Mehr Ali Shah Arid Agriculture University Rawalpindi

C. Population estimates and habitat modeling of Barking Deer in Margalla Hills National Park, Islamabad

Authors: Shahzad Aslam and Dr. Amjad Rashid Kayani

Department of Zoology, Faculty of Sciences, PMAS Arid Agriculture University Rawalpindi

D. Distribution and Diet Composition of Leopard Cat (*Prionailurus bengalensis*) in Margalla Hills National Park, Islamabad.

Authors: Hira Fatima, Dr. Tariq Mehmood

Department of Wildlife Management

PMAS-Arid Agriculture University Rawalpindi.

E. Distribution and Habitat Use of Kalij Pheasant (*Lophura leucomelanos*) in Margalla Hills National Park, Islamabad

Authors: Muhammad Farooq (M.Phil Thesis) Department of Wildlife Management, PMAS-Arid Agriculture University Rawalpindi

F. Relative Impact of Five Most Diverse Species of Birds, Mammals and Plants Indigenous to Margalla Hills National Park on the Surrounding Environment

Author: Zulkifl Abbasi, Dr. Naeem Ejaz, Dr. Liaqat Qureshi, Zahid Abbasi, Naeem Ashraf Raja, Rana Tahir, Sakhawat Ali, Ali Jabbir

Department of Environmental Engineering

University of Engineering and Technology, Taxila.

6.3.5.4 PARTICIPATING UNIVERSITIES:

1. PMAS- Arid Agriculture University, Rawalpindi
2. Capital University of Science and Technology, Islamabad.
3. Islamic International University, Islamabad.
4. Fatima Jinnah Women University, Rawalpindi.

6.3.5.5 JURY FOR EVENT:

The following judges selected the best works during the event:

- Mr. Tassdaq Malik
- Mrs. Tassdaq Malik
- Mr. Rab Nawaz

6.3.5.6 PRIZE & CERTIFICATE DISTRIBUTION:

At the end of the event, the winners of the competition were awarded a shield and certificate. Certificates were also distributed among the participants.

7. RESEARCH & PLANNING

Research was conducted by the IWMB scientific committee under the chairmanship of Prof. Z. B. Mirza. Moreover, students of the universities are conducting different ecological studies.

7.1 Status of Common Leopard in MHNP

The camera trapping study started in the year 2019-2020. The study was carried out by establishing three basecamps at three different potential sites in the national park. The presence of common leopard (*Panthera pardus*) was monitored at various locations in MHNP. The results of this study are not finalized yet.

7.2 Impact of forest fire on Biodiversity of Margalla Hills National Park (In-Progress)

7.2.1 LOCATION & STUDY AREA:

The current study was carried out in Margalla Hills National Park (MHNP) Islamabad, located between 33° 43' N and 72° 55' E, having a total area of approximately 17,386 ha (Fig.1). It covers Margalla Hills (12802 ha), Rawal Lake (1702ha) and Shaker Parian (1376 ha). Its topography is uneven, comprising mostly of sheer slopes and gullies and the rock composition is basically limestone. Its elevation ranges from 450 to 1580 m above sea level (Jabeen et al. 2009). On the western side, elevation of the mountain is about 1600 m, which increases towards the eastern side (Anwar, 2001). The soil is colluvial, wind deposited, ranging dark brown to yellowish brown in color with a fine texture (Hijazi, 1984) while the climate is sub-tropical to semi-arid. Average maximum and minimum temperatures of the area are 34.3ºC and 3.4°C, respectively (Shinwari, 1998). Climatically, there are five seasons including winter (December-February), spring (March-April), summer (May-June), monsoon (July-September) and autumn (November) (Anwar and Chapman, 2000). The area receives a reasonably high monsoon rainfall and the annual rainfall is up to 1200 mm. Underground water table is in moderate condition having a pH of 7.4 (Shinwari, 1998). There are many small and scattered villages in the MHNP at different elevations.

7.2.2 AREA OF RECENT FIRE:

There are four major area that suffer badly due to fire incidents in Margalla Hills National Park that are;

1. Kanthela & Kot Jandan in Glora Range

2. Sandoori & Nooran Di Gali in Golra Range

3. Talhar valley in Saidpur Range

4. Murad Gali in Nurpur Range

7.2.3 JUSTIFICATION:

Human population residing in the Margalla Hills National Park is randomly distributed. There are 38 villages comprising of more than 92000 peoples. (CDA 2000) With the passage of time and human development, there are certain biotic and abiotic factors which imparted significant negative changes to the environment of the National Park. One of the important setbacks was the decline of vegetative cover. This was due to grazing and manmade fire incidents which rapidly replaced the palatable species with the unpalatable ones. Forest fire incidents in the National Park happened every year, which caused great impacts on the forest ecosystem, biodiversity, as well as the surrounding environment including urban area of ICT. Fire in Margalla hills severely damage the entire ecosystem and impact on biodiversity is still unclear. So, there is a dire need to study the impact of forest fire on the biodiversity of Margalla Hills National Park.

7.2.4 LITERATURE REVIEW:

Rasheed *et. al.,* 2005 made phyto-sociological observation on the fifteen transect lines covering every geographical area of the compartment 17 in Margalla hills National Park. It was observed that Kao (*Olea ferruginea*) was the dominant tree of the study area, occurring as first in the 7 out of 15 strands, followed by Chir pine (*Pinus roxburghii*) dominant in first 5 strands and Kamila (*Malotus philippensis)* dominant in first 3 strands. The dominant shrub was Khokhan (*Myrsine africana*) and the dominant grass was Loonder (*Themeda anathera*). Human and animal impact can clearly be seen in the area in the form of over grazed grass patches and denuded patches of soil. Encroachments were made by local people for cultivation adding to the vegetation deterioration of the compartment 17 of Margalla Hills National Park.

Khan, *et. al.,* 2014 conducted research to analyze the chemical properties of the soil of Margalla Hills of Pakistan affected by fire in comparison with un-burnt soil of the same area. Soil texture is affected by combustion but with the revival of nature plants, soil properties return to pre-burn status. A study of fire affected soil revealed that soil properties were significantly improved on burnt soils than on the un-burnt site and the response was attributed changes in the host plant.

Khalid *et. al.,* 2015 found that deforestation is a serious environmental problem throughout the world including Pakistan where a striking depletion of forest reserves has been an ecological

concern for quite some time. Remote sensing techniques have been used to monitor land use and forest cover changes. The present study aims at visualizing the potential impacts of climate change and declining forest reserves on Margalla Hills National Park (MHNP). ERDAS Imagine 9.1 and Arc GIS 10.2 software's were employed for the spatial and temporal analysis and visualization of over the past two decades. Our analysis revealed a great increase in the built-up area, barren soil and agricultural land, whereas diminishing trend is shown by the classes such as water body, lower vegetation, scrub and conifer forest. The conditions of the region are unsatisfactory and require conservation practices to be carried out in order to avoid susceptibility against ecological and socio-economic disturbances.

Syaufina *et. al.*, 2015 conducted a study on fire impacts assessment on vegetation biodiversity and air pollution was conducted in Tesso Nilo National Park (TNNP), Riau Province, Sumatera, Indonesia. This paper aimed to describe fire severities and fire impacts on species diversity and pollutants in urban areas surrounding the study location. Vegetation analyses and diversity analyses were conducted in the burned as well the unburned areas to calculate Important Value Index and Diversity Index. Fire severities were determined using vegetation condition approach. Pollutant data and public activity impacts were obtained from the local government. The forest fire that occurred in TNNP in July 2015 is classified as high fire severity. Species Diversity Index of burned area (0.96) is classified as "Not good" lower than that of unburned area (3.05) which is classified as "Good". The forest fire may decrease commercial tree species from 28 to 3 species including: *Macaranga pruinosa*, *Diaphania costata* and *Shorea macroptera*. Air Pollution Index in urban area surrounding study location seems to be unhealthy even at dangerous levels which causes great impacts to public activities.

7.2.5 METHODOLOGY:

Following methodology adopted to observe the impact of forest fire on biodiversity of Margalla Hills National Park;

7.2.5.1 Site selection:

The sampling sites will be selected on the basis of recent fire incident. The areas where fire incident took place will be referred to as burned area and other sites where fire incidents did not

take place will be characterized as un-burned area. Studies will be carried out on burned area and unburned area simultaneously.

7.2.5.2 Procedure:

A survey team will focus on the flora and fauna of the selected area by using a line transect method. The movement of the surveyor is according to terrain which will be zigzaged or slightly changed. Macro fauna will be sampled in transects, for which the optimum size is 40 x 4m. However, for the quantitative sampling of termites and for a number of above-ground studies (particularly plant functional attributes and carbon sequestration) quadrates of 40 x 5m will be deployed, and it seems advisable to standardize both above-ground and below-ground work at 40 x 5m.

7.2.5.3 Field Collection:

Field collection will be carried out separately that are;

Diurnal Species:

The diurnal macro invertebrate will be recorded by direct observation and unidentified macro invertebrate collected in glass vial for further identification in the lab.

Nocturnal biodiversity:

The nocturnal macro invertebrate will be recorded by tilting of loose stones and observation recorded.

Plant Species:

All plant species in the sampling plot will be recorded and also placed in herbarium sheet for further record.

8. STAFF TRAINING:

IWMB staff was provided training on the following:

8.1 Ecology and conservation of mammals, birds and reptiles in MHNP

Training was provided to the IWMB staff to know about the biodiversity of Islamabad and its significance. The major fauna and flora of the area were discussed. The staff attend weekly basis training session in which they learn about the field activities.

8.2 Bird and Mammals Identification

Field methodologies were discussed by Senior Professor Dr. Z. B. Mirza with the IWMB team so that the important mammals and birds of the Park are identified.

8.3 Ecotourism in MHNP

The training was all about how ecotourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small-scale alternative to standard commercial mass tourism. The Training also focused on how ecotourism is responsible for travelling to natural areas conserving the environment and improving the well-being of the local people. Its purpose was to educate the traveler, to provide funds for ecological conservation, to directly benefit the economic development and political empowerment of local communities, or to foster respect for different cultures and for human rights.

8.4 Plants Identification

A basic training was provided to the IWMB team so that they can be able to differentiate between the different species of the plant and identify them.

8.5 Littering Issues and Plastic Free Park

Litter is any kind of trash thrown in small amounts, especially in places where it doesn't belong. With time, it heaps up. The practice is unlawful because it costs municipalities millions of rupees annually in cleanup costs. It also portrays a bad picture of an area. The most frequently littered stuff include fast food packaging, cigarette buds, used bottles, chewing gum wrappers, broken electrical equipment parts, toys, broken glass, food scraps or green waste. So, training was essential for the IWMB to develope policies and draw plans to keep Margalla Hills National park clean.

8.6 Basic First Aid

Many important Standard operating procedures for snake bite and first aid were developed to know how to deal in emergency situations.

8.7 International Ranger Congress:

At the IRF World Ranger Congress in Nepal last November the Chitwan Declaration aimed at addressing the many threats and issues faced by rangers, that if implemented, could lead to reduced ranger deaths and increased effectiveness. In this congress, the following staff was nominated and sponsored by WWF-Pak;

1. Auneeb Ahmed (Wildlife Guard)
2. Jamshed Nazir (Wildlife Guard)

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The End