

**IDENTIFYING CHALLENGES IN THE IMPLEMENTATION OF
NATIONALLY DETERMINED CONTRIBUTIONS (NDCs) 2021 OF
PAKISTAN**



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A thesis submitted as a draft for preliminary requirement for
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THESIS ACCEPTANCE CERTIFICATE

Certified that final copy of the thesis titled “IDENTIFYING CHALLENGES IN THE IMPLEMENTATION OF NATIONALLY DETERMINED CONTRIBUTIONS (NDCS) 2021 OF PAKISTAN” written by Mr. Mubasher Hussain (Registration No. 00000318305), of Urban and Regional Planning (NICE-SCEE) has been vetted by the undersigned, found complete in all respects as per NUST Statutes/Regulations, is free of Plagiarism, errors, and mistakes and is accepted as partial fulfillment for the award of MS degree. It is further certified that necessary amendments as pointed out by GEC members of the scholar have also been incorporated in the said thesis.

Signature: _____

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Date: _____

Signature (HOD): _____

Date: _____

Signature (Principal & Dean): _____

Date: _____

DEDICATION

This research work is dedicated to my beloved parents, who realized the importance of education and made me capable of reaching this level. At the same time, it is dedicated to my dearest Siblings and my Wife, who supported and guided me in every field of life. It is their love and support that enabled me not only to complete this task but also to walk every step of life with confidence and commitment.

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The research work is a result of the coordination, contribution, and assistance of many individuals. But, I start with the name of Almighty Allah, who granted us wisdom and insistence for completing this project.

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Mubasher Hussain

ABSTRACT

Pakistan is a signatory to the Paris Agreement, which aims to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C above pre-industrial levels. As part of the agreement, Pakistan submitted its first NDCs in 2016, and has recently updated its targets for 2021. Pakistan's updated NDCs aim to reduce greenhouse gas emissions by 30% below business-as-usual levels by 2030, with a target of achieving 60% of electricity generation from renewable energy sources by 2030. To achieve these targets, Pakistan has identified a number of mitigation and adaptation measures in various sectors such as energy, transport, industry, agriculture, and forestry. However, the implementation of these targets faces significant challenges. Pakistan is a developing country and faces economic constraints, which limit its ability to invest in new technologies and infrastructure. Moreover, Pakistan is vulnerable to the impacts of climate change, such as floods, droughts, and heat waves, which pose significant challenges for its adaptation efforts.

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CHAPTER ONE

1 INTRODUCTION

1.1 BACKGROUND:

The Nationally Determined Contributions-2021, Pakistan offers a consensus of our country's goals, limitations, and multi-sectoral objectives for our climate activities in the upcoming ten years. Pakistan's sectoral priorities and national development plans are in line with its climate change strategy. The National Climate Change Policy (NCCP) and the Framework for its implementation serve as the foundation for this updated NDC. With Pakistan playing a prominent role in climate change-related initiatives and programs in accordance with the Paris Agreement, this research would highlight Pakistan's extreme vulnerability. With NDCs, nations have the chance to prioritize and give attention to policies that will benefit their own citizens the greatest while also advancing global climate action. (Atteridge et al., 2020).

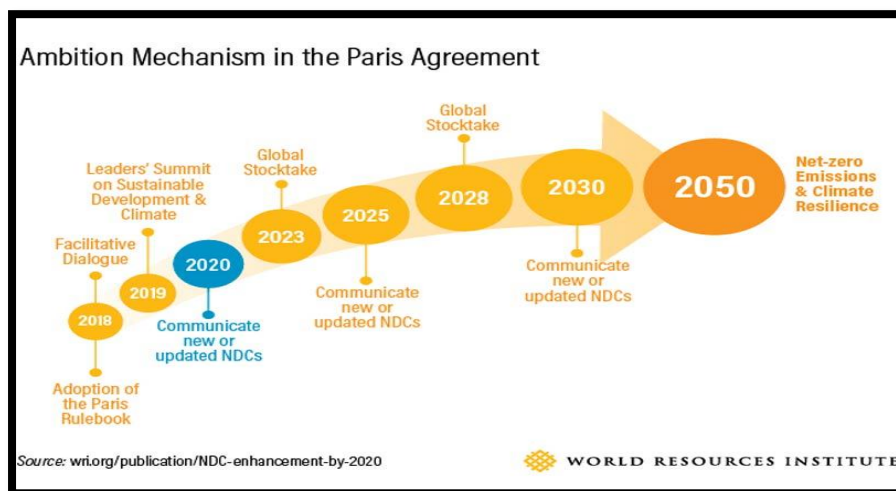
Particularly in developing nations, emphasis has been placed on the significance of climate change in meeting GHG emission reduction targets outlined in their INDCs. (Giles et al., 2021). The NDC plan encompasses all economic sectors and is based primarily on changing the energy sector to use sustainable energy sources, including sectoral targets for increasing the capacity of renewable energy sources and enhancing energy efficiency in the demand sectors. (Fragkos & Zisarou, 2022). For NDCs implementation, Institutional, informational, financial, behavioral/psychological, and technical hurdles were the categories that resulted from the adoption of NDCs. (Giles et al., 2021)

1.2 Research Problem:

The Paris Agreement also requires that parties gradually raise the ambition of their NDCs. Given that the Paris Agreement was reached in 2015, the first NDCs began to be implemented in 2021. The Paris Climate Agreement sets a goal of keeping average global warming well below 2 °C over pre-industrial levels and pursuing measures to keep the temperature increase to 1.5 °C. (Roelfsema et al., 2020). Align the NDC with long-term national goals and strategies for economic, development, and climate goals. (Fransen et al., 2017). All end-use industries are expected to have a rise in final energy consumption as a result of strong GDP and population expansion, urbanization tendencies, and growing standards of comfort and living. (Fragkos & Zisarou, 2022). Due to low income economy, Pakistan is witnessing an increase in the frequency

and intensity of climatic occurrences like droughts, heat wave, severe water shortages, floods in some areas, and an increase in pest and disease incidences. (Smit and Skinner, 2002). The NDCs policy guidelines are yet to be followed in its true sense. There are numerous new strategies and modern means about adaptation & mitigation principles to cope with ongoing environmental & climate change impacts. (Fragkos & Zisarou, 2022)

A number of policy alterations have been made by the Pakistani government since the NDC was first filed in 2016. Beyond what is described in the NDC, ecosystem-based methods, low-carbon development, carbon sequestration, and the use of renewable energy all represent significant advancements. It still needs to put in place a strategy for nature-based solutions, together with green jobs and other chains of activities, to further help goals within the confines of its constrained national resources. (NDCs-2021, GoP)



The Government of Pakistan has contributed to the global effort to combat climate change as a Party to the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). To speed the shift to a climate-resilient economy, the GoP has presented a revised Nationally Determined Contributions (NDC) document that reflects national consensus and is inclusive. (NDCs-2021, GoP). The new NDCs of the Parties must be compared and analysed in order for the global community to comprehend the emissions gap. (Wang et al., 2022)

The current contribution showcases the successes of the GoP in addressing climate change, including technological interventions as well as laws and programmes promoting nature-based solutions (NbS). Recognising the importance of environment in climate adaptation and mitigation, Pakistan has launched successful natural capital restoration efforts, such as the Ten

Billion Tree Tsunami Plan (TBTP), Protected Areas Initiative (PAI), and others. (NDCs-2021, GoP).

NDCs are commitments made by each country to reduce greenhouse gas emissions and get ready for the effects of climate change. The NDCs are an important part of the Paris Agreement, which was created during the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015. The NDC plan encompasses all economic sectors and is based primarily on changing the energy sector to use sustainable energy sources, including sectoral targets for increasing the capacity of renewable energy sources and enhancing energy efficiency in the demand sectors. (Fragkos & Zisarou, 2022)

1.2.1 Level of Research Already Carried Out on the Proposed Topic:

This study is based to identify implementation hurdles and challenges faced by NDCs 2021 of Pakistan for its streamline in National climate change policies. This level of research has not been carried out in Pakistan. The study has three (03) components where as first component of NDCs key words comparison with National climate change legislations has not yet done any research in Pakitsna. In the past, Pakistan has designed inclusive mitigation and adaptation measures for fighting against worst impacts of climate change in the region. (Done)

1.3 Reason/Justification for the Selection of the Topic:

Climate change makes threats more prevalent. People are impacted in fundamentally uneven ways, with the poorest and those least equipped to handle stress and climatic shocks essentially suffering the most. When there are insufficient funds to combat climate change, low-income countries suffer more than developed countries. (Abanda et al., 2023). Numerous difficulties are brought on by climate change, which is now posing a threat to humanity's existence. Pakistan's experience in tackling global difficulties through Nature-based Solutions (NbS) enables it to be a solution provider. (Felix, 2020). It is essential to have a mechanism in place, such as M&E, that may improve human capacities for the successful implementation of NDCs. (Abanda et al., 2023).

Despite contributing only 0.9% of the world's greenhouse gas (GHG) emissions, Pakistan is one of the countries most vulnerable to its consequences. The updated NDCs' primary goal is to make Pakistan a sustainable, low-carbon, and climate-resilient nation. In view of the current scenario, the Government of Pakistan (GoP) promises to work towards the full implementation

of NDC contributions. The GoP acknowledges the importance of socioeconomic factors in the development of climate action plans. (NDCs-2021, GoP)

Pakistan wants to advance these particular goals:

- Enhance NDC legislation, planning, policy, and strategy.
- Establish the conditions that will allow NDC deployment.
- Accelerate the integration and coherence of policies to accomplish the Sustainable Development Goals (SDGs)
- Improve NDC measurement, reporting, verification, and climate action well dissemination at country level

1.4 Advantages of Study:

- Strengths of National and provincial climate change policies will be generated
- Challenges and weaknesses of Pakistan's National and provincial climate change policies, acts, plans will be exposed
- A comparison draw between NDCs-2021 and Pakistan's climate change legislations will be performed
- Awareness of NDCs concepts, guidelines to the urban planners
- To urge and aware urban planners to adopt NDCs guidelines in their Master Planning and city development activities
- To calculate urban planners perceptions to the level of seriousness of climate change happening in Pakistan

To reach the target, Pakistan aims to shift to 60% renewable energy, and 30% electric vehicles by 2030 and completely ban imported coal, our national plans on climate change must be supportive in that way. Further, Pakistan has taken steps for Nature based solutions and campaign for Ten Billions Trees Project, urban planners level of involvement is very crucial to achieve that target. Pakistan needs to empower its administrative and technical abilities to meet target to reduce GHG emissions in the country.

1.5 Research Objectives:

1. To critically review current legislations and acts in the context of Nationally Determined Contributions (NDCs-21).

2. Awareness of NDCs 2021 and Urban Planners Perceptions to Climate Change in Pakistan
3. Urban Planners perception in achieving Nationally Determined Contributions (NDCs-2021) Pakistan.

1.6 SCOPE OF STUDY:

The Government of Pakistan (GoP) development in climate movement that levels from policy and applications on Nature-based Solutions (NbS) to technology-based interventions. In addition, Pakistan has introduced some of policy movements targeted on mitigating greenhouse fuel emissions from excessive emission sectors like power and industry. (Government of Pakistan, 2021)

The awareness of GoP's climate movements all through the last decade in advance is determined by means of the modern climate-prompted vulnerabilities, aimed at attaining decreased poverty and ensuring a strong economic system. Hence, Pakistan intends to set a cumulative bold conditional goal of universal 50% reduction of its projected emissions by 2030. (Government of Pakistan, 2021)

1.7 Thesis Break up

The thesis includes seven chapters starting from introduction, literature review followed by research methodology. Then data collection and its analysis are done to attain conclusions afterwards policy recommendations.

CHAPTER TWO

2 LITERATURE REVIEW: (NDCs AND CLIMATE CHANGE)

2.1 NDCs CONCEPT:

A non-binding national strategy for lowering greenhouse gas emissions and addressing climate change is known as a nationally determined contribution (NDC) or intended nationally determined contribution (INDC). These plans also cover the measures the government aims to take to combat climate change and advance the global objectives set forth in the Paris Agreement. the first UNFCCC targets for reducing greenhouse gas emissions that apply to both developed and poor countries. (FCCC, 2021)

Globally, the frequency of extreme occurrences brought on by climate change has grown. The Updated NDC-21 offers a consensus of our country's goals, limitations, and multi-sectoral objectives for our climate activities in the upcoming ten years. Pakistan's sectoral priorities and national development plans are in line with its climate change strategy. The National Climate Change Policy (NCCP) and the Framework for its implementation serve as the foundation for this updated NDC. In light of Pakistan's severe susceptibility to climate change and planning for adaptation in light of NDCs, as well as its leadership in climate change-related initiatives and programs, this research would highlight Pakistan's acute vulnerability and reflect the Town Planners' assessment for NDCs implementation through Master Planning Strategies. (Wang et al., 2022)

Given Pakistan's vulnerability to climate change and the capital-intensive transition to a low-carbon economy, the country still has significant financial needs. The nation considers using the tools on increased ambition given in Article 6 of the Paris Agreement as well as improving access to international climate funding to deliver the contributions. To help diversify the funding sources, Pakistan has previously identified market- and non-market-based strategies, such as Nature Performance Bonds, Green/Blue Bonds, Carbon Pricing Instruments, etc. Pakistan encourages the development of NbS that address its capacity for both mitigation and adaptation and the implementation of its climate ambition across sectors. (NDC-21 Government of Pakistan, 2021)

2.2 Back ground of NDCs:

The Nationally Determined Contributions (NDCs) describe the steps taken to cut emissions, as well as how to adapt to the effects of climate change and what assistance the nation needs or will provide to battle the problem. After the initial NDC submission in March 2015, an evaluation phase was carried out to determine the impact of the NDCs ahead of the 2015 United Nations Climate Change Conference.

The parties (countries or regional groups of nations) in question separately construct NDCs. But they do it inside a constricting, iterative "catalytic" framework meant to gradually ramp up climate action. States are expected to amend their initial NDCs every five years after setting them. Reports on the status of the goals outlined in each state's NDC are to be released every two years. These will go through a technical evaluation and be used as input for a global inventory exercise that will evaluate the overall sufficiency of NDCs on a collective basis.

The data received from each party's reports and evaluations, combined with the more complete picture obtained through the "global stock take," will in turn inform and influence the formulation of the pledges made by the states going forward. Overall, it is believed that this process will provide a variety of platforms on which domestic and international political processes can take place, making it easier to make more ambitious pledges and increasing pressure on nations to adhere to their nationally set objectives. All the goals for each country are stated in their NDC which are based on the points below.

- Until 2050, climate neutral
- Striking a goal of limiting global warming to 1.5 °C and keeping it far below 2 °C
- Lowering greenhouse gas (GHG) emissions; enhancing adaptation to the negative impacts of climate change; and
- Adjusting financial flows to be paired with lower GHG emissions

2.2.1 Terminologies under NDCs:

2.2.2 Socio Economic Section:

2.2.2.1 Gender Equality:

Pakistan has pledged, as part of the NDCs, to support gender equality and women's empowerment in its climate change initiatives. This involves making sure that women participate in climate change related decision making processes and have access to resources and information about the climate change issues.

2.2.2.2 Climate Finance:

Pakistan's NDCs place a strong emphasis on the need for increasing financial assistance from industrialized nations to help Pakistan meet its climate goals. Pakistan anticipates spending \$40 billion over the next ten years to implement its NDCs, with a sizable chunk of this money coming from outside the country.

2.2.2.3 Poverty Alleviation:

NDCs 2021 aims to promotes climate-smart farming and sustainable land-use methods, which may assist to raise smallholder farmers' agricultural production and incomes. This will entail expanding the use of crops that are climate resilient and agro-forestry techniques, which can assist to boost yields. encouraging sustainable urban development can also help to open up job opportunities and enhance the quality of life for city dwellers. Moreover, ecological preservation and restoration, which can boost local residents' livelihoods and lower poverty.

2.2.2.4 Eco-tourism:

Pakistan's NDCs for ecotourism include an emphasis on the creation of infrastructure for ecotourism that is sustainable, the preservation of natural resources, and the encouragement of community-based tourism. The government wants to create more national parks, wildlife refuges, and protected areas while also enhancing the infrastructure and management of these locations to boost ecotourism.

2.2.2.5 Green Jobs:

By the year 2030, Pakistan wants to generate 60% of its electricity from renewable sources. As a result, there will be a demand for specialists in the field of renewable energy, including

engineers, technicians, project managers, and policy analysts. Green jobs involves energy efficiency livelihood in agriculture, transport and waste management sector.

2.2.3 Climate Change Adaptation Planning Section in NDCs-2021:

2.2.3.1 Water Resource Management:

By building new dams and reservoirs, Pakistan has agreed to increase its water storage capacity under the NDCs. The NDCs also concentrate on increasing the effectiveness of water use in agriculture, which uses the most water in the nation. Additionally, the NDCs emphasize water resource conservation through lowering water pollution and improving water quality.

2.2.3.2 Climate Education:

The creation of a national climate change curriculum is one of Pakistan's NDCs' primary climate education initiatives. From primary to higher education, this curriculum is being developed to include climate change education in formal educational systems. Climate science, adaptation and mitigation tactics, and sustainable development will all be covered in the course material.

2.2.3.3 Climate Risk:

Pakistan has pledged to address climate risks in its NDCs for 2021, the nation still has to fight against extreme weather events including floods, droughts, and heat waves have become more frequent poses having a negative impact on agriculture, water resources, and public health. Another big risk is posed by the melting of Himalayan glaciers, which are vital for Pakistan's agricultural sector's access to water supplies.

2.2.3.4 Technology Need Assessment:

Countries may undertake TNAs to determine the technology solutions and capacity-building required to support their climate initiatives in order to attain the objectives outlined in their NDCs. Pakistan, like other developing nations, might need foreign assistance, such as technology transfer and capacity building, to carry out its NDCs.

2.2.4 Climate Change Mitigation Section in NDCs-2021

2.2.4.1 Nature Performance Bonds:

"Nature Performance Bonds" are financial rewards that can encourage nations to safeguard their natural resources and biodiversity. These bonds are intended to praise nations financially when they achieve certain goals for the preservation and sustainable management of natural resources.

2.2.4.2 Carbon Trading:

According to Pakistan's NDCs, the government intends to create a national carbon market so that the nation can trade carbon credits. By providing a financial incentive for doing so, this approach will encourage businesses and industries to cut their emissions. It has not yet been decided how Pakistan would design, implement, and regulate its carbon trading system.

2.2.4.3 Electric Vehicle:

As a tool for policy, carbon pricing assigns a cost to greenhouse gas emissions in order to encourage their reduction. Although Pakistan has not yet adopted a carbon pricing strategy, it may do so in the future in order to meet its climate goals and lower its carbon footprint.

2.2.4.4 Carbon sink:

By planting 10 billion trees by 2023, Pakistan has pledged to increase its carbon sink. This programme, the "10 Billion Tree Tsunami," aims to enhance the nation's forest cover and lower atmospheric carbon dioxide levels. Pakistan has set a goal to cut its greenhouse gas emissions by 30% in 2030 in addition to the tree planting campaign. Overall, the implementation of the 10 Billion Tree Tsunami and other forest conservation and replanting projects, as well as the performance of the nation's emissions reduction policies, will determine Pakistan's NDC's success in strengthening its carbon sink.

2.2.5 Disaster Risk Reduction Section:

2.2.5.1 Urban Heat Island Effect

The urban heat island effect is not specifically addressed in Pakistan's NDCs, but the government has pledged to take steps to reduce its overall greenhouse gas emissions and strengthen its ability to adapt to climate change, with a goal of generating 60% of its electricity from renewable sources by 2030.

2.2.5.2 Ecological Management:

One of Pakistan's NDCs' main goals is to raise its forest cover to 6% by 2030. This will enhance biodiversity, lessen soil erosion, and lessen the effects of climate change. Measures to preserve and safeguard Pakistan's natural resources, that mangrove and wetland ecosystem are also included in the country's NDCs. The nation wants to make its ecosystems more resilient, lessen pollution, and support sustainable fishing and farming practices.

2.2.6 Energy Section:

2.2.6.1 Energy Security:

Pakistan has established policies and steps to guarantee a consistent and reasonably priced supply of energy. Pakistan has acknowledged the significance of energy security. Due to its heavy reliance on imported oil and gas, the nation is susceptible to changes in the price of energy on the international market and interruptions in supply.

2.2.6.2 Renewable Energy:

The Alternative Energy Development Board (AEDB), which is in charge of encouraging and supporting the development of renewable energy projects in Pakistan, is one of the policies and initiatives that have been put into place to support the development of renewable energy.

2.2.6.3 Energy Transition:

The energy transition in Pakistan is undertaking as part of its NDCs is intended to lower emissions of greenhouse gases and advance sustainable development. Further, dedicated to making the required progress in the direction of a low-carbon future. encouraging private investment in initiatives for energy efficiency and renewable energy.

2.3 Climate Change:

Climate change, as it is commonly understood, is the continual rise in the average global temperature and its effects on the planet's climate system. A larger definition of climate change covers earlier, lengthy changes to the planet's climate. The use of fossil fuels by humans is mostly to blame for the present, more rapid rise in the average world temperature. (Carter et al., 2015)

Greenhouse gases are increased by the use of fossil fuels, deforestation, and some industrial and agricultural practices. Some of the heat that the Earth radiates after being warmed by sunlight is

absorbed by greenhouse gases. More of these gases trap more heat in the lower atmosphere of the Earth, contributing to global warming. (Alam et al., 2017)

Deserts are growing larger as a result of climate change, and heat waves and wildfires are occurring more frequently. Permafrost melting, glacier retreat, and a reduction in sea ice have all been impacted by increased heat in the Arctic. Storms, droughts, and other weather extremes are becoming more intense as a result of rising temperatures. Even if efforts are effective in reducing future warming, some consequences will last for generations. Sea level rise, ocean acidification, and ocean heating are a few of these. (Preston et al., 2011)

At the current level of warming of 1.2 °C (2.2 °F), several effects of climate change are already apparent. These effects will intensify with further warming, which may also lead to tipping points like the melting of the Greenland ice sheet. Nations collectively pledged to keep warming "well under 2 °C" under the 2015 Paris Agreement. Global warming will still reach roughly 2.7 °C (4.9 °F) by the end of the century even with pledges made under the Agreement. To keep global warming to 1.5 °C, emissions must be cut in half by 2030 and net-zero by 2050. (Giles et al., 2021)

2.4 NDCs Implementation Case Studies:

2.4.1 NDCs Implementation in Africa:

Monitoring the Effect and Application of Measures The framework's indicators will be used to monitor both the effectiveness and impact of the initiatives. Measures' status and their level of implementation are tracked by implementation indicators. Implementation actions are intended to check if this has occurred. If they are, though, and there is still no impact, this may indicate that the measure(s) in question are ineffective and must be changed or eliminated. Impact indicators seek to monitor this effect by determining whether and to what extent it is occurring. To evaluate the effectiveness of a policy or measure, the indicators may select from a variety of various metrics. In some circumstances, this could be a quantitative evaluation of GHG reductions. Other metrics, either easier to calculate or linked to data that is more easily accessible, are typically employed. Such indicators may be connected to lower GHG emissions. For instance, by looking at the generation mix to see if renewable energy sources are contributing more or less to on-grid electricity generation, one can establish whether GHG

emissions are rising or falling. In order to understand why progress is not being made, it is more important to track both implementation and impact. (Felix, 2020)

2.4.1.1 Mainstreaming NDCs in Development Plans in Africa

The implementation of a Nationally Determined Contribution (NDC) can be mainstreamed in sectoral development plans, much like with the execution of any policy plan that affects numerous economic sectors and stakeholder groups across various government levels. The allure of these mechanisms resides in their capacity to boost implementation's efficiency. Setting up defined roles and duties for all pertinent ministries, agencies, and sectors, as well as outlining the procedures that should direct these agencies in their work, will help sub-Saharan countries integrate NDCs into their development plans.

2.5 Pakistan's NDCs 2021:

The Paris Agreement describes each nation's plan to combat climate change and lower its greenhouse gas emissions, and it includes a list of climate-related obligations called NDCs (Nationally Determined Contributions). A thorough analysis of Pakistan's present emissions, the identification of major sectors that contribute to emissions, and the determination of workable mitigation strategies are all part of the approach used to generate the NDCs 2021 implementation plan for Pakistan. Numerous stakeholders, including government agencies, non-governmental organizations, academic institutions, and the commercial sector, were consulted throughout the process.

For each business, including energy, transportation, manufacturing, agriculture, and forestry, the document outlines a set of key activities and targets. These steps are being taken to lower emissions and strengthen Pakistan's ability to adapt to climate change. A thorough framework for monitoring and reporting is also included in the implementation plan to track advancement towards the objectives of the NDCs. The NDCs 2021 implementation process in Pakistan, in general, emphasizes a participatory approach, which takes into account the demands and concerns of many stakeholders while maintaining the country's sustainable development.

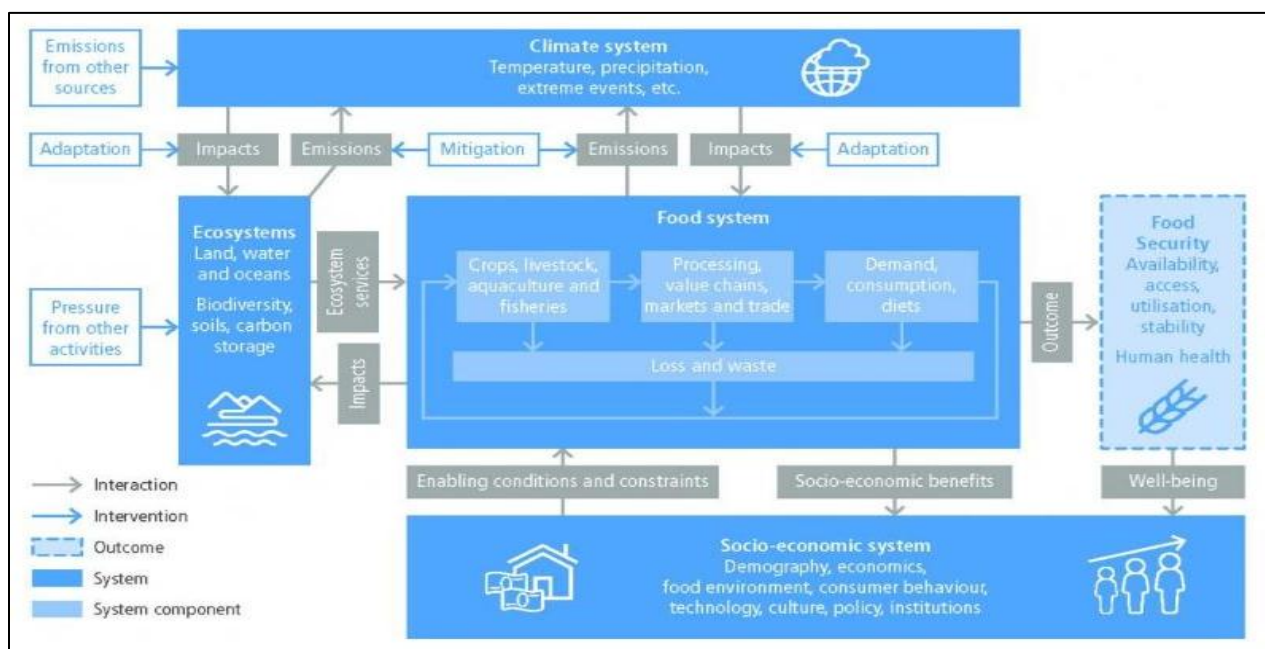
The Nationally Determined Contributions (NDCs) outline actions taken to reduce emissions as well as adaptation to climate change consequences and what help the country needs or will offer to combat climate change. An assessment phase was conducted after the original INDC submission in March 2015 to evaluate the impact of the INDCs before the 2015 United Nations Climate Change Conference.

All the goals for each country are stated in their NDC which are based on the points below.

- Until 2050, climate neutral
- Striking a goal of limiting global warming to 1.5 °C and keeping it far below 2 °C
- Lowering greenhouse gas (GHG) emissions;
- Enhancing adaptation to the negative impacts of climate change; and adjusting financial flows to be paired with lower GHG emissions

2.6 Climate System:

On larger, continental and global spatial scales, it may be possible to partially forecast climate changes and change brought on by external forces. It is thought that the large-scale effects of human-induced climate change are also somewhat predictable because human activities, such as the generation of greenhouse gases or changes in land use, do result in external forcing. However, the ability to really do so is constrained since we are unable to correctly foresee future trends in population, economy, technology, and other pertinent aspects of human activity. Therefore, in order to make climate projections in practice, one must rely on properly thought-out scenarios of human behavior. climate factors, such as average, maximum, and lowest temperatures, winds that blow close to the Earth's surface, different types of precipitation, humidity, cloud type and amount, and solar radiation.



Source: Global Climate Observing System Secretariat

Above is shown schematic view of the components of the global climate system, their processes and interactions and some networking aspects.

2.7 CASE STUDIES OF NDCs WORLDWIDE

2.7.1 European Union NDCs:

In accordance with the Paris Agreement, the European Union (EU) filed its Nationally Determined Contributions (NDCs) in 2020. In comparison to 1990 levels, the EU's NDCs seek to reduce greenhouse gas emissions by 55% by 2030. The EU's long-term objective to achieve climate neutrality by 2050 includes this target. (*Comparative Analysis of the NDCs of Canada , the European Union , 2019*)

To achieve this target, the EU has set out a number of policy measures in its NDCs, including: Increasing the proportion of renewable energy to at least 32% in the EU's energy mix by 2030. Reducing the EU's transport sector's greenhouse gas emissions at least 60% by 2050. Reducing emissions from buildings by at least 60% by 2050. Adding a carbon border adjustment mechanism (CBAM) to the EU Emissions Trading System (ETS) will make it more effective at preventing carbon leakage, which would be detrimental to the EU's attempts to reduce emissions. The EU has pledged in its NDCs to raise money to aid developing nations in their attempts to mitigate and adapt to climate change.

2.7.2 CANADA NDCs:

The Nationally Determined Contributions (NDCs) of Canada are the nation's pledges to cut greenhouse gas emissions and support international efforts to slow global warming. In accordance with the Paris Agreement, Canada filed its initial NDCs in 2016 and updated them in 2021.

Canada agreed to reduce its greenhouse gas emissions by 40–45% below 2005 levels by 2030 as part of its 2021 NDCs. A 36% reduction in emissions from the power sector, a 30% reduction in emissions from the oil and gas sector, and a 25% reduction in emissions from the buildings and communities sector are just a few examples of the sector-specific targets included in the NDCs. The NDCs also contain strategies to boost carbon sequestration on working and natural areas. (*Comparative Analysis of the NDCs of Canada , the European Union , 2019*)

Along with laws to lower emissions from industry and transportation, Canada's NDCs also contain policies and programs to aid in the transition to a low-carbon economy. Examples include investments in public transportation, clean energy, and energy-efficient buildings. In order to reduce emissions, the NDCs also stress the significance of collaboration and cooperation with Indigenous peoples, provinces and territories, and other stakeholders. Canada's NDCs show the nation's dedication to combating climate change and supporting international efforts to keep warming to far below 2 degrees Celsius over pre-industrial levels.

Every nation has a different NDC that reflects its distinct circumstances, such as its degree of development, energy mix, and political environment. To avoid the worst effects of climate change, all NDCs, however, have the same objective of lowering greenhouse gas emissions and limiting global warming.

2.8 Climate Change Institutions of Pakistan:

National Determined Contributions (NDCs) in Pakistan are governed by the Ministry of Climate Change. The Ministry is in charge of putting policies and programs concerning climate change, biodiversity, and sustainable development into action. A federal minister chosen by the Pakistani Prime Minister oversees the Ministry of Climate Change. The following are some of the divisions and organizations under the ministry that focus on various facets of climate change:

1. Climate Change Division: The division in charge of creating policies, strategies, and plans for climate change adaptation and mitigation is known as the "climate change division." In order to put these policies into effect, it also coordinates with other government departments, civil society organizations, and the commercial sector.
2. Pakistan Meteorological Department (PMD): The PMD is in charge of keeping an eye on weather trends and predicting climatic changes. Additionally, it offers data and information about climate change to the general public and other governmental organizations.
3. Pakistan Environmental Protection Agency (Pak-EPA): The Pak-EPA is in charge of upholding environmental legislation and rules. Additionally, it carries out research on climate change-related topics and offers technical help to other government organizations.

4. Climate Change Mitigation and Adaptation Unit (CCMAU): The CCMAU is in charge of carrying out initiatives linked to climate change adaptation and mitigation. On these matters, it also offers technical support to other governmental organizations and the commercial sector.
5. Global Change Impact Studies Centre (GCISC): The GCISC is in charge of studying climate change and offering technical help. Additionally, it creates models and scenarios to evaluate the probable effects of climate change on various economic sectors.

In addition to collaborating closely with these divisions and organizations, the Ministry of Climate Change also conducts policy-related work with the Ministry of Water Resources, Ministry of Energy, Ministry of Agriculture, and Ministry of Industries and Production. In Pakistan, the Ministry of Climate Change is the principal government body in charge of putting National Determined Contributions (NDCs) policies into effect. It has a number of divisions and sectors that focus on various facets of climate change, including as adaptation and mitigation, weather forecasting, environmental protection, and research. The ministry collaborates closely with other governmental institutions to put climate change policy into effect.

CHAPTER THREE

3 METHODOLOGY

3.1 Study Area Selection:

The study is associated with Nationally Determined Contributions 2021 which is prepared under government document of Pakistan. So the whole country of Pakistan boundary is covered under study area selection.

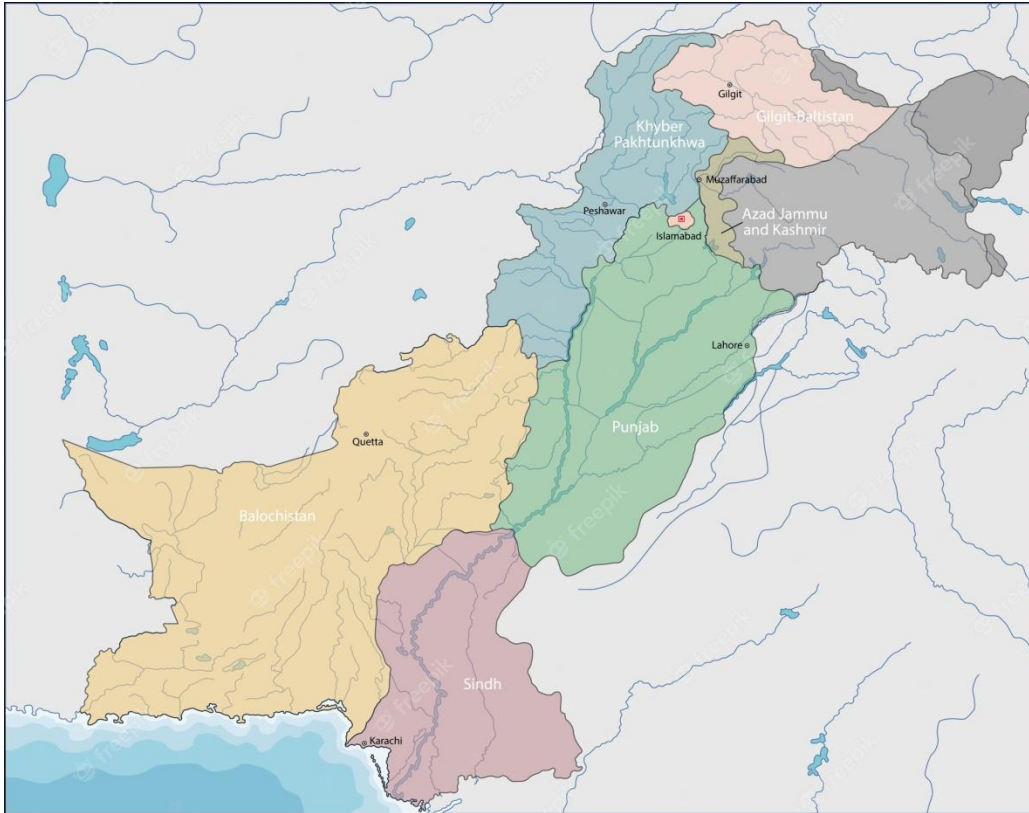


Figure 3: Map of Pakistan

3.2 RESEARCH DESIGN

Following flow diagram is associated with our research design of thesis work. In the start, the NDCs-2021 was read out thoroughly and their key indicators identified after a lot of discussions and filters. Then Pakistan's climate change policies, acts, plans at national, provincial and regional levels segregated and comparison of these policy documents initiated. During the work, it was noticed that provinces have yet to improve their Climate Change policies. So national

level policies identified for the research and later on it cut down the number of legislations due to overlapping.

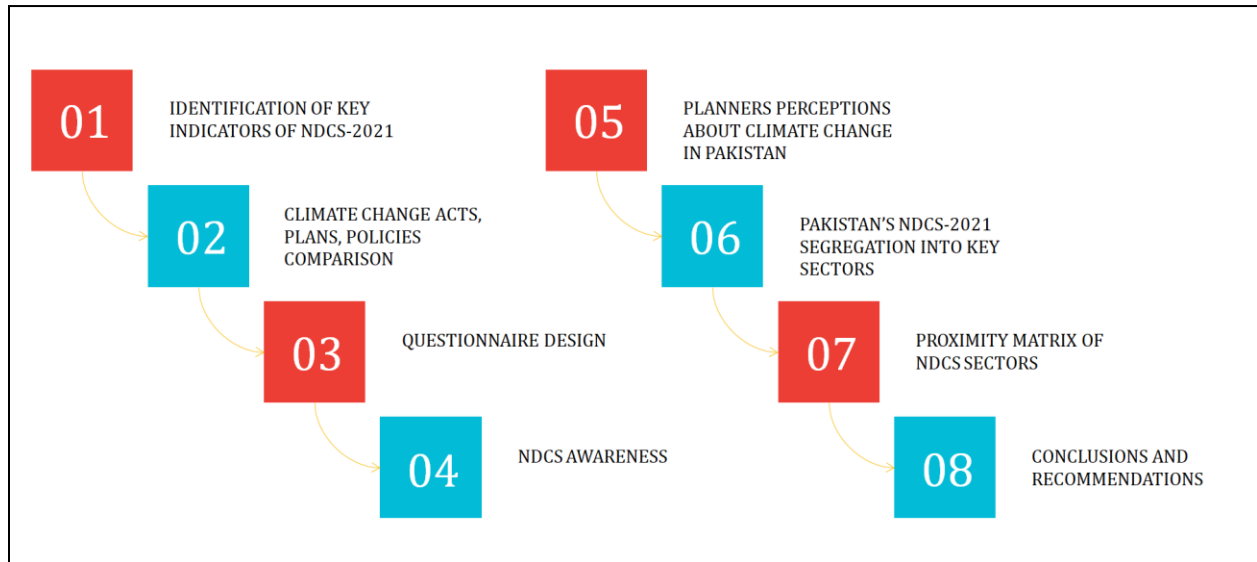


Figure: Flow Diagram of Research Design

In the next step, questionnaire was designed involving different domains of NDCs, climate change and perception levels to accurately find the purpose of implementation. Meanwhile, NDCs key indicators segregated into different sectors for which the study got comparison analysis among different sections of NDCs for its implementation by respective Climate Change institutions. Finally conclusions and recommendation established to conclude research study.

3.3 REVIEW OF CLIMATE CHANGE CRITICAL POLICIES OF PAKISTAN

Climate Change Policies are selected to examine whether NDCs key words are present in the document or still need to update those policy documents in fighting advanced global issues of Climate Change. While searching about ministries in Pakistan, it came to know that a number of ministries create impacts on climate change. But Ministry of climate change take the lead role in that context. Following is the list of documents to test and examine in view of NDCs 2021.

Table: List of Climate Change Policies involved in research study

CLIMATE CHANGE LEGISLATIONS, ACTS, PLANS IN PAKISTAN	
1	National Climate Change Policy 2021
2	National Electric Vehicle Policy-2019
3	Climate Change Act-2017
4	National Forest Policy 2015

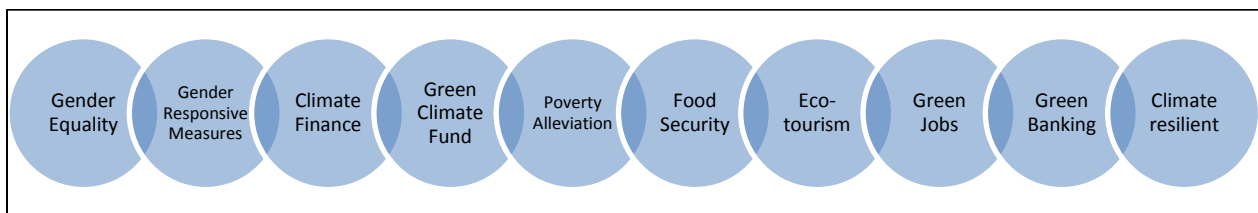
5	National DRR Policy 2013
6	National Disaster Response Plan 2019
7	National Relief and Response 2016
8	Pakistan Floods 2016
9	NDMA Act 2010
10	National Disaster Management Plan 2012

In onwards section of research, the detailed comparison of policy documents of Ministry of Climate Change with NDCs indicators will be performed.

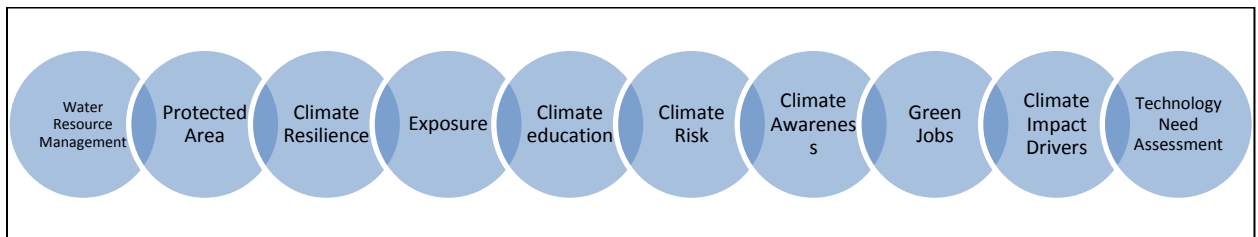
3.4 NDCs 2021 INDICATORS SELECTION:

The complete document of NDCs 2021 is studied thoroughly and checked key words in context of Climate Change terminologies and concepts. Initially the 100 above key words reviewed again and again and finally collected around 70 influential key words from NDCs 2021. Following are the final indicators for the research work.

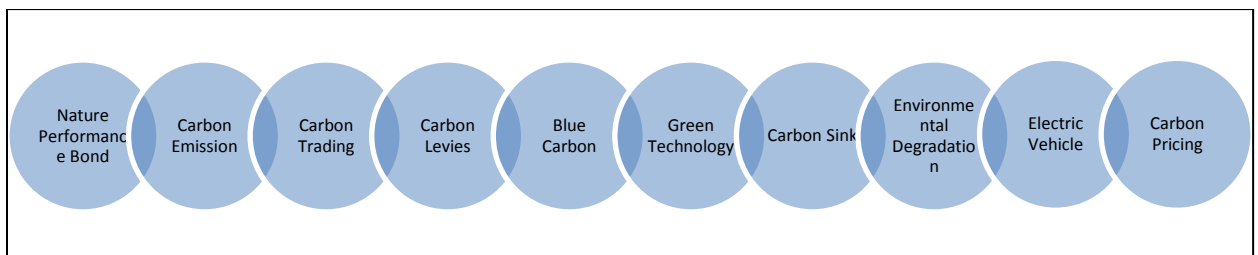
Section 1: *Socio economic* key indicators extracted from NDCs as listed below:



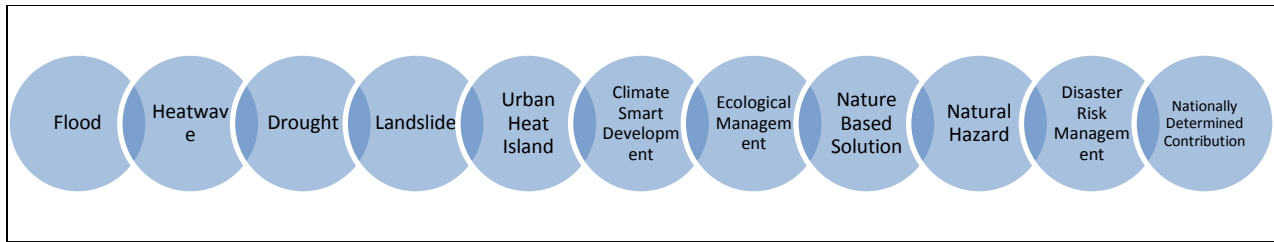
Section 2: *Climate Change Adaptation Planning* key indicators extracted via NDCs as below:



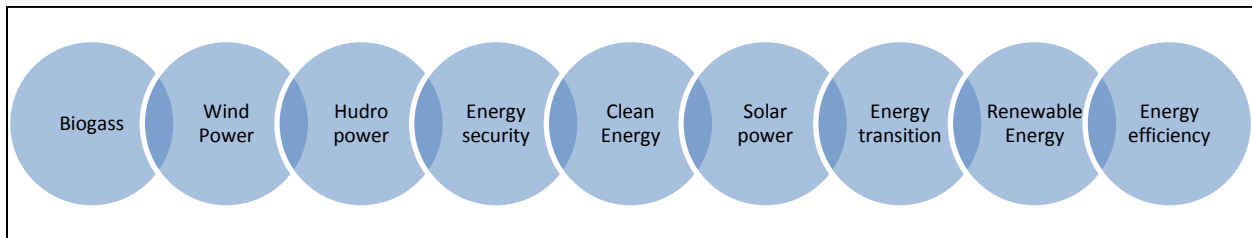
Section 3: *Climate Change Mitigation* key indicators Extracted from NDCs as listed below:



Section 4: *Disaster Risk Reduction* key indicators Extracted from NDCs as listed below:



Section 5: *Energy sector* key indicators extracted from NDCs as listed below:



3.5 FREQUENCY TABLE OF KEY INDICATORS AND CLIMATE CHANGE LEGISLATIONS

In Pakistan, the climate change policies, acts, plans designed at different levels to mitigate, adapt and fight against adverse impacts of climate change. In the research, different climate change legislations selected and searched that if a specific key indicator from Pakistan’s Updated NDCs 2021 is present in those policies/ plans.

3.6 QUESTIONNAIRE DESIGN:

The questionnaire designed to address the research objectives and research questions. Any research endeavor must start with a questionnaire design since it establishes the framework for data collecting. The research was focused on the Pakistani community of town planners.

Questions come in two categories: open-ended and closed-ended. Less open-ended questions were used in the survey because respondents can give more thorough replies to open-ended questions. The type of questions to ask should be chosen based on the goals of the research and the intended audience. Research questions easiness for responders to understand.

The questionnaire for research data collection is composed of four sections as below:

Section 1: Respondent Details

Section 2: Awareness about NDCs

Section 3: Assessment of planners to climate change in Pakistan

Section 4: Perception of NDCs concepts/key words for their implementation

3.7 PROCEDURE OF DATA COLLECTION:

The research based on the sixty (60) interviews conducted with professional urban planners working in Pakistan. The interviews recorded online with the help of Google forms and at the end responses collected for further data analysis. The responses converted into excel sheet for treatment with data collected.

3.8 DATA ANALYTICAL TECHNIQUES:

Data from interviews can be analyzed using a number of easy data analysis approaches. This research has used following data analysis techniques with the help of SPSS (Statistical Package for Social Sciences). Firstly, Frequency analysis performed for key indicators of NDCs, this strategy requires tracking the frequency with which each response option is selected. It is helpful to know the proportion of respondents who selected each response choice. Further, A proximity matrix in SPSS used which is a square matrix that details the similarity or difference between pairs of cases. The proximity matrix can be used for multidimensional scaling, cluster analysis, and other methods that call for a way to compare or distance cases from one another.

These methods are fairly easy to use and can be used to examine survey data with ease. However, it is crucial to select the best technique based on the research question, the nature of the data, and the degree of variability measurement.

Table 6: Rating of achievement of Targets for each Indicator for the NDC Implementation

Components Scale of Rating		Description
1-	0-15% of target	Strongly Disagree
2-	>15%-35% of target	Disagree
3-	>35%- 50% of target	Undecided
4-	>50%- 75% of target	Agree
5-	>75%- >100% of target	Strongly Agree

CHAPTER FOUR

4 NDCs 2021 KEY INDICATORS AND CRITICAL CLIMATE CHANGE POLICIES OF PAKISTAN

Pakistan has been actively involved in designing its climate change policies. The main steps involved are:

Mitigation: Pakistan has committed to reducing its greenhouse gas emissions by 30% by 2030. To achieve this, the government has taken several measures, including the promotion of renewable energy sources, such as wind and solar power, and the introduction of energy-efficient technologies. **Adaptation:** Pakistan is highly vulnerable to the impacts of climate change, including floods, droughts, and extreme weather events. To address this, the country has developed a National Adaptation Plan and has identified priority areas for adaptation, including water management, agriculture, and forestry. **Finance:** The government of Pakistan has committed to mobilizing \$6 billion for climate-related activities by 2030. This includes funding for both mitigation and adaptation activities. **Technology transfer:** Pakistan is actively seeking technology transfer to support its efforts to mitigate and adapt to the impacts of climate change. The country has established partnerships with several countries and international organizations to facilitate technology transfer. **Capacity building:** Pakistan has identified capacity building as a key priority for its climate change policies. The government is working to develop the skills and knowledge needed to implement climate change policies effectively.

Evidence from the research found that Pakistan is taking significant steps to address the challenges posed by climate change, and its NDCs 2021 reflect the country's commitment to reducing greenhouse gas emissions and building resilience to climate change impacts. These key indicators provide a good starting point for a thesis exploring the involvement of Pakistan in climate change policies.

4.1 KEY WORDS:

The research key indicators mentioned in methodology chapter in details. Further, the key words from NDCs 2021 segregated into different sections. In this chapter, we will analyze the NDCs key words with prominent Climate Change policies in Pakistan.

4.2 List of Policy Documents to examine presence of NDCs indicators

SR. N	POLICY DOCUMENT UNDER MINISTRY OF CLIMATE CHANGE
1	National Climate Change Policy 2021
2	National Electric Vehicle Policy-2019
3	Climate Change Act-2017
4	National Forest Policy 2015
5	National DRR Policy 2013
6	National Disaster Response Plan 2019
7	National Relief and Response 2016
8	Pakistan Floods 2016
9	NDMA Act 2010
10	National Disaster Management Plan 2012

4.3 Tables of Key words assessment in Ministry of Climate Change Policies:

Following are the data charts of NDCs key words involvement in national climate change policies.

4.3.1 Socio Economic Sector:

Table: Matrix and Frequency table showing NDCs key words and National Climate Change Policies

MATRIX AND FREQUENCY TABLE OF SOCIO-ECONOMIC SECTOR, MINISTRY OF CLIMATE CHANGE															
Ministry	Type of Documents	Key Words													
		Gender equality	Gender Responsive Measures	Climate Finance	Green Climate Fund	Poverty Alleviation	Food Security	Social Safety Net	Forced Migration	EIA	Eco-tourism	Green Jobs	Green Bonds	Green Banking	Climate resilient
Ministry of Climate Change	National Climate Change Policy 2021	0	2	1	2	1	8	0	0	1	1	0	1	0	6
	National Electric Vehicle Policy-2019	0	0	0	0	0	0	0	0	0	0	0	0	3	0
	Climate Change Act-2017	2	0	1	0	0	1	0	0	0	0	0	0	0	2
	National Forest Policy 2015	0	0	0	2	0	0	0	0	1	0	0	0	0	1
	National DRR Policy 2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	National Disaster Response Plan 2019	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	National Relief and Response 2016	0	0	0	0	0	Food (38)	0	0	0	0	0	0	0	0

Above data interpretation shows that there is disparity between NDCs 2021 key words address/ involvement in Pakistan’s National Climate Change policies, acts, plans etc. For example, above table shows that ‘gender equality’ a key word/ concept from NDCs-2021 which is involved in just one policy at national level. Further, poverty alleviation also addressed in one among selected policies.

4.3.2 Climate Change Adaptation Planning Sector

Table: Matrix and Frequency table showing NDCs key words and National Climate Change Policies

MATRIX AND FREQUENCY TABLE OF CLIMATE CHANGE ADAPTATION PLANNING SECTOR, MINISTRY OF CLIMATE CHANGE																
Ministry	Type of Documents	Key Words														
		Water Resource Management	Protected Area	Adaptation	Climate Resilience	Climate Vulnerability	Exposure	Climate education	Waste Management and recycling	Climate Risk	Climate Awareness	Climate Forecasting	Climate Proofing	Climate Impact Drivers	Technology Need Assessment	Urban Storm Water Management
Ministry of Climate Change	National Climate Change Policy 2021	4	11	62	9	0	1	0	18	26	0	0	0	0	1	0
	National Electric Vehicle Policy-2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Climate Change Act-2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	National Forest Policy 2015	0	7	1	2	0	0	0	0	0	0	0	0	0	0	0
	National DRR Policy 2013	0	0	2	17	42	4	0	0	12	17	0	0	0	0	0
	National Disaster Response Plan 2019	0	0	0	1	2	0	0	0	6	1	0	0	0	0	0
	National Relief and Response 2016	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0

The climate change adaptation planning sector of NDC, above data interpretation shows that there are many key words those are addressed not in one policy document. For example, above tabled ‘climate education,’ ‘climate forecasting,’ ‘climate proofing’ etc shows that they are not discussed in any among selected policies. Also few key words only involved in one policy document.

4.3.3 Climate Change Mitigation Sector

Table: Matrix and Frequency table showing NDCs key words and National Climate Change Policies

MATRIX AND FREQUENCY TABLE OF CLIMATE CHANGE MITIGATION SECTOR, MINISTRY OF CLIMATE CHANGE																	
Ministry	Type of Documents	Key Words															
		Nature Performance Bond	Afforestation	Carbon Emission	GHG Emission	Carbon Trading	Carbon Levies	Blue Carbon	Blue Bond	Green Technology	Climate Mitigation	Carbon Sink (Farm Forestry)	Environmental Degradation	Forest	Electric Vehicle	Carbon Pricing	Climate Action
Ministry of Climate Change	National Climate Change Policy 2021	1	10	9	17	1	0	3	1	1	20	4	1	30	7	4	4
	National Electric Vehicle Policy-2019	0	0	1	12	0	0	0	0	0	1	0	1	0	26	0	0
	Climate Change Act-2017	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
	National Forest Policy 2015	0	14	2	0	1	0	0	0	0	0	2	2	25	0	0	0
	National DRR Policy 2013	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
	National Disaster Response Plan 2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	National Relief and Response 2016	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0

This sector of NDCs-2021 is almost well taken in climate change policies as compared to previous two sections. Almost all key words are involved in policy documents. Moreover, still there is need for advancement of climate policies in Pakistan.

4.3.4 Disaster Risk Reduction

Table: Matrix and Frequency table showing NDCs key words and National Climate Change Policies

MATRIX AND FREQUENCY TABLE OF DISASTER RISK REDUCTION SECTOR, MINISTRY OF CLIMATE CHANGE																		
Ministry	Type of Documents	Key Words																
		Flood	Heatwave	Drought	Landslide	Cyclone	Seawater intrusion	Flash Flood	Climate induced Loss & damage	Urban Heat Island	Climate Smart Development	Ecological Management	Biodiversity conservation	Nature Based Solution	Natural Hazard	Coastal Management	Disaster Risk Management	Nationally Determined Contribution
Ministry of Climate Change	National Climate Change Policy 2021	43	0	20	4	12	0	3	0	0	0	1	2	5	2	0	2	5
	National Electric Vehicle Policy-2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Climate Change Act-2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	National Forest Policy 2015	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	National DRR Policy 2013	22	0	4	4	3	0	0	0	0	0	0	0	0	6	0	9	0
	National Disaster Response Plan 2019	6	0	4	3	2	0	1	0	0	0	0	0	0	0	0	2	0
	National Relief and Response 2016	36	0	30	13	29	0	5	0	0	0	0	0	0	3	0	12	0

The disaster risk reduction sector of NDCs shows above table that again few of key words are involved actually in policies. A few key words are not even addressed in any selected policy. ‘National Electric Vehicle policy’ and ‘climate change act-2017’ shows not any key word discussed in this document when disaster risk reduction is concerned.

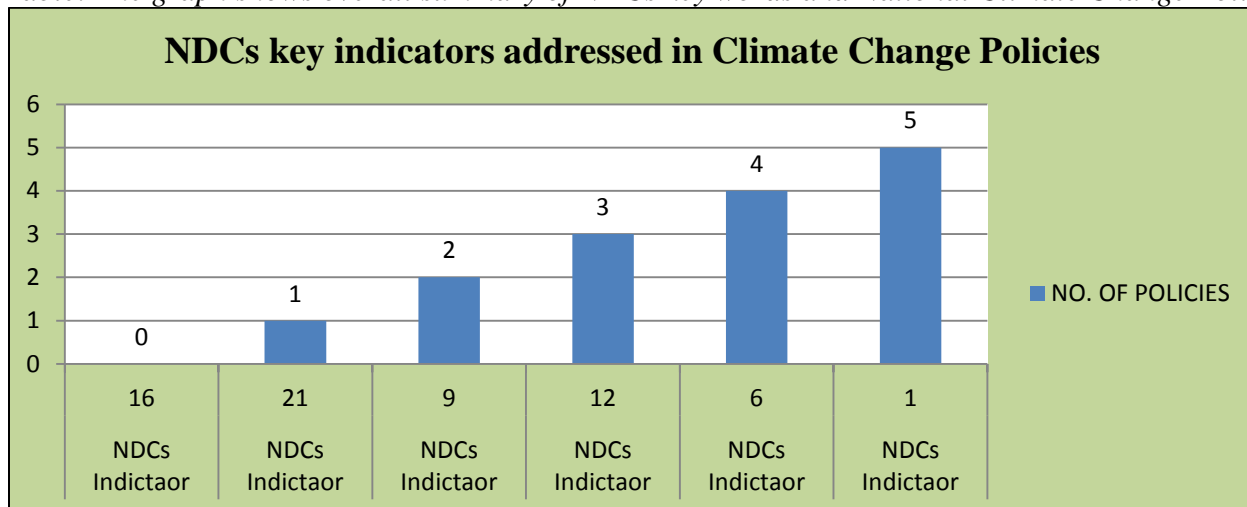
4.3.5 Energy

Table: Matrix and Frequency table showing NDCs key words and National Climate Change Policies

MATRIX AND FREQUENCY TABLE OF ENERGY SECTOR, MINISTRY OF CLIMATE CHANGE												
Ministry	Type of Documents	Key Work										
		Biogas	Wind Power	Hydro Power	Biomass	Fossil Fuel	Energy Security	Clean Energy	Solar Power	Energy Transition	Renewable Energy	Energy Efficiency
Ministry of Climate Change	National Climate Change Policy 2021	0	0	2	1	5	4	1	0	0	11	12
	National Electric Vehicle Policy-2019	0	0	0	0	2	0	0	0	0	1	2
	Climate Change Act-2017	0	0	0	0	0	0	0	0	0	0	0
	National Forest Policy 2015	0	0	0	0	1	0	0	0	0	0	0
	National DRR Policy 2013	0	0	0	0	0	0	0	0	0	0	0
	National Disaster Response Plan 2019	0	0	0	0	0	0	0	0	0	0	0
	National Relief and Response 2016	0	0	0	0	0	0	0	0	0	2	0

The energy sector of NDCs, above data interpretation shows that there are many key words those are addressed not in one policy document. For example, above tabled ‘solar power,’ ‘energy transition,’ ‘wind’ etc shows that they are not discussed in any among selected policies. Also few key words only involved in one policy document.

Table: The graph shows overall summary of NDCs key words and National Climate Change Policies



The above stated analysis shows that A strange sequence of NDCs key indicators presence in Climate Change Policies found that only 1 indicator out of 73 included in five out of seven policy documents. Further, 16 indicators of NDCs guidelines are ones those are none included in any of Climate Change policies in Pakistan. 21 indicators of NDCs are included in single Climate Change policy and Nine (09) indicators are included in only two (02) Climate Change policies, acts/ plans.

CHAPTER FIVE

5 ASSESSMENT OF NDCs AWARENESS AND CLIMATE CHANGE PERCEPTION

Nationally Determined Contributions (NDCs) are a crucial step towards reaching global climate targets. metropolitan planners play an important role in the implementation of NDCs because they are in charge of planning and managing metropolitan areas' physical infrastructure and systems.

Urban planners can assess how well NDCs have been integrated into urban planning processes. This involves an examination of the policies, procedures, and regulations in place to facilitate NDC adoption. In addition, urban planners can evaluate the adoption of low-carbon initiatives such as renewable energy, energy efficiency, and sustainable transportation. They can also assess how effective these solutions are at reducing greenhouse gas emissions. Green infrastructure development, such as parks, green roofs, and urban forests, can be reviewed by urban planners. These kinds of infrastructure can assist reduce urban heat islands and enhance air quality.

Urban planners can assess the extent of community participation in NDC implementation. This involves determining how much local communities were involved in the development and execution of low-carbon plans. Monitoring and evaluation can be used by urban planners to measure the efficiency of NDC implementation.

This includes monitoring progress towards emission reduction targets as well as assessing the social, economic, and environmental consequences of NDC implementation. Overall, urban planners can play an important role in assessing NDC implementation and ensuring their effective integration into urban planning processes.

5.1 NDCs AWARENESS WITH TOWN PLANNERS:

Urban planners are critical resources for the implementation of NDCs since they are in charge of creating and regulating the built environment, which has a large impact on a country's greenhouse gas emissions.

A questionnaire devised to gather information via interview regarding urban planners' knowledge of NDCs, their understanding of the importance of urban planning in achieving NDCs, and their experiences implementing climate actions in their work to measure NDC awareness. The study might also collect data on the tools and training that urban planners require to properly incorporate NDCs into their work.

Workshops and training sessions, in addition to surveys, might be organised to educate urban planners about NDCs and give them with the skills and information they need to integrate climate action into their work. Training on sustainable urban design, energy-efficient buildings, public transportation, and other techniques to reduce greenhouse gas emissions could be included.

**Table: Important Research Question Description:
Urban Planners Awareness to NDCs**

	Weights	Justification
1. Do you aware about NDCs- 2021 guidelines/ recommendations?	Lowest 37% Middle 29% Highest 34%	Urban Planners in Pakistan are yet to aware about NDCs at large scale.
2. Have you incorporated NDCs guidelines in City's Master Plans?	Lowest 46% Middle 34% Highest 20%	NDCs involvement in City and regional planning has not been incorporated as study shows.
3. Do you think NDCs guidelines should be improved?	Lowest 8% Middle 19% Highest 73%	Multiple climate change organizations policies, acts and guidelines are not updated as per current climate goals.
4. Planners should contribute to improve NDCs guidelines/ recommendations?	Lowest 7% Middle 46% Highest 47%	Urban planners have intense knowledge of city's socio economic and infrastructural development.
5. Do you think NDCs implementations can be achieved by Master Planning?	Lowest 5% Middle 5% Highest 90%	Master planning is a holistic document and other professionals like environmental engineers must have say how this document prepared by urban planners should contribute for NDCs implementation and goals achievement at national and sub national levels.

Table 6: Rating of questions for the NDC Awareness

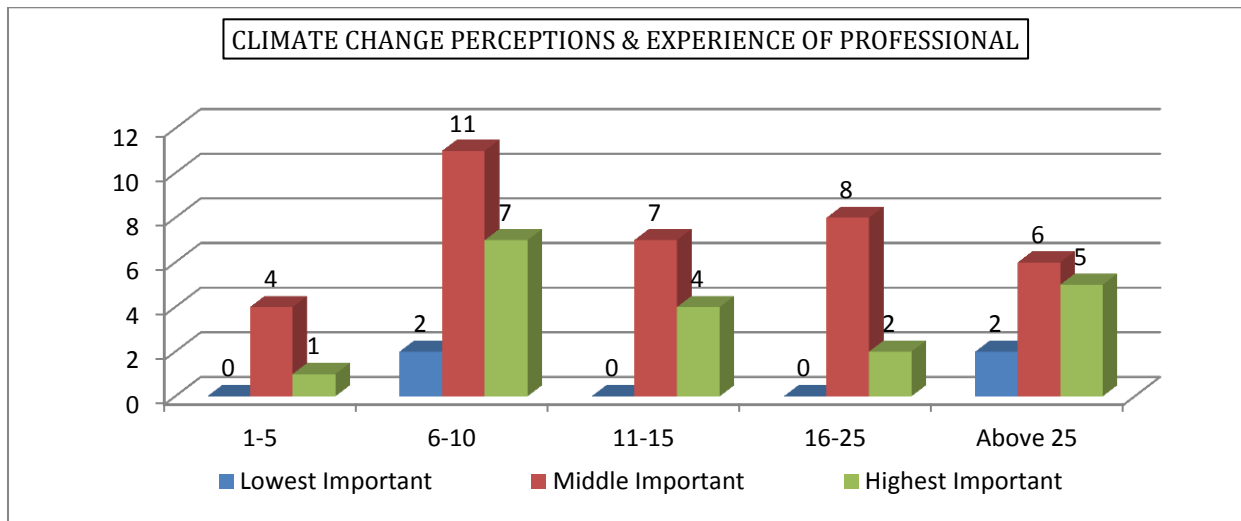
Scale of Rating		Description
1	0 < 25%	Disagree
2	26% < 50%	Undecided
3	51% < 100%	Agree

5.2 PLANNERS PERCEPTION TO CLIMATE CHANGE:

The term climate change perception refers to the perceived distance or closeness of events, objects, or ideas to a person's mind or experience. Perception can refer to the degree to which town planners regard climate change as a remote, abstract subject that is not immediately relevant to their work, or as a concrete, urgent matter that requires immediate action. Study is conducted with questionnaires, interviews to examine urban planners' perceptions detachment from climate change.

5.2.1 CLIMATE CHANGE PERCEPTIONS & EXPERIENCE OF PROFESSIONAL

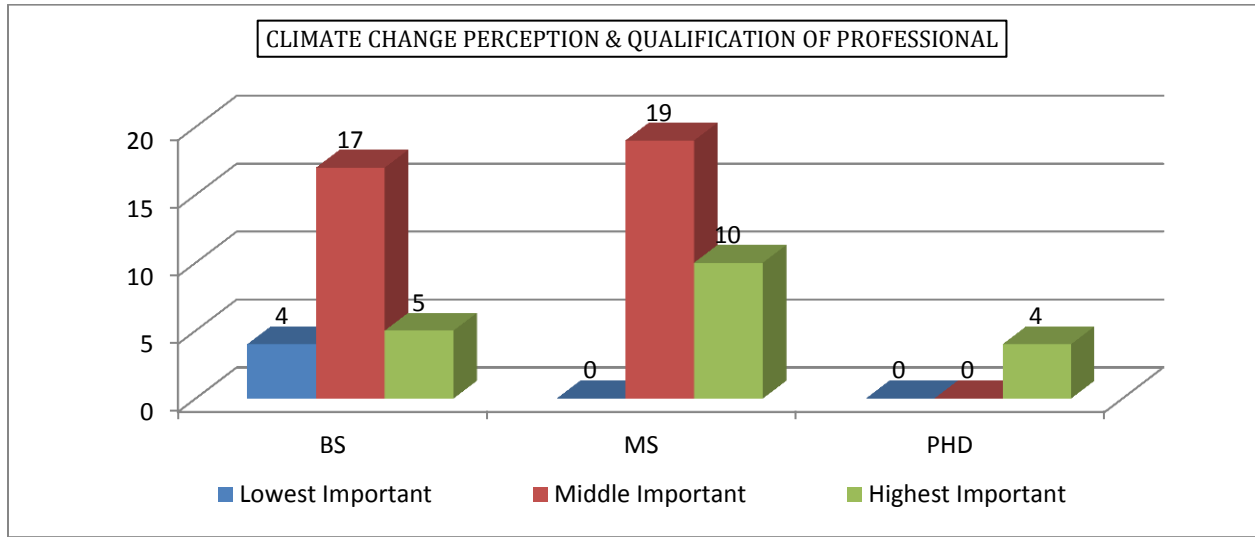
Following bar chart shows the relationship between experience of professional with the level of importance of climate change perceptions.



The above graph shows that there is uniformity among urban planners of each group of professional experience. It is seen that two of above 25 years of experience professionals has shown the lowest importance/ perception of climate change. They must be empowered enough in private sector to pose their decisions regarding what they think of climate change than they will take measure to least cope with adverse impacts of climate change.

5.2.2 CLIMATE CHANGE PERCEPTION & QUALIFICATION OF PROFESSIONAL

Following bar chart shows the relationship between qualification of professional with the level of importance of climate change perceptions.



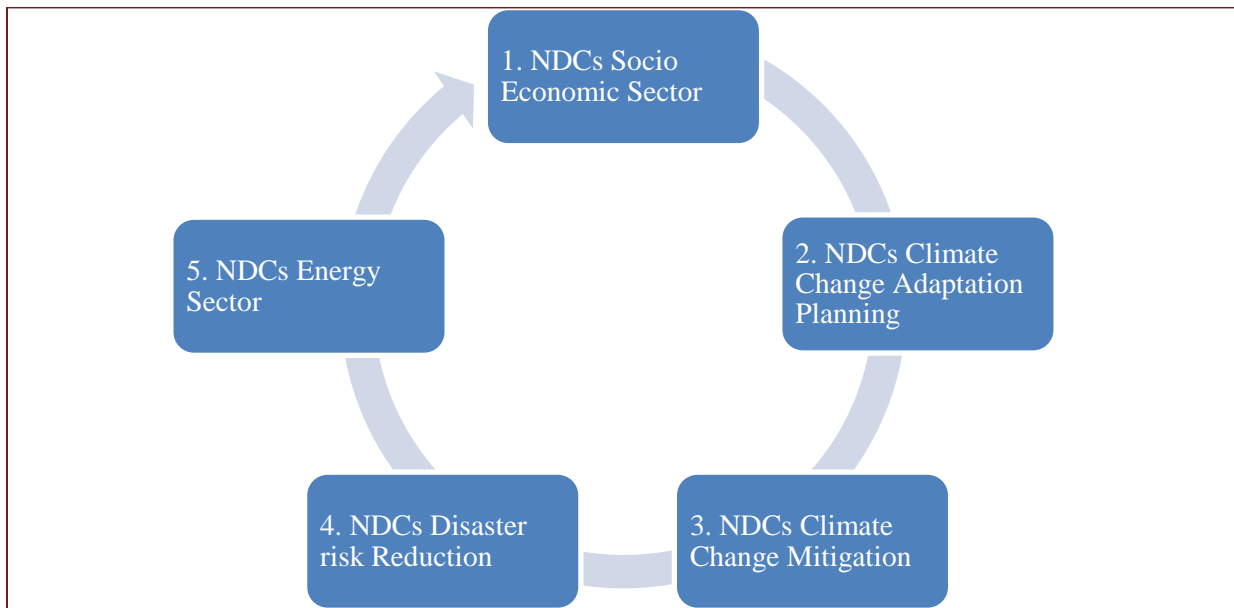
The above graph analysis shows that there are middle importance percentage of climate change perception is much higher than the highest level. As we move from comparatively higher study level, the importance of NDCs implementation goes higher as well.

Planners who think climate change won't affect them much could be less willing to handle it. The Social distance to do with the perceived cultural or social divides between urban planners and those who will be most affected by climate change. Planners who don't have a strong bond with the affected communities may overlook their demands while making planning judgments. Psychological distance is a reference to the supposed cognitive barrier that exists between the town planner and the idea of climate change.

CHAPTER SIX

6 NDCs CONCEPTS AND KEY INDICATORS perceptions WRT URBAN PLANNERS

Numerous environmental and urbanization issues have recently been plaguing Pakistan. In order to address these concerns, the nation is working on its Nationally Determined Contributions (NDCs) for 2021. These NDCs lay out Pakistan's strategies for lowering greenhouse gas emissions, encouraging sustainable growth, and enhancing the nation's overall environmental performance. Urban development initiatives that can lower carbon emissions, encourage sustainable living, and enhance citizen quality of life are designed and implemented by urban planners, who are essential to attaining these aims. We shall examine the ideas and objectives of Pakistan's NDCs for 2021 in this article, as well as the part that urban planners can play in accomplishing these objectives.

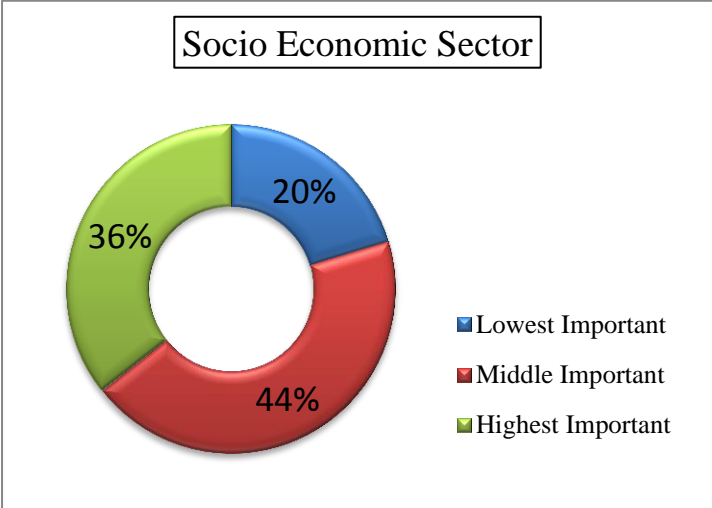


Pakistan has pledged to cut its greenhouse gas emissions, advance sustainable development, and enhance its environmental performance in accordance with the NDCs 2021. The Paris Agreement, which Pakistan joined in 2016, is in compliance with these promises. Pakistan is committed to improving its overall environmental performance by promoting sustainable land use, protecting forests and wildlife, and improving water and air quality.

Climate change adaptation and mitigation sector consist of many components like Transportation is a significant source to carbon emissions in metropolitan areas. By planning pedestrian-friendly streets, bike lanes, and efficient public transportation networks, urban planners may promote sustainable mobility options such as walking, cycling, and public transportation. Buildings are another significant source of carbon emissions in cities. By incorporating green building standards into construction rules and encouraging the use of renewable energy sources such as solar power, urban planners can promote energy-efficient structures.

6.1 SOCIO ECONOMIC SECTOR

NDCs, or Nationally Determined Contributions, are commitments made by governments under the United Nations Framework Convention on Climate Change (UNFCCC) to reduce greenhouse gas emissions and adapt to the effects of climate change. While the particular descriptions of the socioeconomic sectors included by NDCs vary by nation, they generally include a wide variety of economic activities that contribute to a country's emissions and/or vulnerability to the effects of climate change.

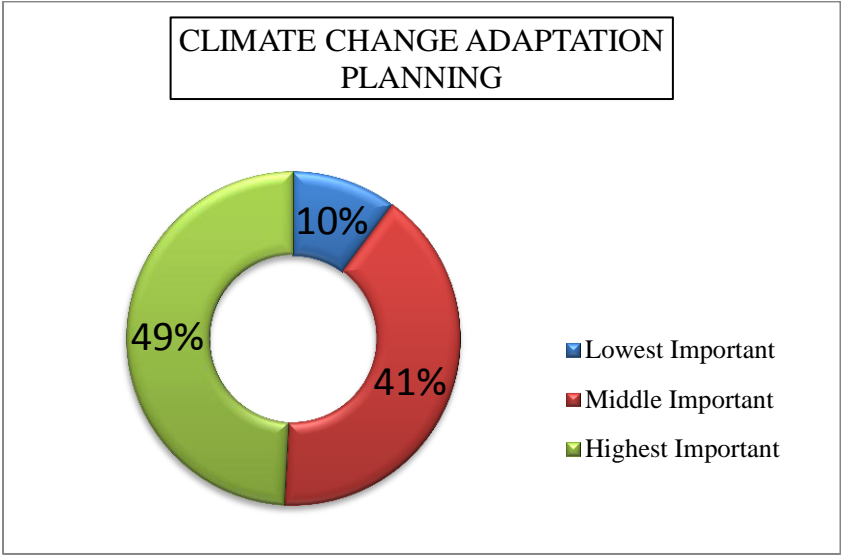


Socio-economic sector of NDCs 2021 perceived by Urban Planners at a large percentage. There are 1/5 ratio of professionals those actually shows the socio economic sector need to be more upgraded for its implementation in true sense at national level.

6.2 CLIMATE CHANGE ADAPTATION PLANNING

Each nation is required to maintain and improve its NDCs as part of the Paris Agreement. Many nations are anticipated to submit updated NDCs in 2021 outlining their strategies for reducing

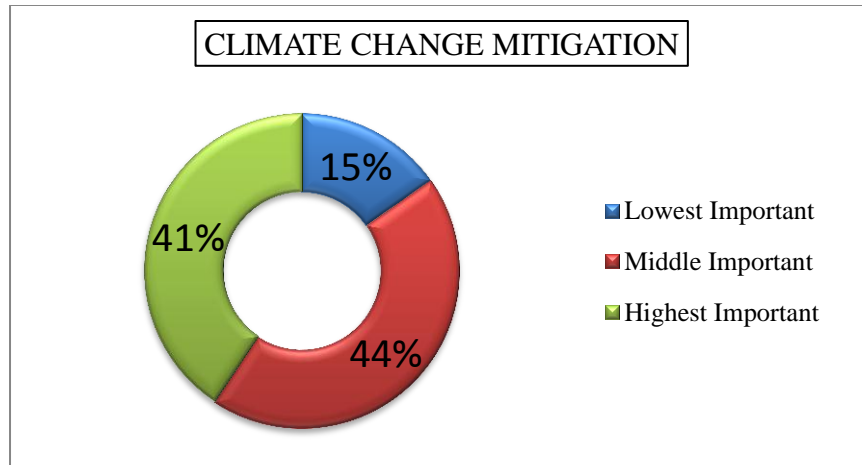
emissions and preparing for the effects of climate change. Planning for climate change adaptation is a crucial part of these updated NDCs. Planning for adaptation entails determining the precise effects of climate change that are likely to have an impact on a nation and creating plans to lower the risks and boost resilience to those effects.



Overall, the 2021 NDCs will be crucial in determining how the world will respond to climate change adaptation planning and assisting in ensuring that nations can adapt to its effects. Infrastructure upgrades, modifications to land use, and the creation of technology need assessment systems for development and industrialization and climate education in national curriculum are all examples of adaptation techniques. A huge percentage of professionals think that this sector is very much important for the better implementation of NDCs at national level policies.

6.3 CLIMATE CHANGE MITIGATION

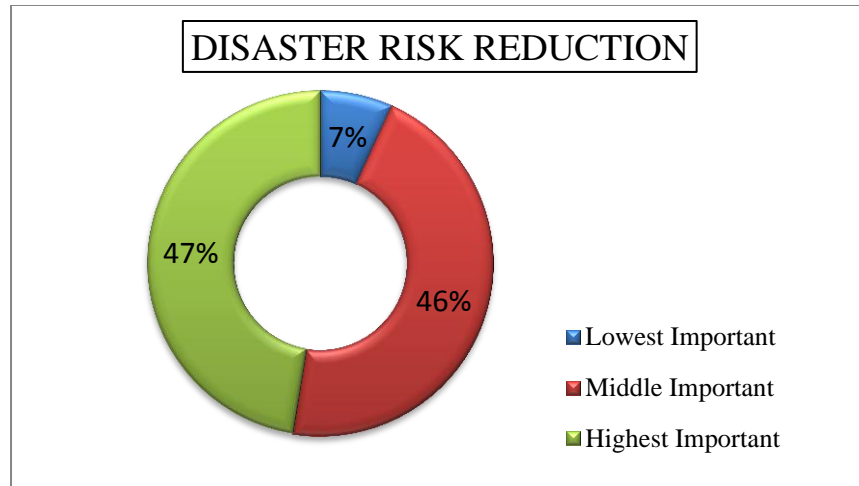
The Nationally Determined Contributions (NDCs) are a collection of climate commitments made by nations to cut greenhouse gas emissions and keep the increase in global temperature to less than 2°C or even 1.5°C. Given that it influences the land use and transportation patterns, which have a considerable impact on GHG emissions, urban planning is essential to combating climate change. Since cities produce over 70% of the world's GHG emissions, urban planners must be involved in the creation and implementation of NDCs in order to make the necessary cuts.



Study analysis shows that majority of planners accepted importance of key words involved in this sector. Urban planners can support NDCs in a number of ways. They can first assist in locating chances to cut down on GHG emissions in cities. This covers tactics including boosting the use of public transportation, encouraging biking and walking, supporting the use of electric vehicles, and enhancing building energy efficiency. Second, by ensuring that the implementation of NDCs is integrated into the urban planning process, urban planners may help. Creating climate action plans that are in line with the NDCs, making sure that new construction is low-carbon, and including climate change considerations into the planning process at every stage are all necessary steps in this process.

6.4 DISASTER RISK REDUCTION

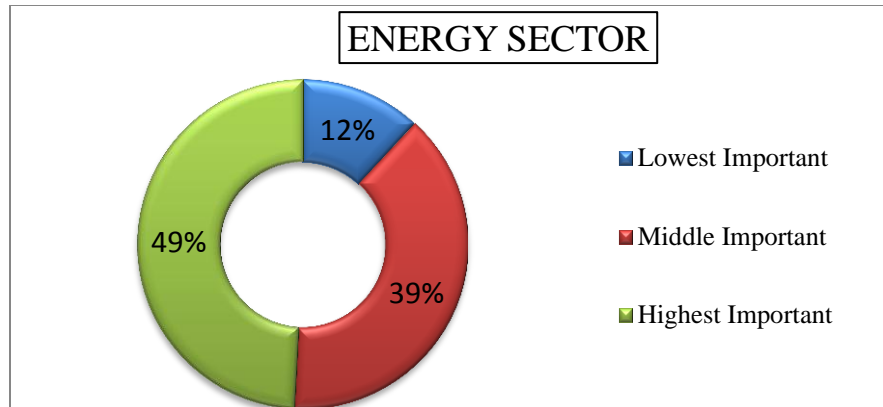
An important focus of Pakistan's Nationally Determined Contributions NDCs-2021 is on disaster risk reduction and the participation of urban planners in disaster mitigation and response. Disaster risk reduction, which includes steps to lessen the risks and effects of natural disasters including floods, earthquakes, and droughts, is one important area of concentration. In this situation, urban planners are crucial to the reduction of disaster risk. Through zoning laws, building rules, and other controls, urban planners can assist in identifying and mitigating dangers.



Above graph also shows the huge importance of this sector of NDCs for implementation in Climate change policies. Pakistan plans to improve the effectiveness of its drought, landslip, and flood early warning systems. It will be important to improve stakeholder collaboration, communication, data collection, and analysis in order to do this. promoting the incorporation of catastrophe risk reduction elements into the urban design process: To achieve this, laws and norms for urban development must be created that consider the dangers and consequences of natural disasters. Increasing capacity for emergency management: Pakistan seeks to strengthen the capability of governmental organizations, civil society organizations, and other stakeholders to handle emergencies. This necessitates supporting activities for capacity-building and training as well as promoting communication and cooperation among various stakeholders.

6.5 ENERGY SECTOR

Urban planning and the energy sector of NDCs-2021 are closely intertwined, so it is crucial to bear this in mind when talking about how urban planners will be involved in accomplishing these goals. How cities are designed and operated has a significant impact on energy use, greenhouse gas emissions, and the overall sustainability of the urban environment. Urban planners are therefore crucial to achieving the objectives of the energy sector in the NDCs.



As per research data analysis it is clearly obvious that this sector of NDCs has huge importance with NDCs key words which involves energy efficiency, energy transition, solar and wind energy. The country is facing energy crisis in many ways. In order to achieve the goal of increasing the share of renewable energy in the overall power mix, Pakistan will need to develop a comprehensive strategy that includes a variety of measures like policy and regulatory frameworks, investment in renewable energy infrastructure, and capacity building for renewable energy technologies. Urban planners can help with the execution of these programs by including renewable energy options into urban planning and development. The usage of electric vehicles can be encouraged, renewable energy sources can be incorporated into building design, and sustainable transportation networks can be supported.

In summary, the NDCs for 2021 focus on the energy sector in Pakistan, and urban planners have a crucial role to play in implementing these targets. By incorporating renewable energy solutions into urban planning and development, urban planners can contribute to the development of a more sustainable and resilient urban environment in Pakistan.

Table 4: Importance of NDC Components, Perception of Urban Planners

NDC Implementation components		Weights	Justification
1	Socio Economic Sector	Lowest 20% Middle 44% Highest 36%	Gender Equality factor is taking lead to be implemented in National Policies. Economical scenarios part and parcel to implement climate change projects.
2	Climate Change Adaptation Planning	Lowest 10% Middle 41% Highest 49%	The goal of adaptation is to provide vulnerable groups of individuals with services that will help them become

3	Climate Change Mitigation	Lowest 15% Middle 44% Highest 41%	<p>more resilient to the effects of global warming. This explains why the immediate impact on the most disadvantaged makes it a priority intervention for the majority of policies</p> <p>The information in National Communications has been influenced by mitigation measures. The achievement of the NDCs Implementation Targets depends in large part on mitigation techniques. Nationally Appropriate Mitigation Actions (NAMAs) are required for all nations.</p> <p>Electric vehicles policies along with forestry development need to be implemented at broader level including local and regional proximities.</p> <p>Energy efficiency is the key role in implementation of NDCs. Energy transition to reduce GHG emissions creating impacts at large scale economy.</p>
4	Disaster Risk Reduction	Lowest 7% Middle 46% Highest 47%	
5	Energy Sector	Lowest 12% Middle 39% Highest 49%	

Sustainable techniques can support long-term growth, the preservation of natural resources, and the reduction of carbon emissions. Urban planners can advocate for sustainable land use practices such compact, mixed-use development, preserving green space, and sustainable agriculture.

Urban planners may improve the quality of the water and air by promoting green infrastructure like parks and green roofs, minimizing air pollution from vehicles, and supporting sustainable storm water management techniques. Urban planners can promote disaster preparedness, create resilient infrastructure, such as flood-resistant buildings and transportation systems, and promote the use of green infrastructure to lessen the effects of extreme weather events in order to promote climate change resilience.

Table: Proximity Matrix

Case	Socio Economic	Climate Change Adaptation Planning	Climate Change Mitigation	Disaster Risk Reduction	Energy
i. Socio Economic	0	32	21	27	30
ii. Climate Change Adaptation Planning	32	0	28	26	18
iii. Climate Change Mitigation	21	24	0	25	26
iv. Disaster Risk Reduction	27	26	25	0	22
v. Energy	20	18	26	22	0

The above analysis defines the relationship of different components of NDCs with each other in context of their importance according to Urban Planners perceptions. National policies have the key role of each component implementation at large and small scale.

CHAPTER SEVEN

7 CONCLUSIONS & RECOMMENDATIONS

7.1 Conclusion

The findings presented in this study include data and information on the execution of NDC components derived from various climate change policies in Pakistan as well as Nationally Determined Contributions 2021. NDCs-2021 Since Pakistan is a party to the 2015 Paris Agreement, it is obligated to submit revised Nationally Determined Contributions every five years as part of the agreement. At various times, Pakistan has produced and submitted its National Communication to the UNFCCC. At various points during the last ten years, the nation has also created its own strategies for mitigation and adaptation. Numerous significant economic sectors are vulnerable to the implementation of climate change policies, according to research, and developing nations like Pakistan need to get financial support from the international community.

Socio economic sector of NDCs 2021 has best relating with Climate change adaptation planning and least connection with climate change mitigation that lead towards climate networking in national and local climate change policies of Pakistan.

Therefore, it is crucial that Pakistan strengthens its ability for climate change adaptation planning through the development of systems as urban planners has shown maximum attachment with this component of NDCs. Despite the fact that NDCs-2021 demonstrate that a minimal contribution to global GHG emissions, many of their top development efforts are reflected in their intentions to reduce greenhouse gas emissions. The governments of Pakistan have made a conscious effort to establish regulatory mechanisms that mainstream low carbon growth efforts into their planning processes and activities in order to achieve low carbon growth.

Research has shown that there is a need to effectively address the challenging issues of this climate disaster in this specific component of NDCs-20221 despite the fact that mainstreaming climate change mitigation has the least connection to the socioeconomic component of NDCs. Almost all of the NDCs' components aim to incorporate climate change policy initiatives and activities into national and sectoral planning and management procedures. The creation of

frameworks and instruments to integrate climate change responses, such as green technology and electric vehicles, has led to the mainstreaming of climate change mitigation.

Disaster Risk Reduction component of NDCs-2021 undertakes forms a foundation for the attainment of low carbon climate-resilient development and sets the basis for climate change mitigation. DRR has the lowest relation with the energy sector. It, therefore, requires the government to undertake various core interventions, including the energy efficiency, energy transition in climate change policies to provide the framework for coordinated implementation of climate change responses and action plans.

Energy sector of NDCs 2021 has lowest related with Climate change adaptation planning in terms of implementation perceptions by urban planners in Pakistan. Climate change mitigation has largest connection with energy sector. The country's commitments to decreasing greenhouse gas emissions and adapting to the effects of climate change are outlined in the NDCs, which concentrate on the energy sector. Pakistan has set a goal to reach 60% of its total power mix from renewable sources by 2030 in the energy sector.

7.1.1 NDCs Awareness to the Professionals

It was very shocking to reveal that only 33 % of our professionals known to the Nationally Determines Contributions 2021 which is our lead role policy document to fight against adverse impacts of Climate Change and future guidelines at national level. NDCs outcomes and steps taken nationally must be incorporated in our national policy documents at Climate Change level.

7.1.2 Climate Change Perception

Majority of respondents think that natural hazards effects & Climate Change risks generally not incorporated in city's Master Planning preparation. That situation needs to be addressed at our policy level. Around 70 % of professional think that poverty factor steer climate change impacts. So it is important to address economic sector to fight poverty and finally climate change impacts will be reduced.

7.2 Recommendations

Various sectoral laws and policies that will serve as the legal foundation for particular actions in various countries must be examined for potential amendments to improve their ability to facilitate the implementation of the actions in accordance with the requirements of the Paris Agreement in order to ensure the smooth and coordinated implementation of NDCs. Additionally, a technical institutional framework is required to direct policy and the effective implementation of the national government's legal obligations related to climate change. This mechanism must be an institutional coordination mechanism with high-level convening power.

7.2.1 Policy Recommendation:

The policy documents of climate change institutions examined with NDCs key indicators and ultimately found that there are very limited address of NDCs in our national policies. Gender quality concept was very rare in our main policies to execute on ground. Also GHG emissions areas are not technically addressed not even its name present in most of the Climate Change Policies.

A crucial milestone in Pakistan's efforts to solve the environmental and urbanization issues it faces is represented by its NDCs-2021. It will take the combined efforts of all parties, especially urban planners, to accomplish climate change aims by encouraging eco-friendly energy, environment and transportation sectors.

The socio economic area of NDCs and climate change mitigation sector are in minimum connection. It need to be addressed at large scale in Pakistan by the potential involvement of climate change institutions at national, provincial and local level.

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QUESTIONNAIRE FOR RESEARCH WORK (MS-URP-NUST)**SOCIO-ECONOMIC INFORMATION:**

6. Age? (Years) -----
7. Qualification? BS MS PHD Post Doc
8. Experience in Town Planning Field? (Years) -----
9. Gender? Male Female
10. Working Sector? Govt Private
11. Organization Name? -----

AWARNESS ABOUT NDCs: (Lowest to Highest From 1-5)

12. Do you aware about NDCs-2021 guidelines/recommendations?
 1 2 3 4 5
13. Have you incorporated NDCs guidelines in City's Master Plans?
 1 2 3 4 5
14. Do you think NDCs guidelines are very comprehensive in Climate Change context?
 1 2 3 4 5
15. Do you think NDCs guidelines should be improved in certain Climate Change areas?
 1 2 3 4 5
16. Planners should contribute to improve NDCs guidelines/recommendations?
 1 2 3 4 5
17. Do you think NDCs-2016 guidelines were implemented by Govt. institutions in Pakistan?
 1 2 3 4 5
18. Planners can contribute to reduce GHG emission?
 1 2 3 4 5
19. Planners can contribute in Climate Change Adaptation via Master Planning?
 1 2 3 4 5
20. Planners can contribute in Preparedness via Master Planning?
 1 2 3 4 5
21. Do you think NDCs implementations can be achieved by Master Planning?
 1 2 3 4 5

PLANNERS PERCEPTION ABOUT CLIMATE CHANGE RISKS: (PHYCOLOGICAL DISTANCE TO CLIMATE CHANGE)

22. Do you think you are well informed about different issues of Climate Change?
 1 2 3 4 5
23. Climate change effect the City's Master Planning way outs?
 1 2 3 4 5
24. City population growth effect climate change?
 1 2 3 4 5
25. Agglomeration of urban infrastructure effects on urban flooding?
 1 2 3 4 5
26. Natural hazards effects incorporated in Master Planning in Pakistan?
 1 2 3 4 5
27. Urban Heat Island effect incorporated in Master Planning in Pakistan?
 1 2 3 4 5
28. Do Actual Climate Risk incorporated in Master Planning in Pakistan?

- 1 2 3 4 5
29. Do urban poverty steer climate change impacts in cities?
- 1 2 3 4 5
30. Do Planners have intentions to take adaptive measures to cater climate change impacts in cities?
- 1 2 3 4 5
31. Climate Change institutions working satisfied for climate change adaptation planning?
- 1 2 3 4 5
32. “Flooding” is very likely to occur in Pakistan within a decade?
- 1 2 3 4 5
33. “Glacier Depletion” is very likely to occur in Pakistan?
- 1 2 3 4 5
34. Do Cultural context steer climate change impacts in cities?
- 1 2 3 4 5
35. Do Political context steer climate change impacts in cities?
- 1 2 3 4 5
36. Preparedness by Climate Change institutions is satisfied in terms of **Floods**?
- 1 2 3 4 5
37. How much is your local community likely to be affected by Climate Change?
- 1 2 3 4 5
38. In your view, how much will climate change impact your country?
- 1 2 3 4 5
39. How much do you agree that the country is feeling the effects of climate change now?
- 1 2 3 4 5
40. How much do you agree that climate change will impact future generations?
- 1 2 3 4 5
41. How certain are you that climate change is happening?
- 1 2 3 4 5
42. Have you noticed particular changes in ‘Rain’ pattern in last 10 years in Pakistan?
- 1 2 3 4 5
43. Have you noticed particular changes in ‘Temperature’ pattern in last 10 years in Pakistan?
- 1 2 3 4 5
44. Have you noticed particular changes in ‘Season Shift’ Pattern in last 10 years in Pakistan?
- 1 2 3 4 5
45. Have you noticed particular changes in ‘Floods’ Pattern in last 10 years in Pakistan?
- 1 2 3 4 5
46. Have you noticed particular changes in ‘Droughts’ Pattern in last 10 years in Pakistan?
- 1 2 3 4 5

47. IMPORTANCE OF CLIMATE CHANGE CONCEPTS ON ADAPTATION & MITIGATION:

48. “Gender Equality” importance while NDCs implementation?
- 1 2 3 4 5
49. “Climate Finance” importance while NDCs implementation?
- 1 2 3 4 5
50. “Poverty Alleviation” importance while NDCs implementation?
- 1 2 3 4 5
51. “Food Security” importance while NDCs implementation?
- 1 2 3 4 5
52. “Environmental Impact Assessment” importance while NDCs implementation?
- 1 2 3 4 5
53. “Eco-tourism” importance while NDCs implementation?
- 1 2 3 4 5

54. “Green Jobs” importance while NDCs implementation?
 1 2 3 4 5
55. “Climate resilient livelihood” importance while NDCs implementation?
 1 2 3 4 5

CLIMATE CHANGE ADAPTATION PLANNING

56. “Water Resource Management” importance while NDCs implementation?
 1 2 3 4 5
57. “Preparedness” importance while NDCs implementation?
 1 2 3 4 5
58. “Protected Area Initiatives” importance while NDCs implementation?
 1 2 3 4 5
59. “Climate Resilience” importance while NDCs implementation?
 1 2 3 4 5
60. “Climate Risk Vulnerability” importance while NDCs implementation?
 1 2 3 4 5
61. “Exposure” importance while NDCs implementation?
 1 2 3 4 5
62. “Climate education” importance while NDCs implementation?
 1 2 3 4 5
63. “Waste Management and recycling” importance while NDCs implementation?
 1 2 3 4 5
64. “Climate Risk Communication” importance while NDCs implementation?
 1 2 3 4 5
65. “Climate Awareness” importance while NDCs implementation?
 1 2 3 4 5
66. “Climate Proofing” importance while NDCs implementation?
 1 2 3 4 5

CLIMATE CHANGE MITIGATION

67. “Carbon Emission” importance while NDCs implementation?
 1 2 3 4 5
68. “Carbon Levies” importance while NDCs implementation?
 1 2 3 4 5
69. “Green Technology” importance while NDCs implementation?
 1 2 3 4 5
70. “Carbon Sink” importance while NDCs implementation?
 1 2 3 4 5
71. “Electric Vehicle” importance while NDCs implementation?
 1 2 3 4 5
72. “Carbon Pricing” importance while NDCs implementation?
 1 2 3 4 5
73. “Decarbonization Pathways” importance while NDCs implementation?
 1 2 3 4 5
74. “Climate Action” importance while NDCs implementation?
 1 2 3 4 5

DISASTER RISK REDUCTION

75. “Climate induced Loss & damage” importance while NDCs implementation?
 1 2 3 4 5
76. “Urban Heat Island” importance while NDCs implementation?
 1 2 3 4 5
77. “Climate Smart Development” importance while NDCs implementation?
 1 2 3 4 5
78. “Biodiversity conservation” importance while NDCs implementation?
 1 2 3 4 5
79. “Nature Based Solutions” importance while NDCs implementation?
 1 2 3 4 5
80. “Coastal Management” importance while NDCs implementation?
 1 2 3 4 5
81. “Disaster Risk Management” importance while NDCs implementation?
 1 2 3 4 5

ENERGY:

82. “Clean Energy” importance while NDCs implementation?
 1 2 3 4 5
83. “Solar Energy” importance while NDCs implementation?
 1 2 3 4 5
84. “Energy Transition” importance while NDCs implementation?
 1 2 3 4 5
85. “Renewable Energy” importance while NDCs implementation?
 1 2 3 4 5
86. “Energy Efficiency” importance while NDCs implementation?
 1 2 3 4 5