

AJ&K Climate Change Policy



Climate Change Center
Planning & Development Department
Azad Government of the State of Jammu & Kashmir

August 2017



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Foreword

Pakistan is one of the top ten most vulnerable countries to the impacts of Climate Change. Azad Jammu and Kashmir (AJ&K) is one of the most fragile and sensitive territories within Pakistan to the impacts of climate change because its geographical location, its water resources, glaciers, forests, fisheries and associated biodiversity are vulnerable to the impacts of Climate Change, its communication, physical infrastructure and power sectors are at risk which is alarming for the economy. Climate change is also the main cause of many disturbances and disasters like floods, landslides, and storms. There is a need to get adapt to these rapid changes taking place along with putting up our share of mitigation efforts, thereby halting and reversing progressively worsening impacts. Addressing climate change is therefore a top priority of the Azad Government of the State of Jammu and Kashmir.

Foreseeing the AJ&K's peculiar vulnerabilities to ensuing catastrophes of climate change striking with inconceivable occurrence and ferocity, the development of an effective AJ&K Climate Change Policy commences the process of mainstreaming Climate Change response initiatives in development efforts by different departments and agencies in AJ&K. The policy prepared in consultation with relevant stakeholders is in full conformity with the National Climate Change Policy with addition of new initiatives like sustainable development goals and new sectors like communication and power infrastructure, tourism, mining and finance. Furthermore, some of the measures have been elaborated in more detail.

The AJ&K Climate Change Policy reiterates the State's commitment to address climate change with sustained participation of relevant stakeholders, including Government, NGOs and other private sector. It also provides the State an opportunity to address climate change adaptation and participate in the global and national efforts to reduce Greenhouse gas (GHG) emissions in the context of sustainable development. The policy comprehensively, addresses possible challenges of climate change by taking Climate Change adaptation and mitigation measures, in foreseeable future. The Government of AJK is committed to gender issues and these issues have been mainstreamed in the policy. Furthermore, it ensures to provide solid foundation for Climate Change strategies, action plans, programs and projects for resource mobilization.

The policy will be useful in providing more insight to enable the AJ&K to effectively adapt to climate change and participate in state, national and global level efforts to mitigate climate change with a view to achieve sustainable development goals. I, therefore, request everyone to participate in implementing the AJ&K Climate Change Policy. The Government is committed to effectively meet the objectives of the Policy and engage to the national and international processes in order to support the implementation of same.

Dr. Syed Asif Hussain
**Additional Chief Secretary (Dev.)/
Secretary, Environment and Climate Change
Government of Azad Jammu & Kashmir**



Acknowledgment

The AJK Climate Change Policy is a result of wide ranging consultation process involving all the relevant government departments and other key stakeholders of the State, their valuable inputs and national and international experts with keen insight and interest in climate change related issues.

The invaluable guidance and ideas provided by Dr. Syed Asif Hussain, Additional Chief Secretary (Dev.) / Secretary, Environment, Government of Azad Jammu & Kashmir and the support provided by Mr. Muhammad Ahsan, Secretary, Planning & Development Department, GoAJ&K throughout the process of development of this policy document is deeply appreciated.

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Dr. Raja Aurangzeb Khan
Director General
Climate Change Center, AJ&K

List of Acronyms

A2	A2 Scenario, per capita economic growth & technological changes slower	Agency	
A1B	A1B Scenario, very rapid economic growth with balance across all sources	GCF	Green Climate Fund
AF	Adaptation Fund	GCM	Global climate model, General Circulation model
AJ&K	Azad Jammu & Kashmir	GCISC	Global Change Impact Studies Centre
AKCCPIC	AJ&K Climate Change Policy Implementation Committee	GEF	Global Environment Facility
AMJ	April, May, June	GHGs	Greenhouse gases
AR5	Fifth assessment report of IPCC	GIS	Geographical Information System
B1	B1 Scenario, sustainable but without additional climate initiatives	GLOFs	Glacier Lake Outburst Floods
BAP	Biodiversity Action Plan	GoAJ&K	Azad Government of the State of Jammu & Kashmir
°C	Degree Centigrade	GPS	Geographical Positioning System
CBO	Community Based Organization	H ₂ O	Water
CDM	Clean Development Mechanism	ICAO	International Civil Aviation Organization
CH ₄	Methane	IEE	Initial Environmental Examination
CO ₂	Carbon dioxide	IPCC	Inter-Governmental Panel on Climate Change
CSOs	Civil Society Organizations	JAS	July, August September
CSR	Corporate Social Responsibility	KMB	Knowledge Based Management
CSW	Commission on the Status of Women	KP	Khyber Pakhtunkhwa
Dev.	Development	L	Long Term (2027 to 2031)
DFIs	Development Finance Institutions	LNG	Liquefied Natural Gas
DRR	Disaster Risk Reduction	LOC	Line of Control
ECHAM-5	Max Planck Institute for Meteorology's 5th generation atmospheric circulation model	LPG	Liquefied Petroleum Gas
EIA	Environmental Impact Assessment	M	Medium Term (2022-2026)
EPA	Environmental Protection	MRV	Monitoring, Review & Verification
		NCCP	National Climate Change Policy 2016
		NGO	Non-Government Organization

N ₂ O	Nitrous oxide
OHCHR	Office of the High Commissioner for Human Rights
P&DD	Planning and Development Department
PMD	Pakistan Meteorological Department
RCP	Regional Climate Projections
REDD+	Reducing Emissions from Deforestation & Forest Degradation
RS	Remote Sensing
RSP	Rural Support Program
S	Short Term (2017-2021)
SDGs	Sustainable Development Goals
SDMA	State Disaster Management Authority
SF ₆	Sulfur hexafluoride
SERRA	State Earthquake Reconstruction and Rehabilitation Authority
SRES	Special Report Emission Scenarios
TMAX	Maximum Temperature
TMIN	Minimum Temperature
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

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1. Overview of AJ&K

The total area of AJ&K is 13,297 km² with a population¹ of 4.045 million in 2017, with about 49.7 percent female. The literacy rate is 74 percent. Rate of enrollment in primary schools is 98 percent and 90 percent for boys and girls, respectively. The majority of the rural population depends on forestry, livestock and agriculture for its subsistence. The area under cultivation is around 194,082 hectares (almost 13% of the total area) out of which 92% of the cultivable area is rain-fed. The major crops are maize, wheat & rice whereas minor crops include vegetables, grams, pulses like Red Lobia (Kidney Beans) and oil-seeds. Major fruits are walnuts, apple, pears and apricot². Area under the control of the Forest Department extends about 42.6% of the land area of the AJ&K. Out of this, about 11.6 percent of the total land area is under forests containing mostly Deodar, Kail, Blue Pine, Silver Fir and Chir-pine. Additionally 16.9 percent of total land area is under thinly wooded forests. The total forest area has a growing stock of approximately 34.4 million cubic meters.

The southern parts of AJ&K including Bhimber, Mirpur and Kotli districts (Figure 1) have extremely hot weather in summers and moderate cold weather in winters, and receive mostly monsoon rains, classified as a warm to hot sub-tropical continental monsoon climate type (Figure 2). The topography of the southern areas of the State is partially hilly in Kotli, whereas Bhimber and Mirpur are plains and similar to agricultural regions of northern Punjab. Alternatively, the topography of the central and northern areas of the State is mainly hilly and mountainous with valleys and stretches of plains (Figure 3). Northern parts comprise of lower parts of Himalayas and the Poonch, Bagh, Muzaffarabad and Neelum districts.

The climate is moist and dry temperate highland type with average rainfall exceeding 1400 mm³ in central and northern areas. In central and some of the northern areas weather remains moderate hot in summers and very cold and chilly in winter. The AJ&K has been divided into eight agro-climatic zones i.e. (i) Glaciers and cold caps; (ii) Very cold temperate continental winter rains; (iii) Cold dry temperate continental winter rains; (iv) Very cold temperate continental winter rains and monsoon; (v) Cold temperate continental winter rains and monsoon; (vi) Moist warm temperate continental winter rains and monsoon; (vii) Humid warm sub-tropical continental winter rains and monsoon; and (viii) Sub-humid hot sub-tropical continental winter rains and monsoon. The elevation ranges from 360 meters in the south to 6,326 meters in the North⁴.

The main rivers are Jhelum, Neelum and Poonch. There are 239 glaciers with a total area of 92.229 square kilometer⁴. The number of glacier lakes are 76 having a total covered area of 545 hectare⁵ (Annex-IV). Most of the glaciers and glacier lakes are in District Neelum (Figure 3).

¹Azad Kashmir; https://en.wikipedia.org/wiki/Azad_Kashmir

²About AJ&K; <https://www.ajk.gov.pk/aboutprofile.php>

³Azad Kashmir; https://en.wikipedia.org/wiki/Azad_Kashmir

⁴Survey results for total Jhelum river basin, Cryosphere Monitoring and Research Unit, Pakistan Meteorological Department.

⁵Ashraf, A, R. Naz, R. Roohi; 2012; Monitoring and Estimation of Glacial Resource of Azad Jammu and Kashmir, Pakistan Journal of Meteorology, Vol. 8, Issue 16: Jan 2012

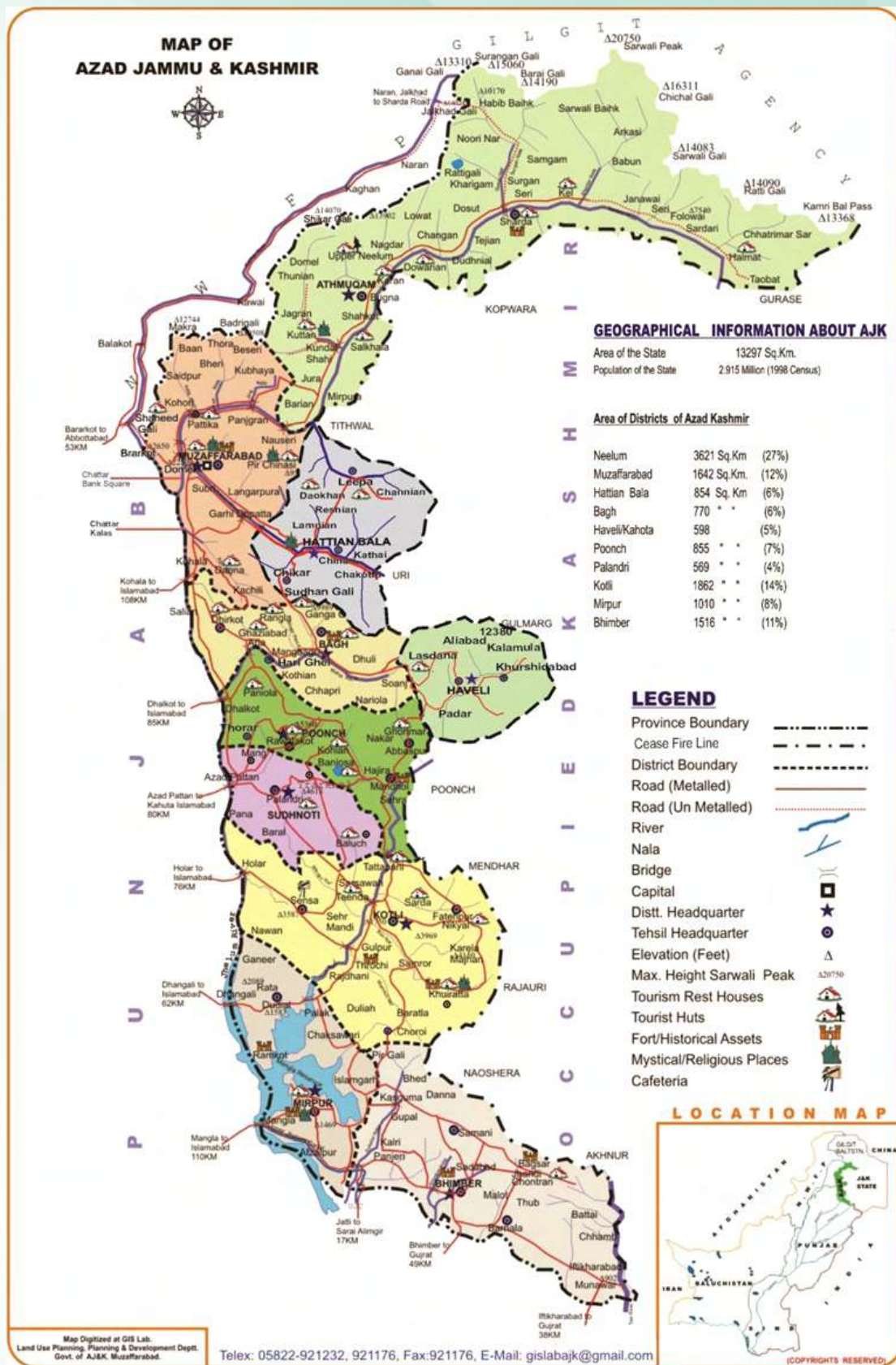


Figure 1–Map of Azad Jammu and Kashmir

Eco-Climatic Zones of Azad Jammu & Kashmir

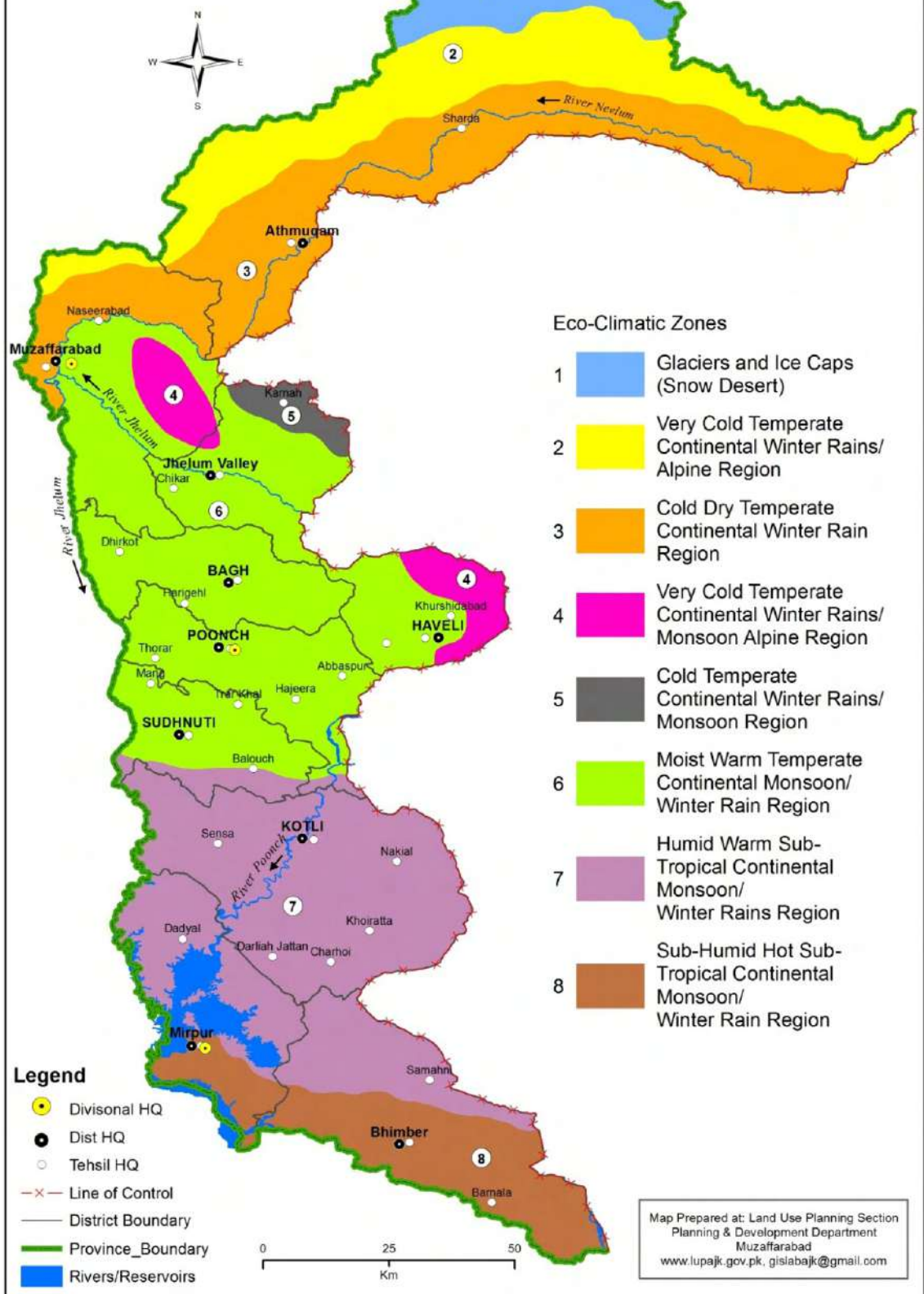


Figure 2–Eco-Climatic Zones of Azad Jammu and Kashmir



Figure 3 - Neelum Valley's High Altitude areas, Glaciers & Glacier lakes in AJ&K

2. The Need for a State Climate Change Policy

Different sectoral departments are implementing activities to adapt and mitigate the impacts of climate change but their activities are not being coordinated in a proper way. So far, the National Climate Change Policy (NCCP) 2012 has served as the guiding framework in AJ&K on climate actions. A separate Climate Change policy for the AJ&K is now required for the following reasons, to:

- Provide AJ&K-specific, concise and accessible tool and measures for coordination of climate change activities based on the guidelines provided in the NCCP 2012;
- Formulate the overall climate change position and objectives for the AJ&K;
- Identify policy priorities, guidelines, policy instruments and measures to address climate change as applicable and relevant to the AJ&K;
- Provide guidance to policies and strategies of AJ&K's different sectors from climate change perspectives; and
- Include a new dimension in the policy due to emerging international developments, such as Sustainable Development Goals, and to add new sectors like communication and power infrastructure, tourism, mining and finance.
- The separate climate change policy would be helpful for getting direct funding for the AJ&K from the international donors.

The Policy will provide an overarching (umbrella/high level) guidance for the GoAJ&K to implement the major climate change objectives of national and provincial priority which are related to adaptation⁶ and mitigation⁷ of Greenhouse gas (GHG) emissions.

⁶Adaptation: is a process, or set of initiatives and measures, to adjust or reduce the vulnerability of natural and human systems against actual or expected climate change effects. Adaptation can also be thought of as learning how to live with the consequences of climate change.

⁷Mitigation: The term used to describe the process of reducing GHG emissions that contribute to climate change. It includes strategies to reduce GHG emissions and enhance GHG sinks.

3. AJ&K's Climate Change Trend and Future Projections

The Policy will be data-driven (evidence based) and will respond to the threat of specific climate shifts at state and district levels as defined by area-specific data and analyses.

3.1 Past trend in AJ&K

The average maximum and minimum temperature of AJ&K increased from 25C^o and 12.0C^o in 1962 to 27C^o and 13.0C^o in 2013, respectively. The temperature increase was more prominent in Garhi Dupata, District Muzaffarabad. The average maximum and minimum temperature rose from 24C^o and 12.3C^o in 1962 to 27.2C^o and 12.6C^o in 2013, respectively. The annual average precipitation shows increasing as well as decreasing trends from 1962 to 2013. The annual average precipitation changed from 1086 mm in 1962 to 1340 mm in 2013⁸.

3.2 Future Projections in AJ&K

The AJ&K-specific climate change analysis to date consists only of the Pakistan Meteorology Department (PMD) modelled projections of 1.4^oC in 2060 and 3.0^oC end-century (2100) average temperature increases in Muzaffarabad under the IPCC RCP 4.5⁹ GHG emission scenario. Similar scenarios of change in temperature were projected for other parts of AJ&K. Pakistan Meteorology Department (PMD) modelled projections of average¹⁰ delta change of maximum and minimum temperature (°C) and average delta change of rain (%) of AJ&K under IPCC RCP4.5 and RCP 8.5¹¹ are presented at Annex-V.

3.3 Past trend in Pakistan

Based upon measured (empirical) data analysis, PMD records that average surface air temperature in Pakistan¹² to have historically risen at the rate of 0.099 °C per decade from 1960-2010, which has resulted in a total increase of 0.47 °C over the past 50 years. Based upon measured (empirical) data analysis, PMD records a trend of monsoon rainfall total increase of 22.6 mm (i.e. not statistically significant) and trend of 20.8 mm total increase in winter rainfall (i.e. 1.95 mm per decade), over 1901-2010, across all Pakistan rainfall stations.

⁸Pakistan Meteorological Department

⁹Representative greenhouse gas concentration trajectory adopted by the IPCC for its fifth assessment report (AR5) in 2014, where RCP4.5 projects a 1.4°C and 1.8°C global warming temperature increase for 2046 – 2065 (mid Century) and 2081 – 2100 (end Century).

¹⁰Average of all PMD stations in AJ&K, Station at Kotli was established in 1952, at GariDupata, Muzaffarabad and Muzaffarabad AP in 1954 & at Rawlakot in 2003.

¹¹RCP8.5 is consistent with a future with no policy changes to reduce emissions. It was developed by the International Institute for Applied System Analysis in Austria and is characterized by increasing greenhouse gas emissions that lead to high greenhouse gas concentrations over time.

¹²Averaged across all temperature recording stations in Pakistan.

3.4 Future Projections in Pakistan

The Global Change Impact Studies Centre (GCISC) and PMD joint modeling study¹³ of future climate change scenarios for Pakistan¹⁴ has projected a significant future increase in both daily maximum and daily minimum temperatures, with a large percentage of Pakistan land area showing significantly greater increase in daily minimum temperature (5°C) than daily maximum temperature in summer, whereas in winter the increase in daily maximum temperature is higher. Modeled temperature projections across the A2, A1B and B1IPCC SRES emission scenarios¹⁵ suggested national average temperature would in future rise from 0.51°C to 0.24°C per decade.

The joint GCISC and PMD down-scaled GCM modeling study noted above, when modeled across the A2, A1B and B1 SRES emission scenarios, alternatively projected respective trends of rainfall increase of 1.73 mm and 1.26 mm per decade, and fall of rainfall of 0.89 mm per decade. This suggests almost insignificant changes in modeled rainfall totals due to climate change. Other PMD studies have found that though monsoon rainfall totals are not increasing, there is a decreasing trend in the number of rain days, suggesting climate change has led to a greater intensity of rainfall per rain day. Other PMD studies have recorded that the spatial pattern of the monsoon rain has tended to extend further northwards into the mountains of AJ&K and KP province as a result of the relatively greater continental warming induced by climate change. These trends of the northward shift in extent of monsoon rains, and an increased intensity of rainfall per rain day, do represent significant climate change impact on rainfall pattern.

4. Policy Goal and Objectives


The goal of the State Climate Change Policy is to mainstream climate change adaptation and mitigation in the vulnerable sectors of the State economy to steer Azad Government of the State of Jammu & Kashmir (GoAJ&K) towards climate change resilient development. The policy is in full conformity with the NCCP 2012, however, some of the new initiatives like SDGs have been considered in addition; some new sectors like communication and power infrastructure, tourism, mining and finance have been added and some of the measures have been elaborated in more detail. The main objectives of AJ&K's Climate Change Policy include:

1. To pursue sustainable economic growth by appropriately addressing the challenges of climate change;
2. To ensure water security, food security, energy security and economic security of the State, and downstream provinces, in the face of the challenges posed by climate change;
3. To integrate climate change policy into the sectoral planning processes of the State;

¹³GCISC (2009b): Islam, S., N. Rehman, M. M. Sheikh and Arshad M. Khan, Climate Change Projections for Pakistan, Nepal and Bangladesh for SRES A2 and A1B Scenarios using outputs of 17 GCMs used in IPCC-AR4, Research Report No.GCISC-RR-03, Global Change Impact Studies Centre, Islamabad.

¹⁴Monthly temperature data sets were used by 17-model GCM ensemble to construct A2 and A1B scenario, but daily data were used for ECHAM-5 (Max Planck Institute for Meteorology's 5th generation atmospheric circulation model) output to produce B1 scenario. Statistical downscaling of multi-model GCMs output by using NCC-RCM (Regional Climate Model of National Climate Centre Beijing) produced final scenarios.

¹⁵The IPCC Special Report Emission Scenarios (SRES) cover a wide range of the main driving forces of future GHG emissions, from demographic to technological and economic developments, inclusive of forest loss.

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4. To strengthen inter-departmental decision making and coordination mechanisms on climate change;
 5. To enhance the awareness, skill and institutional capacity of relevant stakeholders, especially women in climate change related matters;
 6. To mobilize resources to adequately address climate change and facilitate effective use of the opportunities, particularly financial, available at State, national and international levels;
 7. To foster the development of appropriate economic incentives to encourage public and private sector investment in adaptation and mitigation measures;
 8. To minimize the risks arising from the expected increase in frequency and intensity of extreme and uncertain weather events such as storms, floods and droughts;
 9. To increase the share of renewable technologies, particularly hydro-electric energy, in the energy mix at the state level;
 10. To enhance resilience of ecosystems to climate change;
 11. To promote the conservation and long term sustain ability of natural resource stocks;
 12. To focus on pro-poor gender sensitive climate change adaptation while also promoting mitigation to the extent possible in a cost-effective manner;
 13. To develop low carbon emission scenario in settlements including cities;
 14. Promote resource use efficiency and less carbon intense pathways in all economic activities and develop a climate change resilient energy infrastructure that is not carbon intense.


5. AJ&K's Vulnerability to Climate Change Threats and Generalized Policy Measures

5.1 Climate Change Impacts – AJ&K

The important climate change threats to AJ&K are as follows:

5.1.1 Weather, Water Resource and Glacier Impacts

1. The increasing temperature levels (average, minimum and maximum) are expected to lead to a small but fundamental shift in weather patterns within AJ&K, with increasing risks of pre – and post-monsoon severe thunder and wind storms, summer heat waves and extended summer season, shorter autumn and spring seasons, increased water evaporation losses from crops and land cover, unreliable rainfall patterns and increased rainfall droughts and river low flows.
2. The increase in the frequency and intensity of extreme rainfall events, and northward shift of the monsoon rainfall pattern, will result in a small but fundamental shift in hill-slope water movement and river flow patterns (hydrology) within AJ&K, this is expected to lead to more frequent and larger floods, higher risk of glacier lake outburst floods (GLOFs), land-sliding and avalanches due to extreme rains.
3. The rise in temperature and changed rainfall patterns will lead to fundamental shift in the dynamics of glaciers, with complex impacts on AJ&K river flows (hydrology), and water supply for local AJ&K and downstream Punjab water users, and for community health and livelihoods, hydro-power, fisheries and irrigated food production.
4. The unreliable rains and increased winter and summer dry-spell cycles outside of the monsoon, on one hand, could decrease snow input and lead to an accelerated shrinkage of glaciers, which will in the long run reduce the continuous flow of water in rivers and nallahs / streams from spring, summer and autumn ice melt.

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5. This increased spring and summer temperatures and more significantly the warm monsoon rains falling for the first time upon the northern glaciers, will lead to an accelerated summer and monsoon ice-melt, ice slips / avalanches and retreat of the glaciers, which in the short to medium term may increase amount of water flow to local and downstream users, yet in the long term will add to glacial retreat and a reduction of the glacier water resource to feed the spring and summer, dry season, flow of AJ&K and downstream Punjab.
 6. In cooler northern and high altitude areas, climate change appears to be also impacting on the snow patterns, with the snow maxima is shifting from December and January to February and some snowfall even October-November and after a dry-spell remaining in April. The overall result is that the snow residency period is shrinking. Furthermore, Global warming is the prime factor for the accelerated glacial melt and retreat, giving birth to hazardous glacial lakes in the Himalayas which are geologically young and fragile and are vulnerable to even insignificant changes in the climatic system. These factors are resulting in shrinkage of glaciers and increased threats of disasters like glacier lake outburst floods, avalanches, mud flow and floods to downstream areas.


5.1.2 Land Degradation Impact upon Catchment Function

7. Points 1 and 2 outline the projected direct climate change impacts upon AJ&K hill-slope water movement and resulting river flow hydrology (i.e. increased flood risk in rainy seasons and increased low flows during dry periods), these trends will be made worse if the increased frequency and intensity of storms are allowed to lead to accelerated land degradation (i.e. land degradation made worse above that resulting from current land use practices). More frequent and intense rainfall storms, when coupled with poor vegetation ground cover (i.e. due to forest loss, over-grazing, fire or poor cropland and forest plantation management), will lead to increased rain-drop erosion, sun exposure and degradation¹⁶ of soil surfaces on the hill-slopes, this leads in short to medium term (1 to 5 years) to a trend of loss in surface soil infiltration, increased water overland flow, accelerated erosion and decreased water infiltration to sub-soils and groundwater aquifers, which leads in the medium to long term (10 to 20 years) to increased frequency and size of river flood peaks, decreased river base-flows overall and increased dry season low flows (i.e. land degradation impact on river flow hydrology). The negative trends of direct climate change impact on river flows, erosion and sediment transport, are made much worse by the added effect of land degradation induced by increased storms and rainfall intensity.

5.1.3 Reduced River Flow and Hydrologic Drought Impacts

8. Climate changes above and climate change accelerated land degradation, most fundamentally deteriorate water quantity in the inland freshwater, which disturbs the continuous flow of water in rivers (base-flow) which ultimately affects the water, energy, food and economic security of both AJ&K local and downstream Punjab governments, communities and businesses.
9. Reduced river flows due to climate change induced drought and unreliable rains, if extreme and prolonged, may kill livestock, lead to crop failure, negatively affect fish populations and drinking and irrigation water supplies, which results in reduction of arable lands, which

¹⁶Loss of soil organic matter, soil porosity, soil fauna, soil nutrients, root channels and macro-pores; and increased bulk density.



negatively affects food production and nutritional availability in the crops that ultimately reduces food and economic security and risk affecting community health.

5.1.4 Increased Flood Impacts

10. Floods may kill livestock, physically damage crops and farm equipment. After the floods, most commonly there is an increase in incidence of insects, pests and disease attack, land-sliding and excessive soil erosion which results in reduction of arable lands, which negatively affects food production, food quality and nutritional availability in the crops that ultimately reduces food security and economic security.
11. Floods and increased frequency of extreme weather events may result in the direct impact of loss of life, property, physical infrastructure, including buildings, roads, dams, water pipes, electricity transmission adding pressure on services and utilities, communication, sewerage and drainage systems, micro and small hydropower plants, tourism assets, including the increased run-off wash away or erosion of foundations of these structures, plus reduced landscape aesthetics and increased incidence of vector-borne diseases. These impacts all leading to disruption of communication, human settlements, migration and ultimately negatively affecting energy security and tourists' arrival in the area.
12. The above physical and infrastructure impacts of increased floods, will lead most commonly, to the secondary impact that local community, both men and women, will have to migrate from flood-affected areas, until the area is clear from flood water. The effect of disasters and extreme weather events is most often more pronounced upon women and children. The need for forced migration will disproportionately impact upon women who often avoid using communal shelters due to cultural constraints. When coupled with unequal access to resources and to decision-making processes, limited mobility and acceptable refuge places, women particularly in rural areas are in a position where they are disproportionately affected by climate change.

5.1.5 Increased Sediment Transport and Reduced Water Quality Impacts


13. Climate changes, with increased rainfall intensity, floods, sediment and pollutant transport, coupled with extended dry season periods of river low flows, will deteriorate water quality in inland fresh waters and river, which ultimately affects water, food and economic security, as linked to negative impacts on drinking and irrigation water supplies, fish populations and dams and other water infrastructure.
14. Climate change induced floods, may also mobilize and transport solid waste which is commonly dumped around river and stream banks, to dump it again and allow it to accumulate and deteriorate water quality at other places downstream.
15. Abrupt, erratic and unreliable rains, plus climate change-induced and current land degradation, will result in increased runoff and soil erosion reducing land availability for crops and land productivity.
16. Increased siltation of dams, water infrastructure and drinking water intakes, will result due to climate change accelerated soil erosion and sediment transport, coupled with the trends of vegetative cover loss and land degradation in watershed areas.

5.1.6 Weather and Temperature Impacts

17. In cooler areas, lesser chilling, late frosts and rains in winter and spring may interrupt the flowering and pollination process, causing reduced production of fruit trees like apple. Higher temperatures in July and incessant rains may provide a humid atmosphere ideal for crop diseases and floods may destroy fruit trees and river-side crops.
18. Climate change induced temperature rise may result in enhanced heat and water-stress conditions, reducing the number of reliable crop growing days, and introducing higher inter-annual unpredictability in precipitation, particularly in warmer areas of AJ&K. This will lead to reduced agricultural, fodder and forest crops productivity, and possible losses to crop biodiversity and varieties. The women, again, will be disproportionately impacted because they have to travel longer distances to collect water and fodder.
19. Climate change will make the seasons unreliable, which will disturb the occurrence time, severity and type of epidemics in human beings and livestock (shifts in human and livestock epidemiology), so it will become more difficult to assess the potential disease occurrence and conduct vaccination and treatment in the right season. Increased health risks may result due to an increase in solar radiation, or climate and hydrology regime shifts may lead to increased incidence of vector and water-borne, respiratory and skin diseases. Any increase in prevalence of diseases will most likely increase the reliance on the women's care-giving role for family and community members who are ill.
20. Extreme and unreliable weather events, and resulting reductions in production of agriculture, livestock or from natural resources, will result in secondary negative impact upon manufacturing, cottage industries, wholesale, retail and trade sectors which rely on outputs from these sectors. This, in turn, will negatively affect loan recovery and increase risks for insurance industry, and lead to high claim ratios and lower uptake of insurance cover, impacting in turn on the local and national insurance and finance sectors.
21. At higher altitudes and in the cooler climates, the areas receiving climate change induced heavier snowfall, may lose the time required for growing the maize crop and lead to a contraction of the maize crop area. Alternatively, a decrease in the amount of snowfall and increase in temperature, may allow a longer time period for growing crops like maize and potato which previously did not occur. This may also result decrease of the need for fuel-wood collection in the winter season, due to the increased temperature in the area, and due to the availability of maize and potato as a food source in such areas. This will have positive impact in decreasing the workload of women.
22. Climate change may introduce new limitations to the design and adequacy of housing and human settlements, particularly those in lower lying areas which will be both more heat and flood affected.

5.1.7 Ecological and Associated Impacts

23. Degradation of vegetation may result in watersheds, forest, rangeland and other lands as a direct (e.g. increased temperature and ecological shift) or secondary (i.e. changed land use pressures) due to climate change. In this case, the women in the community who have responsibility to collect fuel-wood, grasses, graze livestock and collect drinking water, may become disproportionately more vulnerable to injuries from carrying heavy loads over long distances.
24. A decrease in the forest cover may result due to increase in natural disasters, soil erosion and extreme weather events, plus there may be long term natural migration (altitude shift) of plant



species. The tree-line is already shifting, and there is an increased incidence of invasive species and pests in the forest areas. Scrub trees are now already encroaching in Chir-pine areas. Chir-pine trees are now found in the higher altitude areas previously known for trees like Blue-pine. Blue-pine trees are found to be already encroaching in areas for Silver fir. Deodar is moving towards the sub-alpine areas. The incidence of forest fire is already increasing in the sub-tropical Chir pine zone and forests in southern districts of AJ&K.

25. There may be changes in wetlands and fisheries systems, due to changes in rainfall and river flow regimes, rising temperatures and increased hazards such as floods and extended period of low flow.
26. Plant species like Hazelnut (*Corylus spp.*), Bhurj-patar (*Betula utilis*), Himalayan yew (*Taxus wallichiana*), Maple (*Acer accuminatum* and *Acer caesium*), Pashurr (*Parratiopsis jacquemontiana*), Oak (*Quercus ilex*) and Tarambba (*Fagopyrum esculentum*) are already becoming endangered, due to the synergistic effects of climate change and habitat fragmentation.
27. Degradation of rangelands and decreasing plant biodiversity may result in a changed pattern or even increased migration of pastoralists and possibly also other communities, especially women, who are dependent on natural resources due to the changed temperature, rainfall and ecological shifts and the impacts on rangeland, forest, scrubland, crop and fodder production patterns.


The above list of potential threats may lead to major survival concerns for the AJ&K, particularly in relation to its water security, food security and energy security, which is ultimately affecting economic security. To reduce such climate change impacts the generalized policy measures are as follows.

5.2 Generalized Policy Measures

1. Conduct studies to compile past trends, present condition and future projections of climate change and its impacts on various sectors of economy and community both men and women; (S)¹⁷
2. Prepare AJ&K's Climate change strategy for both adaptation and mitigation containing enabling actions for both male and female to support the transition to a low carbon climate resilient development pathway; (S)
3. Prepare AJ&K's Climate Change Action Plan for 10 years for implementation of short and medium term policy measures and based on review of the previous plan for the next 10 years; (S)
4. Prepare AJ&K's overarching stand-alone Climate change law; (M)¹⁸
5. Amend sectoral policies, strategies and laws and update codes and regulations to mainstream climate change and facilitate priority actions mentioned in AJKCCP; (M)
6. Prepare AJ&K's data collection, data network development, institutional capacity development and inter-agency cooperation and data analysis plans to support the state's data-based approach to analyzing historic trends, projecting future change and monitoring of climate and hydrological change to monitor mitigation and adaptation effectiveness; (M)
7. Establish a climate change information and knowledge management network and Management Information System to collect, generate and analyze other climate change knowledge products to both men and women; (S)

¹⁷S stands for Short term measures required within the next five years i.e. 2017 to 2021.

¹⁸M stands for Medium term measures required from 2022 to 2026.

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8. Establish Center of Excellence at AJ&K level to promote climate change education and training; (L)¹⁹
 9. Track possibilities of national, regional and international support for climate change and take measures to prepare projects for resource mobilization; (S)
 10. Develop collaborative partnerships to engage government, civil society, local communities both men and women and private sector for proper implementation of climate change initiatives mentioned in the AJ&K Climate Change Policy (AJKCCP). (S)

6. Climate Change Adaptation at Sectoral Level

Climate change adaptation is something urgent that must be delivered locally and the results will be more or less immediate. It is achievable more easily as within our spatial and temporal scale. The AJ&K has very low technical and financial capacity to adapt to adverse impacts of climate change. By devising and implementing appropriate climate change adaptation measures it will be possible to ensure sustainable development, water, food and energy securities for the state as well as to minimize the impact of natural disasters on human life, health and property.

6.1 Water Resources

Water is the basis of all life. The water cycle is linked with climate, therefore, the projected climate change has serious implications for AJ&K's water resources. Freshwater resources in AJ&K are based on monsoon rains, snow and glacier-melt, which are highly sensitive to climate change. The pattern and areas and intensity of monsoon rains, as well as season of snow fall are changing. In rural areas of AJ&K, women have to fetch water from long distances. To address the impact of climate change on water resources and to enhance water security, the GoAJ&K, in collaboration with relevant entities shall take the following policy measures:

6.1.1 Integrated River Basin Resource Management


1. Prepare a comprehensive inventory of all water resources, including surface and groundwater, its quantity and quality in order to support an efficient water management system in the AJ&K; (S)
2. Promote on priority basis, Integrated water resource management including watershed management practices which preserve vegetative ground cover and soil infiltration conditions as the key aim of integrated river basin management, and foster the awareness that good water resource management is more crucially reliant on good catchment management up slope beyond all other management interventions;(M)
3. Promote integrated watershed management including ecological conservation practices in uphill watersheds; protect and conserve water catchment areas against soil degradation, base-flow degradation, siltation and pollution; (M)
4. Conduct watershed management in up-stream areas to protect catchment soil condition and the flow stability and quality of water resources for the downstream and local areas; (S)
5. Protect and preserve water reservoirs, hydro-electric plant, drinking water off-takes and irrigation against base-flow (water supply) degradation, silting and other contamination; (S)

¹⁹ L stands for Long term measures required from 2027 to 2031.

6. Take measures to encourage mechanisms of taking a part of investment required for watershed management in up-stream areas from off-site and down-stream beneficiaries (inclusive of inter-provincial payments); (M)
7. Protect groundwater through regulatory frameworks, sustainable ground water exploitation, avoiding excessive pumping, water licensing, slow action dams particularly mini, micro, small and medium dams,, artificial recharge especially for threatened aquifers, and adoption of integrated water resource management concepts; (M)
8. Undertake recycling of wastewater through proper treatment and its reuse, for example in agriculture, artificial wetlands and groundwater recharge; (L)
9. Promote efficiency in water supply and use to ensure adequate, climate resilient and sustainable water supplies to all sectors; (S)
10. Encourage active participation of farmers, both men and women in integrated catchment and water management along with line departments by accelerating implementation of participatory catchment and water management reforms; (S)
11. Develop contingency plans for short-term measures to adapt to drinking and agricultural water shortages that could help mitigate drought and floods in collaboration with stakeholders, including local communities, both men and women; (S)
12. Do regular surveillance and monitoring of water resources; plan and take appropriate measures like use of sand filter and reverse osmosis techniques for improving quality of drinking water, especially at springs; (S)
13. Minimize water losses from built infrastructure by rehabilitating the drains, removing sedimentation and constructing breeches, water inlet and gated structures in collaboration with stakeholders, including local communities, both men and women; (M)
14. Enact and enforce laws and regulations required for efficient water resource management for domestic, commercial and industrial purposes and a groundwater regulatory framework. (L)

6.1.2 Water conservation

1. Identify new potential dam sites to develop new dams, where ever needed; (S)
2. Construct ponds, delay action dams particularly micro, mini, small and medium dams, spate irrigation systems and water harvesting structures to harvest and spread flood and normal flow waters from rain, rivers, streams and springs, keeping in mind needs of environmental rehabilitation to facilitate groundwater recharge, protecting the needs of downstream communities, whilst increasing water availability for multiple uses (e.g. drinking, hydro-power, fisheries and agriculture) through involvement of local communities, both men and women, in water infrastructure design, construction and maintenance; (M)
3. Increase forest plantation and other climate change mitigation measures in the surrounding areas to mitigate the impacts of large dams on the eco-system and biodiversity of the area; (M)
4. Provide incentives to farmers, both men and women for adoption of efficient irrigation techniques like drip irrigation to reduce irrigation system losses; (M)
5. Undertake measurement and monitoring of drinking water, hydro-power and irrigation


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- water delivery at various points of the supply system for effective planning and management; (M)
6. Enforce measures to enhance the life of existing drinking water, storage and hydro-power facilities; (M)
 7. Promote the role of Biotechnology sector especially biopolymers and genes in water conservation and carbon sequestration; (L)
 8. Conduct energy audits and retrofits of municipal and irrigation tube wells. (S)

6.1.3 Enhancing capacity and awareness raising

1. Develop awareness of all water resource stakeholders that water resources management begins up slope with good catchment vegetation ground cover, forest conservation, good upland agricultural and livestock management practices and the avoidance of soil degradation or restoration of degraded soils with aim to maintain soil infiltration capacity; (L)
2. Develop and train the public, both men and women for catchment management, water efficient technologies, water recycling and to avoid wasteful use of irrigation, domestic and drinking water; (S)
3. Enhance capacities of relevant persons, both men and women, to operate, expand and maintain the local hydro-metric (rainfall and river flow) monitoring networks, to be able to prepare and analyze the collected data and for making seasonal hydro-meteorological forecasts, of both monsoon and winter rainfall; (S)
4. Enhance capacities of relevant persons, both men and women, to operate and maintain surface soil infiltration monitoring plots under differing vegetation types (forest, rangeland or cropland) and land management practices to enhance community, agency and academic understanding of the effects of land degradation and land management upon upslope soil infiltration under changing climate conditions; (S)
5. Enhance capacities of relevant persons, both men and women in remote sensing (RS), Geographical Positioning System (GPS), Geographical Information system (GIS) techniques and drone technology for monitoring temporal changes in water flow, forest, land use, glaciers and snow cover; (S)
6. Monitor river flows and develop flood early warning systems; strengthen capacities of relevant government departments and local communities including men and women in participatory monitoring and disaster early warning system; (S)
7. Devise and strengthen coordination mechanisms among water sector institutions at the national and State levels; (S)
8. Promote public awareness campaigns through print and electronic including social media to underscore the importance of conservation and sustainable use of water resources, avoid wasteful use of water, and related climate change adaptation measures. (S)

6.2 Forestry and Rangeland

Forests have five major roles in climate change: they protect soil condition, and maintain soil infiltration and catchment function in the form of sustained perennial river flows, flood peak buffering and control of erosion and sediment transport; they contribute to global carbon emissions and catchment function degradation when cleared, overused or degraded; they react sensitively to a changing climate; when managed sustainable, they produce wood-fuels as a benign alternative to



fossil fuels; and finally, they have the potential to absorb global carbon emissions into their biomass, soils and products and store them. They can act as safety net for local communities, helping them cope with climate shocks and disasters.

Climate change is likely to have multi-faceted adverse effects on the ecosystem as a whole, particularly on the already vulnerable forestry sector in the AJ&K. The most likely impacts of climate change will be shifts in pressure from other productive sectors upon forest and rangelands due to their adaptation and avoidance of climate change impacts, decreased productivity and changes in species composition of forests and rangelands due temperature and rainfall changes, reduced forest area, unfavorable conditions for biodiversity, and higher land degradation, soil erosion and flood risks. Adaptation in the forestry sector entails the need to restore sustainable management of the AJ&K's forests, with particular focus on how the forests are affected by climate change, and with particular focus on how the forest can be managed to protect catchment function and water resources and store carbon. This will not only benefit state forests, but forest dependent communities and society as a whole, and in protecting water security which have a down-slope and down-stream multiplier effect in protecting energy security (i.e. hydro-power), food security (i.e. irrigation systems), human health (i.e. sustained drinking water supplies) and economic security overall (i.e. economic benefits of all water uses), within AJ&K and in downstream Punjab.


Generally, womenfolk are responsible for the collection of water, fuel-wood, forest products to be used as fodder, medicine and food items. The reduction or disappearance of these products as a result of climate change impacts will have a negative impact on the well being and quality of life for them, their families and local communities overall. To minimize the risks and vulnerability of forests, rangelands and biological diversity from climate change, the GoAJ&K, in collaboration with relevant entities, shall take the following policy measures.

6.2.1 Sustainable Forest Management and Protection

1. Encourage and support forestry experts both men and women in developing forestry projects for different donors for resource mobilization; (S)
2. Initiate pilot projects on adaptation efforts in the forestry sector with national as well as bilateral and multilateral donor assistance; (M)
3. Ensure documentation and utilization of indigenous knowledge of both men and women while managing various types of forests in the context of climate change; (S)
4. Take appropriate measures to estimate economic value of sustainable “ecosystem services” provided by all types of forests; (L)
5. Discourage stone crushing on forest lands. (S)

a. Watershed protection

6. Promote programs for soil and water conservation of the degraded watersheds through participatory watershed management; (M)
7. Identify and declare uphill fragile watershed areas as sensitive and ensure its minimal exploitation and bring them under special silvi-cultural management to check floods and siltation of water reservoirs; (S)
8. Devise mechanisms of payment for eco-system services involving the investment required to conserve watersheds on the upstream or uphill areas to be provided partly by the off-site beneficiaries; (M)

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9. Provide necessary up-stream investment for catchment management to safeguard water resources to overcome the frequent recurrence of landslides in the region; (M)
 10. Apply various slope stabilization and run-off reduction techniques at exposed sites in mountain forest areas such as vegetation lines, check dams and spurs; (S)
 11. Promote the growth of natural barriers such as shrubs on mountain slopes, to protect agricultural terraces from extreme soil erosion, hailstorm and snowstorm related damage; (M)
 12. Prevent losses of vegetation in mountainous areas due to felling and downward falling of trees by using techniques like skyline logging technology; (M)
 13. Reserve some percent of the total income of electricity from hydropower plants for watershed management on up-stream areas to benefit such plants; (S)

b. Sustainable Forest Management

14. Adopt sustainable management, protection and connection of forest fragments to increase resilience and minimize adverse impact from external pressures and climate change; (L)
15. Implement area specific adaptive forest management and conservation practices with greater participation of forest dependent communities, both women and men; (M)
16. Adopt an integrated landscape-scale approach for sustainable management of all types of forests by developing forests' sustainable management plans, protection of critical forest habitats, conservation of forest ecosystems and biodiversity, and securing carbon benefits, through collaborative management agreements with local communities, conservation incentives and equitable sharing of benefits; (M)
17. Encourage sustainable growing and harvesting practices, use of non-timber forest produce (NTFP) and indigenous dry land tree species. (S)
18. Adopt area and species specific adaptive silvi-cultural practices to reduce environmental damage. (M)
19. Discourage plantation of invasive and high water demanding trees like Eucalyptus; (S)
20. Promote raising indigenous plants through nurseries. (S)
21. Promote inter-sectoral coordination to minimize non-forestry uses of the forests and rangelands. (S)

c. Forest Protection

22. Enact/ Revise and enforce laws and regulations to incorporate climate change concerns to facilitate priority actions mentioned in this policy particularly relating to reducing emissions from deforestation and forest degradation (REDD+), sustainable forest management and those against the illicit cutting of forests and trade in timber resulting into deforestation; (M)
23. Provide incentives for promotion of micro and small hydropower plants and provision of enough electricity for cooking and heating purposes on subsidized rates; providing long-term subsidies on Liquefied Petroleum Gas (LPG), fuel-efficient cooking stoves, which can better the lives of women and other wood alternatives like G.I. Sheets to forest dependent communities to prevent deforestation and reduce forest degradation; address other drivers of deforestation and forest degradation in the AJ&K; (M)
24. Establish wood depots of the Forest Department at the grassroots level to provide fuel-

- wood to the local communities, both women and men so that they are not compelled for illegal cutting of forests. (S)
25. Consider expanding protected areas in the State with respect to ecological parameters including conservation of wildlife and their habitats; (L)
 26. Incorporate biodiversity considerations in Forest management plans; (S)
 27. Introduce payment mechanisms like REDD+ and Payment for ecosystem services; (M)
 28. Undertake institutional reforms in Forest Department to effectively protect, conserve and sustainably manage the forests to benefit from global payment mechanisms like REDD+ and Payment for ecosystem services; (M)
 29. Initiate steps towards co-management of the natural resources sharing powers and decision making with all stakeholders, defining their roles and responsibilities to save forests; (M)
 30. Promote social/ watershed forestry on farmlands; (S)
 31. Develop and sustainably manage the bella/riverine forests along with tree plantation on farm-lands; (S)
 32. The federal departments and agencies will work in collaboration with relevant Government departments of AJ&K in forestry and watershed management related initiatives. (S)


d. Reducing forest fires, disease outbreaks & other damage

1. Establish forest fire prediction and protection services in the State; (S)
2. Build capacity of forest departments to combat forest fires and involve forest communities, both women and men in detection and suppression of wildfires; (S)
3. Promote integrated pest management practices; (M)
4. Increase the species mix to enhance the adaptive capacity of forests as part of a pest and disease management strategy; (M)
5. Ensure biological control of forest pests by maintaining viable populations of predatory birds and insects. (L)

6.2.2 Reforms in Governance

1. Enact necessary legislation to stop conversion of State forest land into non-forestry uses; ensure that forest land is not transferred to any government institution or private entity for purposes other than preserving and enhancing the forest value; (S)
2. Establish a network of forest protected areas and ecological corridors, where possible, to conserve biodiversity, particularly in unique types of forests; (M)
3. Undertake boundary demarcation of State forests using GIS and remote sensing techniques for the purpose; (S)
4. Facilitate professional leadership, both men and women for better management of forests and forestry; (S)
5. Develop effective mechanisms to safeguard the interests of vulnerable forest dependent communities, both women and men. (M)

6.2.3 Rangelands and Pastures



The role of rangelands in environmental conservation is vital and important, and their existence and health is critical for conserving biodiversity in the AJ&K. Degradation of rangelands results in gradual loss of flora and fauna. The potential effects of climate change on rangelands and pastures in the AJ&K are: reduced precipitation, increased heat, stronger wind, increased soil erosion and abrupt weather changes in mountain pasture areas. To ensure food security, based on livestock and pasture management, and ecosystem maintenance in the light of impending climate change impacts, the GoAJ&K shall take the following policy measures:

1. Ensure building vegetative barriers or using bio-engineering techniques to safeguard against the erosion of pastures and rangelands' topsoil, particularly at higher altitudes; (M)
2. Control and maintain livestock densities required for optimal output from a rangeland; (S)
3. Ensure close coordination among forest and livestock departments for efficient management of rangelands and other resources while ensuring the rights of the indigenous men and women; (S)
4. Ensure the maintenance of soil and sub-soil moisture and vegetative cover using techniques like micro catchments in dryer areas to safeguard rangelands and forest areas; (M)
5. Improve soil quality by using native soil nutrient fixing vegetation; (M)
6. Promote rotational livestock grazing methods in pastures and rangelands, to facilitate regeneration of grasses and other vegetation; (S)
7. Ensure use of mixed herds of low maintenance, high production livestock for increased efficiency and low ecosystem impact; (L)
8. Designate alternative pastures and passages, in case of earlier or later than usual weather change; (S)
9. Increase quality and quantity of native rangeland vegetation and plant adapted forest species; (M)
10. Implement appropriate rangeland management systems based on ecological principles; (M)
11. Revive rangelands and create artificial wetlands or stock water ponds wherever secondary water resources are available or rainwater harvesting is possible; (M)
12. Use appropriate varieties of grass and necessary treatments in case of soil problems; (M)
13. Prepare and implement integrated range land management plans in collaboration with local communities, both men and women. (S)

6.2.4 Capacity building and awareness raising

1. Ensure inclusion of climate change as a compulsory subject in forest education systems; (M)
2. Ensure the key role of forest, protected area and catchment management practices, with the preservation vegetative ground cover and soil infiltration conditions, is taught in the forest education system as the major initiative in water resource and integrated river basin management, and foster the awareness that the future of forest is most likely reliant water and that the future of water is reliant on forest; (L)
3. Ensure the availability of sufficient and properly trained forest workers both men and

women to face the challenges of climate change; (M)

4. Raise public awareness through print and electronic media on benefits of afforestation and its conservation, and protection of existing forests and its benefits; (S)
5. Create forest protection clubs having representation of both men and women at community level; (M)

6.2.5 Adaptive research & extension

1. Conduct research and gather data and information necessary to understand and adequately address impacts of climate change on forestry; (L)
2. Develop capacities of both men and women for assessment, planning, measurement, monitoring, reporting and verification of the forest and rangeland resources, to remove threats to forests and other biodiversity so that adverse changes that may arise can be detected and redressed through revised codes and management plans; (S)
3. Develop drought resistant shrubs, fodder crops and grasses for pastures for livestock. (M)


6.3 Agriculture, Irrigation and Livestock

Agriculture is central to human survival because of its importance for food security, employment generation and foreign exchange earnings. About 13 percent area of the AJ&K is under agriculture of which 92 percent is rain-fed. It is open to atmosphere and is probably the most vulnerable to climate change. Agriculture in AJ&K is greatly affected by short-term climate variability and could be significantly impacted by long-term climate change. Crop growth cycle is affected by temperature, precipitation and duration of chilling. An increase in temperature will speed up crop growth and shorten the time between sowing and harvesting. This shortening could have an adverse effect on productivity of crops and fodder for livestock. The hydrological cycle is similarly likely to be influenced by global warming, necessitating the agriculture and livestock sectors, particularly in rain-fed areas, to adapt to climate change. In some of the high snowfall areas of the AJ&K, increased temperature and reduced snowfall has resulted in increasing opportunities for growing crops like maize. Sustainable Development Goal 2 deals with no hunger which is closely linked with agriculture and livestock.

It is common among rural communities and households that women play a vital role in securing food and income through participation in fuel collection activities, cropping and livestock farming. In crop husbandry, women worked on their own as well as others' lands in a variety of tasks that included threshing, cleaning, drying, storing and growing vegetables and winter crops. Livestock handling is basically considered the responsibility of female, they are involved in grass cutting, livestock rearing including feeding the cows and poultry. To enhance State food security, the GoAJ&K, in collaboration with relevant entities at the national and State levels, shall take on the following climate change adaptation measures.

6.3.1 Agricultural crops

1. Develop quality data set on crop, soil and climate related parameters; (S)
2. Assess climate change impacts on agriculture; Assess vulnerability and suitability of existing and proposed cropping patterns for different Agro-ecological zones with regard to physical, chemical, biological and financial aspects by using appropriate

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- digital simulation models and carry out productivity projection studies; (S)
3. Encourage farmers, both men and women particularly in rain-fed areas, to avoid monoculture and, instead, grow heat or cold waves and drought resistant low delta crops and fruit trees in accordance with chilling duration, so as to reduce the risk of crop failure; (S)
 4. Streamline agriculture extension services, enhance capacity of farmers, both men and women and raise their awareness through targeted research, print and electronic media and use community based approaches to promote following climate change adaptation practices: (M)
 - i. Sustainable land management and drought management practices in crop production;
 - ii. Climate change resilient crop varieties and techniques such as production techniques including zero tillage, organic farming, crop diversification, proper cropping patterns and optimized planting dates for sustainable production, appropriate harvesting, processing, storage techniques for agricultural crops;
 - iii. Improved irrigation practices by adopting, wherever feasible, techniques such as sprinklers and trickle irrigation and rainwater harvesting;
 - iv. Energy efficient farm mechanization to increase and sustain yields and save labor.
 5. Do proper research to identify ideal cropping patterns and pass on the relevant information to farmers both men and women through extension techniques; (L)
 6. Update sowing and harvesting times of crops in crop calendars for each agro-ecological zone in accordance with changing climate patterns; (S)
 7. Develop new varieties of general and horticultural crops which are high yielding, resistant to changes in temperature, chilling or heat stress; drought tolerant, less vulnerable to heavy spells of rains, less prone to attack by insects and pests and having mechanism for sustaining soil productivity by using techniques like bioengineering; (L)
 8. Develop a program to prevent crop damage due to unexpected weather changes by introducing cold and drought resistant short duration cereal crops suited for high altitudes; (M)
 9. Establish pilot projects to test high-yielding and climate change resistant crop varieties in the mountain areas; (M)
 10. Encourage development of technological innovations for improved water efficiency for crops, including artificial groundwater recharge and trickle irrigation etc.; (M)
 11. Promote “low delta crops” and drought and pest resistant crops; (S)
 12. Do research for climate change resistant crop varieties for different ecological zones in AJ&K and pass on the relevant information to farmers both men and women through extension techniques; (L)
 13. Promote soil moisture conservation techniques; (S)
 14. Take measures for resource mobilization and implementation of AJ&K's Action Plan on Desertification and Drought. (M)

6.3.2 Water storage dams and irrigation infrastructure

1. Undertake GIS mapping of all existing hydraulic infrastructure especially flood embankments for efficient monitoring and flood management; (S)
2. Assess the needs for additional water storage and distribution infrastructure; (S)
3. Develop climate change resilient infrastructure for water distribution from water bodies and hill torrents; (L)
4. Undertake rehabilitation, remodeling and up-gradation of the existing irrigation and water distribution infrastructure in the state to make it resilient to climate change and related extreme events; (M)
5. Incorporate the anticipated increase in the occurrence and magnitude of extreme events in the design of Hydraulic infrastructure (dams, culverts, canals, etc.); (M)
6. Promote the use of gravity drip irrigation and hydraulic ram pumps in the mountains areas. (M)

6.3.3 Animal husbandry practices & livestock production systems

1. Exploring impacts of climate change on productivity of the sector, and search out ways these can be addressed and reduced to develop climate smart livestock sector; (S)
2. Prepare and biannually update livestock and poultry vaccination schedule for each agro-ecological zone in accordance with changing climate patterns; arrange necessary vaccines, medicines and equipment at local levels; establish livestock disease monitoring and surveillance systems at agro-ecological zone level; (S)
3. Promote feed conservation techniques, multi-nutrient mineral blocks, other livestock feed enrichment measures and fodder banks in arable areas to enable increased resilience of livestock to the climate change impacts and to supplement their grazing on rangelands; (S)
4. Develop and introduce better breeds of livestock with higher milk productivity and which are less prone to climate change impacts like heat and cold waves and drought tolerance by using techniques like cross breeding and genetic engineering; (L)
5. Promoting climate change resilient traditional and modern knowledge of both men and women on sustainable pasture and range management systems; (S)
6. Introduce new feedstock technology like silage, hay, urea molasses mineral blocks for cattle and other livestock suited to high altitudes; (M)
7. Encourage and promote the use of local livestock species best adapted to the particular ecosystems for minimal maintenance; (M)

6.4 Wildlife and Fisheries

Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play. Greater species diversity ensures natural sustainability for all life forms. Intrinsically important due to its contribution to the functioning of ecosystems, biological diversity is difficult to recover or replace once eroded. Climate change is likely to have severe consequences on the entire ecological system, and biological diversity. Climate change is likely to impact on the phenology and species distribution along with community composition and ecosystem dynamics. A rapid increase in temperature, for instance, may exceed the ability of many species to adapt to these changes. To conserve, restore and protect the biological diversity of the State, the GoAJ&K shall take the following policy measures:

a. Terrestrial ecosystem

1. Prepare a list of threatened/ endangered species of both fauna and flora under the concerned Government Departments of AJK; (S)
2. Establish and manage protected areas in all vulnerable ecosystems to conserve wildlife, fisheries and its habitats; (M)
3. Facilitate ecosystem based adaptation²⁰ of biodiversity to climate change by increasing resilience of ecosystems to climate change; (M)
4. Raise awareness, and build capacity of stakeholders including relevant institutions, Civil Society Organizations (CSOs), communities both men and women, nature conservationists and encourage involvement of local communities, both women and men in conservation and sustainable use of biodiversity; (S)
5. Encourage empirical research on flora and fauna in the context of their responses to current and historical climatic changes; (L)
6. Identify a focal institute to coordinate Biodiversity initiatives in AJ&K; (S)
7. Set Biodiversity Indicators and implement Biodiversity Action Plan (BAP) for AJ&K in collaboration with relevant stakeholders including local communities both men and women; (M)
8. Establish nature reserves, gene banks, seed banks, zoos, botanical gardens and captive breeding centers to conserve the biological diversity of valuable species; (M)
9. Integrate conservation and protection of biological diversity into various disciplines such as forestry, pastures and agriculture; (M)
10. Identify, demarcate and take appropriate measures to protect natural connectivity corridors as well as assisted migration for wildlife movement; (M)
11. Facilitate development of integrated data management system for terrestrial biodiversity; enhance monitoring of terrestrial habitat and species and assess impacts of climate change on terrestrial ecosystem; (M)
12. Establish game reserves, National parks and game sanctuaries to protect and promote flora and fauna; (L)
13. Take action to enforce laws to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products; (S)
14. Enact and enforce bio-safety codes, rules and regulations. (M)

b. Aquatic ecosystems

1. Promote climate resilient aqua culture including climate change resilient technologies in sustainable fish catch, processing, storage, and packaging; (M)
2. Facilitate development of integrated data management system in the aquatic including fisheries sector; enhance monitoring of aquatic habitat and species including fisheries and assess impacts of climate change on aquatic ecosystem; (M)

²⁰**Ecosystem based adaptation** provides a cost-effective strategy that can be undertaken by parties, and is especially effective at local levels with community involvement. Ecosystem-based adaptation may also contribute to climate change mitigation through the preservation or sequestration of carbon

6.5 Wetlands

The water bodies, rivers, fresh water lakes, streams together with the adjoining terrestrial ecosystem constitute an important wetland resource in AJ&K. However, many anthropogenic and climatic change factors affect their ability to function as a habitat for waterfowl, and birds. To protect, sustain and enhance the wetlands in the AJ&K, the Government, in collaboration with the relevant entities, shall take the following policy measures:

1. Promote coordination among State institutions to sustainably manage and protect wetlands through various initiatives; (S)
2. Ensure conservation and management of high altitude wetlands in collaboration with local communities both men and women; (L)
3. Explore possibilities for designing and creating artificial wetlands at appropriate spots of ecological concern; (M)
4. Promote identification of the risks and impact of climate change on AJ&K's wetlands; (S)
5. Recognize and enhance the role played by wetlands in natural disaster protection and climate change mitigation; (M)
6. Ensure control of and slow down the conversion of wetlands and their immediate surroundings for agriculture and grazing purposes in collaboration with local communities both men and women; (S)
7. Develop adaptation mechanisms for wetlands and communities including men, women and children dependent on wetlands that are threatened by climate change; (M)
8. Ensure sustainable harvesting of wetlands resources and grazing; (S)
9. Ensure control of siltation of wetlands by reducing deforestation and felling of timber in catchment areas; (M)
10. Ensure setting up of scientific analysis systems to check water quality of the wetlands; (M)
11. Design adequate procedures to control organic and inorganic pollution of wetlands, including flow of agricultural chemicals and pesticides into wetlands; (S)
12. Ensure the design and implementation of sustainable, participatory management plans for wetlands, each chosen to be representative of a broad eco-region in the AJ&K. (S)

6.6 Eco-Tourism

The AJ&K is famous for its natural scenic beauty; land of saints as well as it is rich in archaeological and historical heritage. Tourism is among the sectors supporting the economy of the AJ&K and it is also impacted by climate change. In an effort to address the impact of climate change on Tourism, the GoAJ&K will take the following policy measures.

1. Educate and raise awareness among tour hosts, tour guards, local community involving both men and women, line departments and tourists about the impacts of Climate change and importance of measures to mitigate such impacts; (S)
2. Work with stakeholders, both men and women in the tourism sector to develop a strategic plan which incorporates climate change considerations and appropriate measures such as climate resilient physical infrastructure, water and energy conservation, management of water resources like springs, waste management as well as general sustainability concerns. Maximum number of tourists to be allowed in an area will be based on such facilities; (S)
3. Adopt integrated waste management measures to create better environment to support tourism. (S)

4. Undertake hazard and risk mapping of existing infrastructure for telecommunication, power, utilities, transport, irrigation, agriculture, drinking water, sanitation and waste management in the areas attractive for tourists; (S)
5. In the areas attractive for tourists, improve emergency preparedness for disasters, implement and improve early warning and evacuation systems, and put disaster prevention infrastructure into place; (M)
6. Take into consideration local and traditional knowledge of both men and women to develop coping and climate change adaptation strategies in tourist areas; (M)
7. Take necessary measures to mitigate climate change impacts while developing facilities like fuel pumps and auto-workshops; (M)
8. Take necessary measures to save and enhance forest area, conserve biodiversity and preserve eco-system; introduce tree plantation campaigns through tourists; do not disturb migratory corridors of wild animals; (M)
9. Construct hotels, restaurants and other buildings away from river banks, flood plains and other disaster prone areas; (M)
10. Develop contingency plans to address disrupted travel routes. (S)

6.7 Communication, Power & Infrastructure

Today's investment will “lock in” the infrastructure to be used for decades to come. So, the infrastructure for hydraulic, power, building, transport, communication, sewerage and storm-water put in place today should meet the climate change needs of the future. An effective and reliable infrastructure is an important adaptation response to climate change. In an effort to ensure appropriate approaches to adaptation in the communication, works & power Infrastructure sector, the policy guidelines of the Government of AJ&K in these sectors include:

6.7.1. Communication, power & infrastructure

1. Develop climate change resilient communication including roads and other transport infrastructure by making it on levels above the expected flood levels and using techniques like Bio-Engineering; (M)
2. Upgrade and replace aged communication infrastructure to make it climate change resilient (M);
3. Promote installation of micro hydropower plants in the mountains areas, preferably run of river plants, sites of such plants to be selected keeping in mind the expected flood levels; (M)
4. Prepare/ update State level infrastructure standards (roads, bridges, hydropower plants etc.) to withstand the impacts of climate change and natural disasters. (M)
5. Up-date the legislation to reduce the climate change impacts of activities like material excavation for infrastructure (roads and buildings) in private land, forest land and shaamlaat; (M)
6. The future installations of Power infrastructure including poles and hydropower plants would be resilient to extreme weather events and expected disasters; (L)
7. Make slope stabilization through biological or bio-engineering structures a mandatory part of all road construction projects to minimize landslides; (S)

6.7.2. General

1. Undertake hazard and risk mapping of existing infrastructure for telecommunication, power, transport, hydraulic and sanitation; (S)
2. Increase resilience of infrastructure against climate change impacts and climate related hazards; (M)
3. Incorporate climate change impact projections into infrastructure planning. (M)

6.8 Physical Planning and Housing


Over the years, significant investment has been made by Government and Civil Society in the development of official buildings and human settlements. It is recognized that Climate Change is likely to impact negatively on human settlements, especially those situated in low-lying flood prone areas. In order to address such climate change impacts and to promote the implementation of appropriate adaptation measures, the policy measures are as follows:

1. Make rural housing, particularly reconstruction following flood damage, climate change resilient; (M)
2. Build capacity of both men and women and identify settlements that are at risk and assess whether the infrastructure and buildings will be able to withstand extreme events; (S)
3. Make housing in flood prone areas on somewhat higher elevation and ensure that it is resilient to floods and other extreme events; (M)
4. Take measures to protect the communities including men, women and children to establish human settlements on flood plains of rivers or bigger streams; (S)
5. Prepare and take measures to implement standards of gradient for which human settlements can be allowed in mountainous areas; (L)
6. Develop and implement a plan for the relocation or protection of settlement utilities and infrastructure at risk from the effects of climate change; (M)
7. Promote the development and enforcement of a building code which addresses climate change considerations including energy/heat efficiency and flood resistance; (M)
8. Upgrade and replace aged water supply, wastewater and storm-water infrastructure to make it climate change resilient; (M)
9. Develop climate change proof water, health and sanitation infrastructure; (M)
10. Foster increased public awareness of climate change and its effects on human settlements. (S)

6.9 Waste Management

Cities are already experiencing flooding and water shortage. The importance of adapting the current waste management is high. First of all, current urban waste management systems are proven vulnerable day by day. Waste collection systems may collapse or block for a certain period due to extreme weather events and disasters. Second, the most vulnerable waste management systems are the ones that happened to be in growing and transition cities, the environmental and health risks from a potential disaster related to waste management are really high taking into account that dumpsites are usually located at low levels and excavated with no plan and hydraulic protection. The policy measures for waste management are as follows:

1. Prevent accumulation of solid waste, trash and unwanted bio-mass in open sites; take measures to collect, segregate and reduce, reuse, and recycle the solid waste components from


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- Municipal waste in collaboration with relevant stakeholders including local communities, both men and women; (M)
2. Take measures to make waste management systems climate change proof such as dumpsites and landfill sites, located at a level higher than the groundwater having hydraulic protection and having measures of management in case of floods; (M)
 3. Make hazardous/ toxic wastes less hazardous by physical, chemical, or biological treatment. Construct landfill type pits for hazardous waste collection and stabilize these by building suitable barrier around the waste; (M)
 4. Prepare a road map and assess the adaptive capacity of urban waste management systems and frame them within the overall city adaptation strategy. (L)

6.10 Human Health

The three main categories of health risks due to climate change include: (i) direct-acting effects (e.g. due to physical weather disasters), (ii) impacts mediated via climate-related changes in ecological systems and relationships (e.g. mosquito and ticks ecology), and (iii) the more diffuse (indirect) consequences relating to impoverishment, displacement, economic sectors, resource conflicts (e.g. food, water, forest, land), and post-disaster mental health problems.

It is now widely recognized that the increased frequency and intensity of extreme weather events such as heat and cold waves, heavy or too little precipitation, and strong winds due to climate change have serious implications for human health. For example, floods and storms not only increase the risk of death and injuries; they have other health implications such as diarrheal diseases because of insufficient clean water availability for drinking, personal hygiene or for washing food. They may also cause severe psychological problems among the affected population (e.g. mental health effects such as depression have been observed in the aftermath of the disastrous 2010 floods). Similarly, incidence of many vector borne diseases such as malaria, dengue fever and Congo fever due to mosquito and ticks which are sensitive to temperature and rainfall, may increase with the expected changes in climate. Sustainable Development Goal 3 deals with Good health and well-being. Sustainable Development Goal 6 deals with clean water and sanitation is also related to healthy conditions. Women, disproportionately suffer the impacts of more than men as they have less access to medical services, and their workloads increase when they have to spend more time caring for the sick. Women are already more vulnerable to nutritional problems due to physical, social, economic, gender and cultural issues (e.g., pregnancy, lactation, inequitable food distribution within families). In order to address the impact of climate change on human health, the GoAJ&K will take the following measures:

1. Assess the impacts of climate change on human health vulnerabilities of communities including men, women and children in areas most likely to be affected by the adverse impact of climate change in the AJ&K, identify diseases with symptoms; (S)
2. Ensure that appropriate measures to address health related climate change issues are incorporated into State health plans and strategies; (S)
3. Inform, sensitize, educate and train health personnel, the public, both men and women and other relevant stakeholders about climate change related health issues; ways and means to reduce and monitor human health related climate change vulnerabilities, especially for women and children; (S)
4. Ensure that preventive measures and resources such as vaccines, good quality medication and safe drinking water are available to the general public both men and women easily and cost



effectively particularly during climate related extreme events; (M)

5. Focus on improved hygiene and climate change resilient sanitation measures to reduce health issues of the public, both men and women; (M)
6. Upgrade and extend disease outbreak monitoring and forecasting systems to counteract possible climate change health impacts and support prior planning for effective interventions. (L)

6.11 Disaster Preparedness & Management

Climate change is likely to increase climate-related natural disasters with the projected increase in the frequency and intensity of extreme weather events, including floods, droughts, and landslides triggered by heavy rains due to congestion of storm drainage. There are strong indications that in Pakistan, particularly in AJ&K, climate change is intensifying the above-mentioned hazards. The AJ&K is already experiencing climate change impacts which are too visible to ignore. The poor are disproportionately affected by climate change and natural disasters. Climate change affects women and men differently. Women and girls face particular vulnerabilities resulting from cultural norms and their lower socioeconomic status in society. Women's domestic roles often make them disproportionate users of natural resources such as water, firewood and forest products. As these resources become scarcer, women experience an increased work burden and may fall further into poverty as a result. Increasing population growth puts further pressure on resources. Most disasters or hazards that lead to destruction cannot be prevented; their impact however, can be minimized by adaptation and preparedness measures. Natural disasters (and their subsequent impact) on average kill more women than men. Generally, girls and women are responsible for the collection of water, fuel-wood, forest products to be used as fodder, medicine and food items. They spend 3–4 hours per day on these tasks. Flooding, drought and desertification can extend the sea burdens. To address disaster management in the context of climate change in a holistic manner, the GoAJ&K, in collaboration with other relevant entities at the national and State levels, shall take the following policy measures:

a. Policies, plans & institutional mechanism

1. Develop “State Disaster Risk Management Policy and Framework” with a special emphasis on climate induced extreme events and disasters; (S)
2. Allocate adequate financial resources for implementation of State Disaster Risk Management policy and Framework; (M)
3. Ensure the incorporation of climate change considerations into existing or proposed national emergency and disaster related plans; (S)
4. Prepare evacuation plans for communities, keeping in mind the special needs of women and livestock for natural disasters; (S)
5. Clearly define coordination mechanisms outlining the roles and responsibilities of each concerned department of the State during natural disasters. (S)

b. Monitoring & early warning

6. Undertake GIS mapping of all existing flood protection infrastructure especially flood embankments for efficient monitoring and flood management; (S)
7. Strengthen the AJ&K's disaster monitoring and prediction system; (S)
8. Maintain accurate records of seasonal patterns, temperature and precipitation for each agro-

ecological zone and use this data and information to project climate change scenarios; (M)

9. Strengthen floods including local flash floods, Glacial Lake Outburst Floods (GLOF) and drought forecasting, monitoring and early warning systems in the State, particularly in vulnerable mountainous and dry areas, respectively; (M)
10. Enhance capacity of relevant State and local level development institutions in disaster early warning, monitoring and preparedness; (S)
11. Ensure community especially community activists, pastoralist both men and women and local print and electronic media participation in early warning dissemination and disaster risk reduction activities, particularly in developing evacuation plans; (M)
12. Set up appropriate mechanisms to monitor the development of glacial lakes and develop evacuation strategies in case of the risk of GLOF for vulnerable areas; (M)
13. Enhance use of the media and involvement of community both men and women to allow effective and timely communication of climatic predictions and corresponding advice to farming communities; (M)
14. Undertake risk mapping for possible avalanches landslides, GLOFs and mud flow in vulnerable mountain areas and take precautionary measures accordingly; (M)
15. Undertake hydrological modeling and flood plain mapping/zoning of the Jhelum, Neelum, Poonch and Chenab Rivers areas in the AJ&K against climate change scenarios to estimate various projected flood levels; (S)
16. Enhance the research capacity of various relevant organizations to make reliable predictions of climatic parameters and river flows for seasonal, inter-annual and inter-decadal time frames, to assess the corresponding likely impacts on various crops and to develop appropriate adaptation measures; (M)

c. Evacuation

17. Ensure that the elderly, children, disabled and women get particular priority in evacuation strategies; (S)
18. Put additional disaster, especially flood prevention infrastructure into place; (M)
19. Redesign, construct and upgrade disaster resilient multi-purpose school and other available buildings in relatively safer areas to be used as shelters during natural calamities; (L)
20. Redesign and upgrade storm drainage capacity of major cities, keeping in view the likely climate change related increase in short duration intense rainfall events; (M)
21. Develop an 'assessment and compensation mechanism' including insurance for loss and damage in the aftermath of disasters for both men and women; (S)
22. Take measures for soil rehabilitation; (M)
23. Prepare for emergency situation in case of any disaster; (S)
24. Enhance capacities of both men and women to address the impact of floods, droughts and other disasters by strengthening the relevant agencies; (S)
25. Develop strategies for flood management which may include use of dams for managing flood peaks, retarding basins and providing escape channels; (S)
26. Undertake formulation and enforcement of "River Flood Plain" regulations and laws, communities may not be allowed to construct houses and commercial buildings in river flood plain areas; (M)
27. Plan, design, construct and strengthen appropriate flood embankments, dykes and protective bunds to protect flood plains, populations and livestock in the light of likely flood levels. (M)

6.12 Social Welfare and Women Development

6.12.1 Poverty

The majority of the adverse effects of climate change are experienced by poor and low-income communities of the AJ&K. Many poor men and women live in flood plains and because it is the cheapest space available to them with some income generating opportunity and thus they are most vulnerable to the floods. Poor people, especially women are also more vulnerable because of their high dependence on natural resources, their limited technical capacity and insufficient financial resources to cope with climatic extremes.

One of the objectives and goals of economic development planning in the AJ&K is poverty alleviation. With the onset of climate change the plight of the poor is becoming even more miserable. Therefore, it is imperative to incorporate the possible impact of climate change on communities including men, women and children living in deprivation and poverty, into future developmental plans for the AJ&K. Eradicating poverty in all its forms remains one of the greatest challenges facing humanity. The first Sustainable Development Goal is “End poverty in all its forms everywhere”.

In the AJ&K, with its rapidly increasing population, particularly among those below the poverty line, renewed effort is needed to involve local communities in population control programs and in managing natural resources as a part of training and education towards economic well-being. To address the problems of poor communities living in AJ&K's urban areas and those living in the rural areas practicing agriculture, in the context of climate change, the GoAJ&K shall take the following policy measures:

1. Integrate the poverty-climate change nexus into economic policies and plans of the AJ&K such as Annual budgetary planning; (M)
2. Improve awareness and access of poor communities, both women and men to appropriate climate change adaptation and mitigation strategies in agriculture including livestock and forestry, energy and local level enterprise development; (M)
3. Provide interest free loans to the poor particularly women to strengthen community level climate change adaptation measures; (M)
4. Develop renewable energy resources particularly micro-hydropower plants and provide cheap electricity to the poor; (M)
5. Improve governance, policy and decision making processes, which can have a critical bearing on the way in which policies and institutions respond to the impact of climatic factors on the poor, including men, women and children; (L)
6. Establish linkage of Pakistan Meteorological Department with local communities, both women and men and media to provide information of disaster early warning and places for rescue timely to the poor so that they can take necessary measures or migrate timely from the area; (S)
7. Ensure the implementation and expansion of State population planning strategies and programs, as the population explosion is likely to significantly exacerbate the impacts of climate change; (L)
8. Ensure that the development process is sustainable, climate resilient and caters to the needs of the poor, including men, women and children. (M)

6.12.2 Women and Disadvantage Groups


Individual and social factors such as gender, age, education, ethnicity, geography and language lead to differential vulnerability and capacity to adapt to the effects of climate change. Climate change is likely to affect poor and underprivileged regions and women disproportionately as they are weak and more vulnerable and have the least resources to adapt. In the AJ&K, women are likely to be strongly affected by climate change as the majority of rural women are engaged in the fuel-wood, fodder, grass and water collection and agriculture sector, which is highly climate sensitive. Climate change is expected to increase the work of agriculture production and other subsistence activities such as collecting fuel wood, fodder, grass and water, putting extra pressure on women. Further, women are found to be more vulnerable during extreme climate events and disasters. Sustainable Development Goal 5 deals with gender equity. Sustainable Development Goal 10 deals with reducing other inequalities with disadvantage groups.

GoAJ&K fully recognizes that women are powerful agents of change. It is therefore vital to ensure participation of women and female gender experts in all policies, initiatives and decisions relating to climate change. To address the gender aspects of vulnerability from climate change, the GoAJ&K, in collaboration with other relevant entities at national and state levels shall take the following policy measures:

1. Mainstream perspectives of gender and other disadvantage groups like minorities, disabled persons etc. into climate change efforts at State levels; (M)
2. Take steps to reduce the vulnerability of women and other disadvantage groups from climate change impacts, particularly in relation to their critical roles in rural areas in providing water, food and energy; (M)
3. Undertake a comprehensive study of the gender and other disadvantage groups differentiated impacts of climate change with particular focus on gender difference in capabilities to cope with climate change adaptation and mitigation strategies in the AJ&K; (S)
4. Develop gender and other disadvantage groups sensitive criteria and indicators related to adaptation and climate change vulnerability reduction to evaluate and monitor vulnerability of women to climate impacts and address it as well as collect relevant information accordingly; (S)
5. Develop and implement climate change vulnerability-reduction measures that focus particularly on needs of women and other disadvantage groups; (M)
6. Ensure equitable participation of women and other disadvantage groups during every stage of decision making process on climate change mitigation and adaptation initiatives; (S)
7. Use the local and indigenous knowledge of women and other disadvantage groups while implementing climate change mitigation and adaptation measures; (S)
8. Establish coherence among the institutions dealing with issues of climate change, gender, human rights, population planning and health policy. (S)

6.13 Financial Sector

The Government AJ&K recognizes the potential effects of climate change on the financial sector including: (i) the effects of catastrophic events such as flood damage on lending institutions, insurers, and property owners; and (ii) the diversion of financial resources from productive



investment to restorative activities. In an effort to ensure appropriate approaches to adaptation in the financial sector, the Government in collaboration with other relevant entities, will, where feasible, take the following policy measures:

1. Collaborate with the financial sector to develop appropriate risk management measures and regimes to address the impacts of Climate Change; (S)
2. Finance Department of the Azad Government of the State of Jammu and Kashmir will take appropriate measures to provide finances for the activities planned in the AJKCCP; (S)
3. Develop auditing systems for trekking expeditions in the public sector to reduce usage of fossil fuel and waste generation; (M)
4. Encourage private sector to invest on climate change adaptation and mitigation measures, particularly through Corporate Social responsibility (CSR). (M)

7. Climate Change Mitigation at Sectoral Level


As such, the most important targets for mitigation efforts focused on reduction of GHG emissions are the energy and agriculture sectors. In the energy sector, integration of climate change and energy policy objectives is particularly important. Therefore, greater attention must be paid to energy efficiency requirements in building codes and long-term transport planning. Climate change mitigation measures have the potential to deliver following cross-sectoral benefits:

- Mitigation measures focused on reducing energy consumption will also reduce AJ&K's reliance on fuel imports and, in turn, reduce household energy bills;
- Mitigation measures focused on reducing petrol and diesel consumption may also improve traffic conditions, reduce reliance on vehicular transport and reduce pollution in urban areas;
- Reduction in the use of fuel-based transport and emissions of green-house gases will encourage healthier lifestyles (e.g. walking and cycling) and improved living conditions (e.g. reduction in air pollution), which can contribute to a reduction of some non-communicable diseases;
- Mitigation measures focused on maintaining forest carbon stocks and increasing sequestration of carbon through forest conservation, reforestation, afforestation and enrichment planting will also contribute to biodiversity conservation, improved watershed management, improved food security and improved waterway conditions;
- Conservation and sustainable management of wetlands will protect a large carbon sink and reservoirs.

7.1 Forestry as Carbon Sink

Considerable mitigation potential exists in the forestry sector through carbon sequestration via afforestation and reforestation measures as well as preventing deforestation in Pakistan. The GoAJ&K, in collaboration with national entities and support from multilateral agencies, shall take the following measures in the forestry sector to sequester atmospheric carbon, thereby mitigating climate change:

1. Involve students both boys and girls from schools, colleges and universities in afforestation and forest protection activities; (S)
2. Promote forest trees plantation on wastelands by adopting proper treatment measures; (M)
3. Promote community based farm/ social/ Agro-pastoral forestry by planting indigenous trees to


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- meet the needs for timber, fuel wood and fodder for livestock; (S)
 4. Continue support to afforestation, reforestation and forest restoration programs by planting indigenous species resilient to the climate change impacts; (S)
 5. Provide enough financial resources for afforestation/ reforestation of blank areas in the forests; (M)
 6. Promote energy and timber plantations on blank areas outside forests to meet timber and fuel wood requirement of community and reduce pressure on natural forests; (M)
 7. Promote urban forestry, agro-forestry and farm/ social/ Agro-pastoral tree plantations - in the cities as well as rural areas; (M)
 8. Establish linkages with regulated and voluntary carbon markets to promote and encourage forestry mitigation projects in the AJ&K; (M)
 9. Formulate measurement, reporting and verification (MRV) system, quantify carbon value of forests and framework for State level forests' carbon reference level/ reference emission level in the AJ&K and REDD+ strategy containing monitoring indicators and framework on priority basis and ensure its implementation in accordance with international conventions/ processes; (S)
 10. Develop a system for monitoring multiple benefits, impacts, governance and safeguards for REDD+ at the state level; (S)
 11. Develop the legal and institutional framework for improved forest management and clearly specify rights of stakeholders, especially women to REDD+ credits; (S)
 12. Carry out afforestation of barren and degraded lands as well as uphill watershed areas to control sediment and various types of soil erosion; (S)
 13. Use dry afforestation supported by water harvesting techniques like micro-catchments to raise vegetative cover in semi-arid areas; (S)
 14. Provide support to promote natural regeneration in forests with less reliance on artificial planting. (S)

7.2 Electricity/ Power

7.2.1 Renewable Energy

The AJ&K has a great potential to exploit its hydel, solar and bio-mass energy resources. To find solutions to meet current and future energy needs, a creative and sustainable energy policy framework is necessary that may help in reducing greenhouse gas (GHG) emissions. The change in energy mix, development of renewable energy resources and the increased share of nuclear and hydroelectric power provide an opportunity to reduce carbon emissions in AJ&K's energy sector. Sustainable Development Goal 7 deals with affordable and clean energy. The GoAJ&K shall take the following policy measures for mitigating its GHG emissions:

1. Give preferential status to the development and promotion of hydropower generation; (S)
2. Ensure that the negative impact of hydropower projects on the environment as well as local communities, both women and men are properly assessed and addressed; (M)
3. Promote the development of other renewable energy resources and technologies such as solar, bio-energy and waste to energy; (M)
4. Promote the use of solar water heating technologies to replace or in conjugation with traditional electric water heating systems, in residential, commercial, and industrial buildings; (S)

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5. Capitalize on the opportunities of public private partnership for renewable energy production, distribution and uptake; (S)
 6. Promote futuristic building designs that require little energy for space heating or cooling with solar photovoltaic panels and solar geysers for energy self-sufficiency, especially in public sector buildings; (L)
 7. Initiate measures for accreditation of technicians both men and women for installation of renewable energy technologies at grassroots level; (M)
 8. Introduce interest-free credit and other financial incentives for both men and women for installation of renewable energy technologies like solar and bio-energy; (M)
 9. Support entrepreneurs both men and women in developing and applying business models for the promotion of renewable energy technologies; (S)
 10. Consider introducing carbon tax on the use of environmentally detrimental energy generation from fossil fuels; (S)
 11. Promote the use of renewable energy technology by introducing awards/ renewable energy permits for the individuals both men and women and companies using renewable energy technologies; (M)
 12. Give priority to the import of natural gas, Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG) over import of oil and coal; (S)
 13. Identify and encourage national and international donors and take measures to benefit from Clean Development Mechanism (CDM) to invest in the clean and renewable energy sector projects. (M)

7.2.2 Energy Efficiency and Energy Conservation

Energy efficiency improvement, energy conservation and demand reduction provide excellent and cost effective ways to ensure sufficient energy supply to achieve economic development goals, reduce carbon emissions and achieve climate change mitigation goals. The GoAJ&K shall, therefore, take up the following policy measures:

1. Improve energy efficiency in all energy using devices and processes in buildings (residential & commercials), transport, power, agriculture and industry sectors through awareness raising, standardization and labeling of appliances and devices and providing incentives for energy efficiency and energy conservation measures to both men and women; (M)
2. Develop standards and provide incentives to both men and women for conducting energy audits in the above mentioned sectors to identify their energy use and relevant conservation potentials and required measures for retrofit; (S)
3. Develop and enact state level legislation for energy efficiency and conservation and standardized building energy codes; (M)
4. Ensure high quality management of energy production and supply, including reduction in transmission and distribution losses of electricity; (L)
5. Promote Energy efficiency and Energy conservation by introducing awards/ energy efficiency permits for the individuals both men and women and companies using such technologies; (M)
6. Identify and encourage national and international donors and take measures to benefit from CDM to invest in the energy efficiency and energy conservation related projects; (M)
7. Take measures to introduce concept of Energy Service Companies. (M)

7.3 Agriculture and Livestock

The emissions in agriculture and livestock sector were essentially mostly methane (CH₄) and nitrous oxide (N₂O), and originated mainly from four sub-sectors: 1) enteric fermentation in cattle (all in the form of methane); 2) rice cultivation; 3) release of nitrous oxide from agricultural soils/ nitrous fertilizer; and 4) mismanagement of manure.

There is a pressing need to find ways to contain these emissions or at least slow down their growth rate. This will require technological innovations and financial resources, for which the AJ&K will need the support of the International community. To mitigate and minimize GHG emissions from the agriculture and livestock sectors, the GoAJ&K shall take the following policy measures:

7.3.1 Agriculture

1. Promote the following practices for both men and women through extension services and awareness raising:
 - i. Agronomic practices that generate higher carbon residue and carbon storage in soil, such as crop rotation, retaining crop residues for enhanced decomposition in soil, avoiding deep ploughing; (M)
 - ii. Tillage management practices for minimal soil disturbance and reduced erosion; (M)
 - iii. Improve agro-pastoral/ farm/ social-forestry systems for timber, firewood, fodder and other products, and establishing shelter belts and riparian zones/buffer strips with woody species; (M)
 - iv. Energy efficiency measures in the use of agricultural machinery; (S)
 - v. Better management practices for agriculture focusing on reduction in the use of chemical fertilizer, water and pesticides; (S)
 - vi. Methods like fertilizer application timing and integrated nutrient management techniques to reduce nitrous oxide release from agricultural soils; (S)
 - vii. Use of green manure, better manure storage and management; (S)
2. Promote integration of indigenous knowledge of both men and women and the latest technology with scientific research for climate change mitigation efforts in agriculture sector; (M)
3. Raise awareness and train farmers, both men and women to use appropriate feed mixes and additives to reduce methane production from enteric fermentation/ digestion in cattle; (M)
4. Raise awareness and train farmers, both men and women to manage water in rice paddies to control releases of methane from agricultural soils and introduce low water dependent rice varieties; (M)
5. Promote no/ least till farming for methane abatement in flooded soils; (M)
6. Improve water management through soil and water conservation to enhance biomass production, by increasing the amount of above-ground and the root biomass; (M)
7. Develop capacities of the relevant institutions to undertake appropriate mitigation actions to reduce GHG emissions from the agriculture, livestock and fisheries sectors. (S)

7.3.2 Irrigation infrastructure

1. Develop energy efficient water distribution infrastructure and take measures to reduce water losses during distribution of water (M);
2. During rehabilitation, remodeling and up-gradation of the existing irrigation and water distribution infrastructure, take energy efficiency and water conservation measures in collaboration with relevant stakeholders both men and women. (M)

7.3.3 Livestock

1. Promote development of biogas and manure digester for energy production by providing long-term subsidies to both men and women; (M)
2. Develop in research institutions and promote through extension services and awareness raising new breeds of cattle which are more productive in terms of milk and meat, and have lower methane production from enteric fermentation; (L)
3. Improve grassland and grazing management by controlling intensity and timing of grazing (e.g. stocking rate management, rotational grazing, and enclosure of grassland from livestock grazing) by building capacity of both men and women. (M)

7.4 Land Use Planning

Climate change resilient & sustainable land use planning at village, district and state levels

1. Develop and enforce climate change resilient and sustainable land use plans at village, town, district and State levels in consultation with relevant departments as a guiding tool for different departments and to promote sustainable land management; (L)
2. Prepare and get approved AJ&K's Land use Act to regulate proper land use and reduce the impacts of climate change on different sectors; (S)
3. Develop capacity of both men and women in Remote Sensing, GPS, GIS and drone techniques to assess temporal changes in land cover in different agro-ecological zones; (S)
4. Identify climate change adaptation strategies at the city level focusing on waste, hygiene and drinking water management and make these a part of the relevant city's Master plans. (M)


7.5 Physical Planning and Housing

Climate change presents a range of socioeconomic implications for town and regional planning on two counts. One, town planning is a process by which adaptation to climate change impacts is possible in urban areas. Two, town planning influences the level of emissions produced by human settlements by changing fuel and energy consumption patterns. In AJK, rural women are mostly involved in plastering the huts with mud.

To adapt to the impacts of climate change, there is a need to introduce changes in town and regional planning and building systems. Sustainable Development Goal 11 deals with sustainable cities and communities. The GoAJ&K, in this regard, shall take the following measures:

7.5.1 Physical Planning

1. Update town planning design principles for lower carbon footprints to reduce risks from extreme temperatures and heat island effects; (M)
2. Develop and enact laws and regulations to manage urbanization and rural areas in

- 
- such a way that it is climate change resilient; results into least GHG emissions and conversion of prime forest and agricultural land to other uses is reduced; (L)
3. Undertake hazard mapping and zoning of towns and cities before their planning by involving relevant stakeholders both men and women. (S)

7.5.2 Waste Management

1. Make installation of wastewater treatment plants an integral part of all sewerage schemes; (M)
2. Ensure collection, segregation, recycling and re-use of recyclable, composite and biodegradable waste, preferably at source in collaboration with relevant stakeholders including local communities both men and women; (M)
3. Develop State level solid waste standards for collection, transport, treatment and disposal of solid including hazardous wastes and ensure their implementation by all sub-sectors of the economy; (M)
4. Introduce mass awareness campaigns regarding management of ordinary and hazardous waste; (S)
5. Conduct feasibility and initiate waste-to-energy projects. (L)
6. Develop and get approved necessary legislation to keep the distance between drinking water and sewerage lines as per national standards and stop putting sewerage in rivers and natural nullahs without proper treatment. (M)

7.5.3 Housing

1. Bring energy efficiency in the housing sector by improving housing design; using energy efficient household appliances, equipment and installations; fuel-efficient stoves; energy-efficient housing components; and power factor improvement; (M)
2. Use renewable technologies like solar photo-voltaic and solar geysers in collaboration with the relevant stakeholders including local communities both men and women. (M)

7.6 Transport

The transport sector has shown the highest emission growth rate of all sectors. Managing emissions in the transport sector is therefore crucial for tackling climate change. What makes this task difficult is the fact that the scope for technical improvement is limited, at least, in the short run and that transport volumes are closely linked to economic growth. The GoAJ&K shall take the following policy measures:

7.6.1 Road Transport

1. Sensitize the public, both men and women to the importance of proper vehicle maintenance for fuel efficiency enhancement and reduction of emissions; (S)
2. Develop and enforce vehicle emission standards; enact and enforce legislation to reduce GHG emission in the transport sector; including vehicle emission standards; (M)
3. Develop and adopt strategies promoting low carbon transport technologies like computerized tune-up of vehicles, hybrid cars, energy efficient design of truck bodies and use of GPS and remote sensing technology to reduce GHG emissions through

vehicle tracking systems; (M)

4. Build capacity and provide necessary GHG emission testing equipment to motor vehicle examiners; (M)
5. Develop and adopt low carbon transportation modes including mass transit systems like bus rapid transport in big cities and intercity efficient railway system causing least GHG emissions; non-motorized modes such as bicycling and walking; Construct walkways and bike-ways in big cities; (L)
6. Support the private transport sector by providing incentives for reducing emissions and promoting environmentally friendly transport services; (M)
7. Make the existing road network climate change resilient and adjust width and length of roads as per the needs of transport load; (M)
8. Take appropriate Climate Change resiliency measures while expanding road network; (S)
9. Mainstream technologies and modes of reducing GHG emissions in the transport sector in urban and town planning; (M)
10. Provision for necessary plantation of suitable tree species as recommended by the AJ&K Forest Department, on both sides of roads and landslide prone areas, be kept in the PC-1s and project documents of all State, national and internationally funded projects and programs. (S)

7.6.2 Aviation

1. Support the International Civil Aviation Organization's (ICAO's) initiative for carbon emission reduction through improved air traffic management, which includes improved weather services and free flight air routes, instead of defined routes, that hold the potential for reduced flight time and thus fuel consumption. (L)


7.6.3 Railway

1. Initiate an energy efficient railway system in the State, as the advantages of railway over road travel in terms of carbon emissions are well recognized. (L)

7.7 Industries, Mining and Business

The major industries in the AJ&K are cottage industries especially related to handicrafts and minerals. Mirpur and Bhimber are considered to be the industrial districts. The GoAJ&K is making efforts to revive sick industrial units but lack of required infrastructure, natural gas, electricity and water are restricting such efforts. Sustainable Development Goal 9 deals with industry, innovation and infrastructure. The GoAJ&K shall take the following measures to play its role in reducing the emissions from industry, mining and business:

1. Incorporate economic incentives to promote emission-reduction by upgrading industrial processes and technologies and introduce renewable energy in industries; (M)
2. Promote integration of the “Cleaner and sustainable Production” strategy in the Industrial sector by making more efficient use of inputs such as energy, water and raw materials; (M)
3. Promote the use of energy efficient equipment in the industrial and mining sectors; (M)
4. Encourage the industrial sector to have periodic “Energy Efficiency Audits and retrofits”; (S)
5. Promote and improve access to GHG emission reduction technologies for both men and women; (S)

- 
6. Ensure that technology transfer is accelerated for industries and mining to control emissions; (M)
 7. After completion of mining activity in or outside forest areas, ameliorate and restore the land disturbed in degraded sites through appropriate vegetation and engineering measures so that trees or shrubs are growing and can be further grown in such areas; (M)
 8. Encourage the business houses and business persons to monitor their carbon footprint from their utility consumption/ production and work on ways to reduce it. (M)

7.8 Communication and Works/ Infrastructure

There is a need to take mitigation measures in the communication and housing sectors. Wherever, feasible, the GoAJ&K will take the following climate change mitigation measure in the infrastructure/ communication sector:

1. Develop activities and infrastructure that promote the reduction and avoidance of fossil fuel consumption for example, construct proper walking and cycling lanes. (M)

7.9 Eco-Tourism

Climate change mitigation measures in the Tourism industry of AJ&K include the following:

1. Reduce the use of vehicle transport and promote walking, trekking, hiking, and mountain biking and renewable energy technologies particularly under increased projected conditions of tourists activities and projected climate change scenario; (S)
2. Introduce reduce, reuse, recycle and integrated resource recovery of the waste material in tourist areas as well as waste to energy technologies. (M)

8. Education, Capacity Building and Institutional Strengthening

Expertise to address climate change is meager in the State. The AJ&K is hardly prepared to meet the 21st century's biggest challenge of climate change as far as human resources and institutional capacities are concerned. Insufficient trained human resource is a big constraint, in part, due to a brain drain, limited investment in climate change education, and lack of demand and opportunity for skilled individuals in the AJ&K. There is a lack of credible institutions in the State to deal with comprehensive climate change science, modeling, management, adaptation, mitigation, and policy issues. Since capacity building and institutional strengthening is a priority area for the government, a number of area specific policy measures are mentioned in relevant sections and will generally not be repeated here. However to address the deficiencies in climate change related requirements, human resources and institutions, the GoAJ&K shall take the following policy measures:

8.1 Institutional Mechanisms

1. Climate Change Center established initially under Planning and Development Department will be made permanent. The Center will lead the climate change policy, strategy, planning, resource mobilization and interventions including carbon trading/ CDM and REDD+ at the State level and coordinate such programs, projects and interventions being implemented by other departments/ agencies of the State. The Center will also coordinate with federal government, regional and international

- agencies in the relevant matters; (S)
2. The AJ&K Climate Change Policy Implementation Committee (AKCCPIC) established under the chairmanship of Additional Chief Secretary (Dev.) will coordinate, monitor and review all climate change activities at State, national and international levels; (S)
3. All Departments or agencies of AJ&K will be responsible for implementing specific activities or programs to address Climate Change and will report as required to the AJKCCPIC or Climate Change Center; (L)
4. Strengthen State and local level institutions so that these can play their role in the adaptation and mitigation to the climate change impacts in an appropriate way; (L)
5. Adaptation and mitigation to Climate Change is a responsibility of all and as such, Civil Society is encouraged to collaborate with Climate Change Center in the development of appropriate measures in this regard; (L)
6. Integrate and address agriculture, water, forest, energy, infrastructure, communication, Disaster Risk Reduction (DRR), tourism and wetlands related vulnerabilities, induced by climate change and adaptation and mitigation measures mentioned in State Climate change policy, in the relevant State level policy, planning and budgetary documents; (M)
7. Different departments/ Agencies of the State will implement programs, projects and interventions to address climate change measures mentioned in State climate change policy and report its progress to Climate Change Center, and provide necessary support to Climate Change Center, P&DD in coordinating these programs, projects and interventions will be coordinated by Climate Change Center, Pⅅ (M)
8. Take necessary measures to integrate climate change concerns into Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) processes. (M)

8.2 Capacity Enhancement & Education

1. Establish a State level clearing-house for regularly updated climate change related data sharing and networking. Develop knowledge based management (KBM), networking and Management information systems by developing a KBM platform to collect, generate and analyze climate change knowledge products to ensure benefits from international scientific advancements and indigenous knowledge; (S)
2. Assess capacity building needs of stakeholders, both men and women in climate change; (S)
3. Ensure institutional strengthening of the existing Climate Change Center and relevant institutions dealing with climate change and REDD+ matters; (S)
4. Make Climate change concerns, impacts, mitigation and adaptation measures a part of academic syllabus at primary, secondary and tertiary levels; (M)
5. Develop capacity of relevant stakeholders both men and women to prepare GHG emission inventory, quantify past temporal trends of weather and make projections of future changes in temperature, rainfall and precipitation trends, snow cover, snowfall seasons, glacial volume, glacial lake formation and outburst, tree lines, forest and land degradation (e.g. salinity), land sliding, soil erosion, extinction of endangered species of flora and fauna etc; (M)
6. Undertake GIS/Remote Sensing based comprehensive assessments of the economic implications of climate change impacts on various sectors with and without using



different adaptation measures; (S)

7. Develop climate change professionals by sending young scientists, students and experts from relevant departments both men and women to reputable institutions abroad for higher studies; (S)
8. Train relevant professionals and raise awareness of policy makers both men and women and concerned authorities regarding CDM, REDD+ and other international instruments; (S)
9. Integrate climate change in the education system and in all other professional practices; (M)
10. Support academic institutions for Research and demonstrations on climate change aspects; (S)
11. Encourage involvement of academic institutions in awareness raising initiatives of climate change; (S)
12. Take necessary measures to achieve the targets of Sustainable Development Goal (SDG) 13: “Take urgent action to combat climate change and its impacts” in a way that it is helpful in achieving other related SDGs and targets. (M)

8.3 Technology Transfer


Climate change, being one of the most difficult and complex threats the world faces, needs innovative technological solutions to solve the climate change challenges of both mitigation and adaptation. The UNFCCC Cancun conference agreed to set up a special “Technology Mechanism” for the development and transfer of new technologies from developed to developing countries. To find solutions to the climate change challenges in the AJ&K, the GoAJ&K shall take the following policy measures:

1. Determine technological needs at the State level for climate mitigation and adaptation by conducting technology needs assessment; (S)
2. Develop partnerships with national and international institutions to improve local technologies, based on innovation and technological advancement in the field of climate change, as an effective way to implement adaptation and mitigation measures in energy, forestry, infrastructure, water, agriculture and transport; (S)
3. Establishing technology incubation centers at technical institutes, colleges and universities for technology transfer and absorption in the climate change sector. (M)

8.4 Awareness Raising

Public education and outreach are vitally important to create broad awareness of climate change issues and its impact. As such the importance of communicating with the general public and engaging stakeholders, both men and women in climate change related issues is fully recognized by the AJ&K. The Government in collaboration with the private sector and independently, is already working actively to raise awareness about the climate change issue. The scale of the change required, however, and the vast number of men and women and interests that must be influenced, calls for outreach activities of a much greater magnitude.

Involvement of NGO and Community Based Organizations (CBOs) of both male and female is critical to bring awareness of the impacts of climate change. The State Climate Change Policy recognizes that these NGOs and CBOs shall play an important role of advocacy for climate



change adaptation and mitigation. These NGOs and CBOs shall be encouraged to assume the role of coordinating and integrating efforts amongst various stakeholders and the local communities, especially women in order to address climate change issues. Therefore, the GoAJ&K, in collaboration with the relevant entities, shall take the following measures:

1. Develop a climate change awareness program involving communities and CBOs for both women and men, various ministries and departments, academia, media, NGOs and private sector; (S)
2. Ensure advocacy and mass awareness through print and electronic including social media regarding the importance of water and energy conservation, the impact of climate change on various sectors including forest ecosystems, biodiversity and so on; (S)
3. Disseminate climate change knowledge products to potential beneficiaries, especially women and other vulnerable groups, through improved public awareness and communication; (M)
4. Arrange climate change sensitization workshops for policy makers both men and women at State level. (S)

8.5 International Commitments for Gender Mainstreaming

International commitments, such as Universal Declaration of Human Rights, Convention on the Elimination of All Forms of Discrimination against Women stresses on equal rights of men and women, will be considered while taking adaptation and mitigation measures for climate change issues. The Commission on the Status of Women (CSW), the principal global intergovernmental body, is instrumental in promoting women's rights, documenting the reality of women's lives throughout the world, and shaping global standards on gender equality and the empowerment of women. During the Commission's annual session, representatives of UN Member States, civil society organizations and UN entities gather at UN headquarters in New York. They discuss progress and gaps in the implementation of the 1995 Beijing Declaration and Platform for Action, the key global policy document on gender equality, and the 23rd special session of the General Assembly held in 2000 (Beijing+5), as well as emerging issues that affect gender equality and the empowerment of women. The Commission adopts multi-year work programs to appraise progress and make further recommendations to accelerate the implementation of the Platform for Action.

Office of the High Commissioner for Human Rights (OHCHR)'s Key Messages on Human Rights and Climate Change highlight the essential obligations and responsibilities of States and other duty-bearers (including businesses) and their implications for climate change-related agreements, policies, and actions. In order to foster policy coherence and help ensure that climate change mitigation and adaptation efforts are adequate, sufficiently ambitious, non-discriminatory and otherwise compliant with human rights obligations, the following considerations should be reflected in all climate action.

- To mitigate climate change and to prevent its negative human rights impacts
- To ensure that all women and men have the necessary capacity to adapt to climate change
- To ensure accountability and effective remedy for human rights harms caused by climate change
- To mobilize maximum available resources for sustainable, human rights-based development and international cooperation
- To ensure equity in climate action
- To guarantee that everyone enjoys the benefits of science and its applications

- To protect human rights from business harms
- To guarantee equality and non-discrimination
- To ensure meaningful and informed participation

9. Resource Mobilization

Adequate resources, including finances are required in order to undertake climate change adaptation and mitigation. Since Pakistan contributes very little to greenhouse gas (GHG) emissions, its preoccupation focuses on adaptation to the effects of climate change. However, because of the importance of Climate change mitigation initiative at global level; such initiatives will also be taken. Financial and other resources are needed in the quest for adaptation and mitigation. UNFCCC through the Bali Action Plan also recognized the importance of funds. Since all activities of climate change adaptation and mitigation will require financial and other resources, the State climate change policy has made provision of how financial and other resources will be secured, allocated, mobilized and managed. Such funding sources should include adequate allocation for the exploration of appropriate off-setting opportunities in the various sectors.

Climate change is a global concern and its adverse impacts are likely to affect most developing countries. Developing countries face the dual challenge of addressing the negative impacts of climate change and pursuing socioeconomic development. Hence, it is essential that they work by mobilizing regional and international funding opportunities to face these challenges. Pakistan and the AJ&K are committed to engaging vigorously with the international community to find solutions and help the world towards a new era of global cooperation on climate change. Involvement of NGO and Community based organizations of both male and female are critical to mobilize financial and other resources to local communities for climate change adaptation and mitigation. In order to achieve international and regional cooperation and avail funding opportunities, the GoAJ&K shall take the following measures:

1. Actively participate in new international initiatives. Conduct surveys, develop projects in collaboration with relevant stakeholders, both men and women and submit these to State and Federal Governments, multi-lateral donors²¹, Development Finance Institutions (DFIs)²², bilateral and private sector donors through the federal government to ensure the access and effective use of opportunities available internationally for adaptation and mitigation efforts. (S)
2. Develop public private partnership for financing and implementation of climate change adaptation and mitigation projects. (M)
3. Establish linkages with regulated and voluntary carbon markets to promote and encourage climate change mitigation projects. (S)

²¹Green Climate Fund (GCF), CDM, Adaptation Fund (AF), Global Environmental Facility (GEF), UNREDD Program, United Nations Development Program (UNDP), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), United Nations Convention on Biological Diversity (UNCBD), United Nations Environment (UNE), United Nations Educational, Scientific and Cultural Organization (UNESCO) etc.

²²World Bank (including Forest Carbon Partnership Facility), Asian Development Bank, KfW Development Bank and Islamic Development Bank

10. Policy Implementation Mechanism

The Climate Change Center established under Planning and Development Department of GoAJ&K would be the lead agency for implementation of the interventions proposed in the AJ&K's climate change policy. Following approval of the policy, the Government shall develop a strategy and "Action Plan" for its implementation. Furthermore, the legal and institutional framework for different policy initiatives would also be prepared. All relevant departments and agencies shall also devise plans and programs to implement the policy provisions relating to their respective sectors/sub-sectors. To ensure effective Policy and Action Plans implementation and to oversee progress in this regard, "AJ&K Climate Change Policy Implementation Committees" shall be established.

AJ&K's Climate Change Policy Implementation Committee

The tasks of the Committee are as follows:

- Provision of required coordination between different institutions to mainstream and integrate policy initiatives in development planning and implementation;
- Communication for coordination of the relevant initiatives at different levels of governance;
- Regular monitoring and review of the implementation of policy actions and accomplishments; identify bottle neck and suggest measures/ strategies to bridge the gaps;
- Up-gradation of the AJ&K's Climate Change Policy at five years intervals.

The Committee will have representation of both men and women. The composition of the committee is as under:

1. Additional Chief Secretary (Dev.) GoAJ&K (Chair)
2. Secretary P&DD, GoAJ&K.
3. Secretaries to the other Government Departments concerned with Climate Change:

Secretaries, Electricity/Power Development Organization, Forest, Wildlife & Fisheries; Agriculture, Irrigation, and Livestock; Physical Planning and Housing/ Public Health, Tourism, Local Government and Rural Development, Industries and Commerce, Social Welfare and Women Development; State Earthquake Reconstruction and Rehabilitation Authority (SERRA).

Head of the Departments:

4. Director General EPA
5. Secretary/Director General SDMA;
6. Vice Chancellors University of Azad Jammu and Kashmir & Mirpur University of Science & Technology;

Private Sector/ Civil society organizations:

7. President, Chambers of Commerce and Industries, AJ&K;
8. Chief Executive, AJK-RSP

Member/ Secretary

9. Director General (Climate Change Center)

The "AJ&K's Climate Change Policy Implementation Committee" shall meet biannually.

According to IPCC; any change in climate, such as temperature, precipitation, snowfall or wind over time, whether due to natural variability or as a result of human activity refers to climate change. The World Meteorological Organization (WMO) defines this time period as 30 years. As per United Nations Framework Convention on Climate Change (UNFCCC); Climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Climate change may result from: natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system; and human activities that change the atmosphere's composition such as through burning fossil fuels and the land surface through deforestation, reforestation, urbanization, desertification, etc.

The El Niño Southern Oscillation cycle, both El Niño and La Niña, causes global changes of both temperatures and rainfall. El Niño is a climate cycle in the Pacific Ocean with a global impact on weather patterns. The cycle begins when warm water in the western tropical Pacific Ocean shifts eastward along the equator toward the coast of South America. Normally, this warm water pools near Indonesia and the Philippines. El Niño is accompanied by high air pressure in the western Pacific and low air pressure in the eastern Pacific. La Niña is a coupled ocean-atmosphere phenomenon that is the counterpart of El Niño as part of the broader El Niño–Southern Oscillation climate pattern. In a study it was noted that in an El-Niño year if there is warming in AMJ and it is likely to continue or increase in JAS or even it persists then there is likely hood that monsoon rainfall over Pakistan will be in deficit. If there is no warming in the months AMJ and JAS i.e. the temperatures are normal or even warming is there in the month of AMJ and it starts decreasing in the month of JAS, the monsoon rainfall will be above normal.

The Earth's climate has changed due to natural processes and the human activity, but in the last 50-100 years extent of these changes has been increased considerably and happened much faster than in the previous years. Natural levels of Greenhouse gases (CO₂, CH₄, N₂O, per flour-carbons, SF₆ and H₂O) are essential for atmosphere to function properly. Excessive burning of fossil fuels for anthropogenic activities releases additional CO₂ and other GHGs which builds up and traps additional heat which would otherwise escape. This human-caused blanket effect leads to warming of the planet, disrupting the atmospheric balance that keeps the climate stable.

The consensus of the United Nations Inter-Governmental Panel on Climate Change (IPCC) containing experts from 195 countries, is that “warming of the climate system is in no doubt, and since the 1950s, many of the observed changes are unprecedented over decades to millennia (‘000 years)”. Emissions are projected to rise significantly over the next few decades leading to significant increase in global temperatures with profound risks for the natural environment and human society worldwide. According to the latest report from the IPCC, average global temperatures are likely to rise by another 0.3 to 4.8°C by 2100. If we take aggressive action to reduce emissions, the temperature change could be modest. If we continue on our present course, however, the amount of change will be substantial. Most experts agree that the changes are anthropogenic, caused by humans, and largely from emissions of heat-trapping gases released to the atmosphere when fossil fuels are burned. Carbon dioxide (CO₂) is the most significant of these gases.

Climate change is one of the major challenges that the world is facing in the 21st century and is adversely affecting sustainable development and communities – men and women's livelihoods, health, shelters and in some cases, even lives. Responses to climate change can be divided into two aspects: Mitigation and Adaptation.

Greenhouse Effect

The atmosphere is composed of nitrogen (78%), oxygen (21%), carbon dioxide (0.04%), argon (0.9%), water vapours (0-4%) and trace gases such as argon, xenon, neon, krypton and helium. Carbon dioxide and other gases such as methane and nitrous oxide trap the infra-red radiation from the sun and prevent it from escaping by a natural process called “the greenhouse effect”. This phenomenon maintains the temperature of the earth allowing living things to survive.

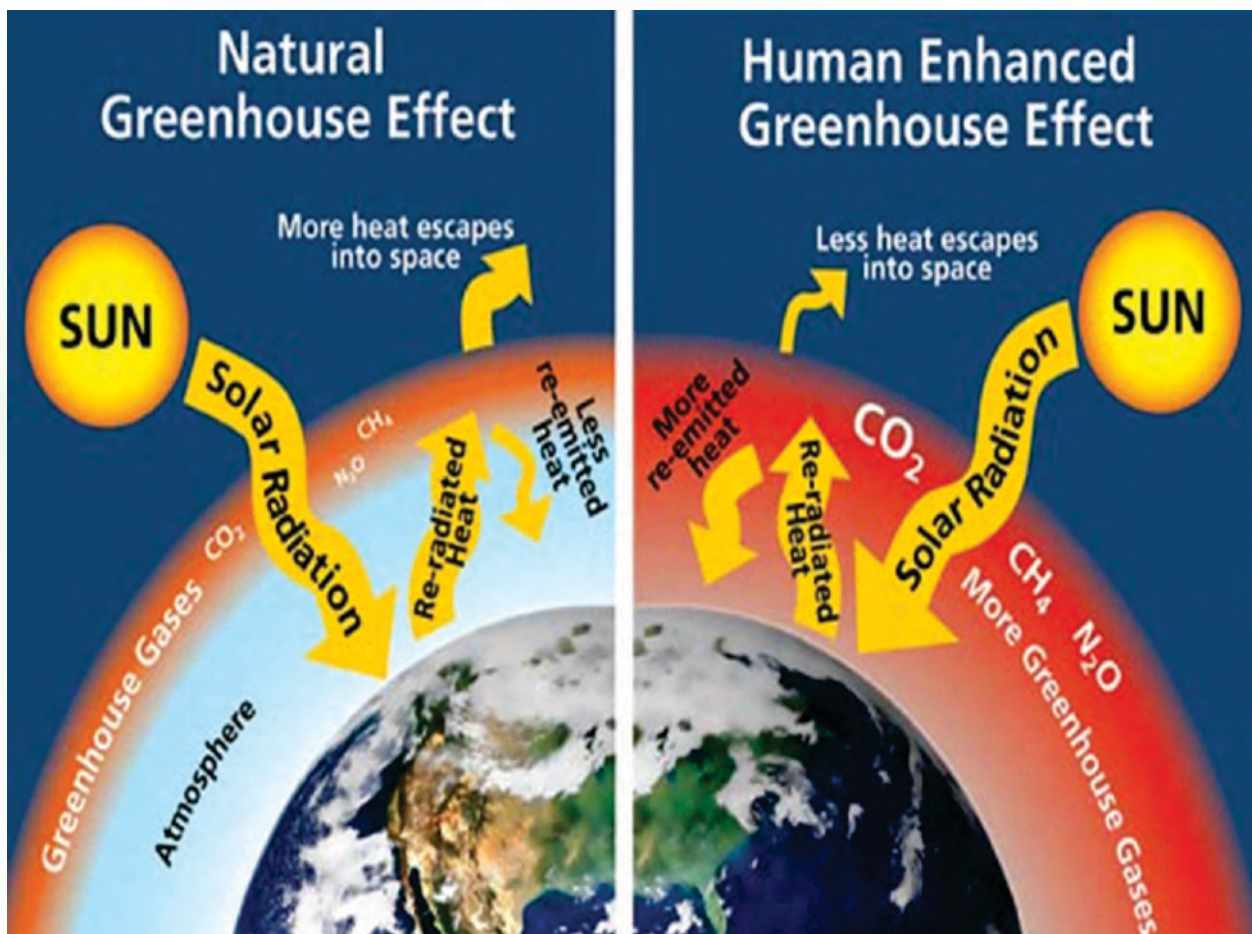


Figure 4: Natural & Human induced Greenhouse Effect

Annex-II Climate change policy & strategy, major instruments at national & international levels

The key aspects of International and National climate change policy and strategy instruments are summarized in Table 1 below.

Table 1: Key aspects of International & national climate change policy & Strategy

Policy Response	Objectives and Targets
United Nation Framework Convention on Climate Change (UNFCCC)	UNFCCC seeks to reduce international GHG emissions by setting National level targets based on the concept of 'common but differentiated responsibility'. This means that nations which emit majority of GHGs need to reduce GHGs at a greater rate.
UNFCCC's Kyoto Protocol	Under the UNFCCC's Kyoto Protocol, developed countries agreed to reduce their overall emissions of a basket of GHG by 5.2 per - cents below 1990 levels over the period 2008 - 2012. It has been extended up to 2020.
National Climate Change Policy 2012	It supports the shift to a resource-efficient, low-carbon economy to achieve sustainable growth. It provides a long-term framework for action to factor in resource efficiency in a balanced manner in many policy areas, including climate change adaptation in water, agriculture, Livestock, human health, forestry, biodiversity, mountain areas, rangelands and pastures, arid and hyper arid areas, coastal and marine ecosystems, wetlands, disaster preparedness, poverty and gender. It also provides policy guidelines for climate change mitigation in sectors like energy, transport, town planning, industry, agriculture, Livestock and Forestry, international and regional cooperation.
Framework for Implementation of Climate Change Policy (2014-2030)	<p>Climate change adaptation effort is the focus of this Framework for Implementation of National Climate Change Policy 2016 (NCCP) document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation actions spelled out. These cover actions to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity, health and other vulnerable ecosystems. Furthermore, due importance is given to mitigation efforts in sectors such as energy, forestry, transport, industries, urban planning, agriculture and livestock. Furthermore, appropriate actions relating to disaster preparedness, capacity building, institutional strengthening, and awareness raising in relevant sectors has also been part of this document.</p> <p>This Framework for Implementation of NCCP has been developed not as an end in itself, but rather a catalyst for mainstreaming climate change concerns into decision making that will create enabling conditions for integrated climate compatible development processes. It is therefore not a stand-alone document, but rather an integral and synergistic complement to future planning in the country. Further, this Framework for Implementation of NCCP is designed as a 'living document'.</p>

Annex-III SDG 13: Take urgent Actions to Combat Climate Change & its Impacts, its relationship with other SDGs

The world has adopted 17 Sustainable Development Goals (SDGs) with 169 targets. The IPCC 5th Assessment Report (2014) notes that the impacts of climate change constitute a major risk for all dimensions of sustainable development. Also, actions to mitigate and adapt to climate change are likely to have significant implications for most dimensions of sustainable development. The SDG 13 is “Take urgent action to combat climate change and its impacts”, it impacts the other SDGs. Following are the targets under this goal: (13.1) Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries; (13.2) Integrate climate change measures into national policies, strategies and planning; (13.3) Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning; (13.a) Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible; and (13.b) Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities. Relationship of SDG 13 with other SDGs is described as below:

Table 2: Linkage of Climate Change with other SDGs

SDG #	Description / Title	Linkage with Climate change
1	End poverty in all its forms everywhere	Climate change impacts on economic growth, with potentially disproportionate impact on the poor.
2	End hunger, achieve food security & improved nutrition & promote sustainable agriculture	Climate change has discernible impacts already on food productivity in many regions.
3	Ensure healthy lives & promote well-being for all at all ages	Climate change has direct implications for health. Many mitigation actions have significant health co-benefits
4	Ensure inclusive & equitable quality education & promote life - long learning opportunities for all	Indirect links
5	Achieve gender equality & empower all women & girls	Indirect links
6	Ensure availability & sustainable management of water & sanitation for all	Climate change impacts water availability. Improving water use efficiency & water management has adaptation benefits.
7	Ensure access to affordable, reliable, sustainable, & modern energy for all	Energy efficiency & increase use of renewables contribute to climate mitigation.
8	Promote sustained, inclusive & sustainable economic growth, employment & decent work for all	Climate change impacts on economic growth. Resource efficiency contributes to mitigation. Availability of finance is critical for mitigation & Adaptation.
9	Build resilient infrastructure, promote inclusive & sustainable industrialization & foster innovation	Climate change impacts on infrastructure. Making infrastructure more resilient contributes to adaptation.
10	Reduce inequality within & among countries	Indirect link, with potentially disproportionate impacts of climate change across & within countries.



11	Make cities & human settlements inclusive, safe, resilient & sustainable	Climate change impacts on cities via e.g. heat island effects. Improving public transport & reducing local air pollution may often have mitigation co-benefits. Improving planning & reducing impact of disasters contributes to adaptation.
12	Ensure sustainable consumption & production patterns	Ensuring sustainable consumption contributes to mitigation, to the extent that pollution via the emission of greenhouse gases emissions is concerned.
14	Conserve & sustainably use the oceans, seas & marine resources for sustainable development	Climate change impacts on marine ecosystems. Improving their management contributes to adaptation.
15	Protect, restore & promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, & halt & reverse land degradation & halt biodiversity loss	Climate change impacts on terrestrial ecosystems. Improving their management contributes to adaptation.
16	Promote peaceful & inclusive societies for sustainable development, provide access to	Indirect link, notably via security risks associated with climate change.
17	Strengthen the means of implementation & revitalize the global partnership for sustainable development	Additional resources, improved governance & cooperation across countries would contribute to mitigation & adaptation.

Annex-IV Maps showing glaciers and glacier lakes in AJ&K

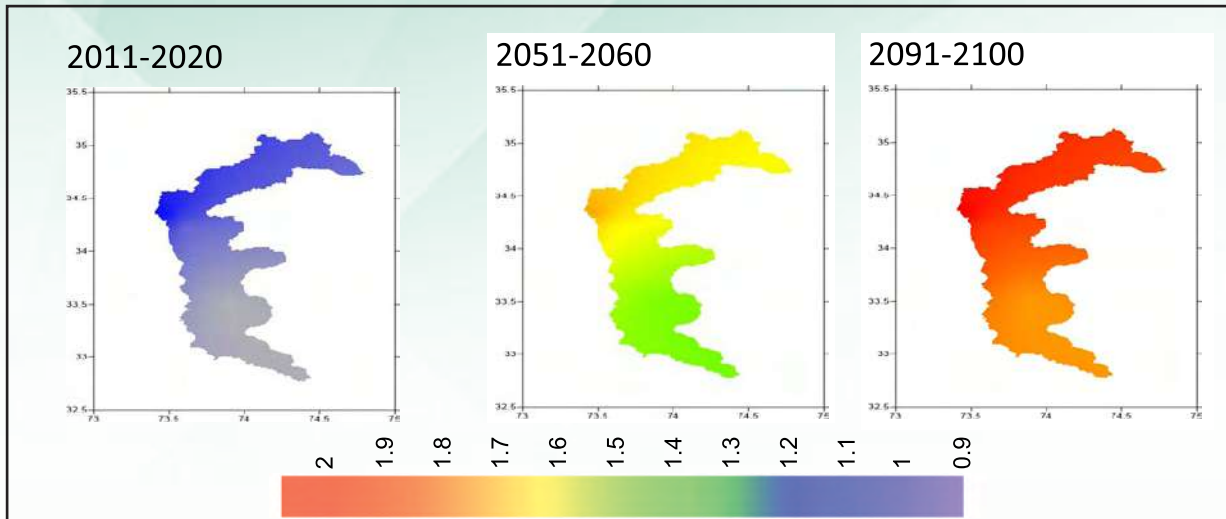


Figure 7: Delta TMAX (°C) at IPCC RCP4.5

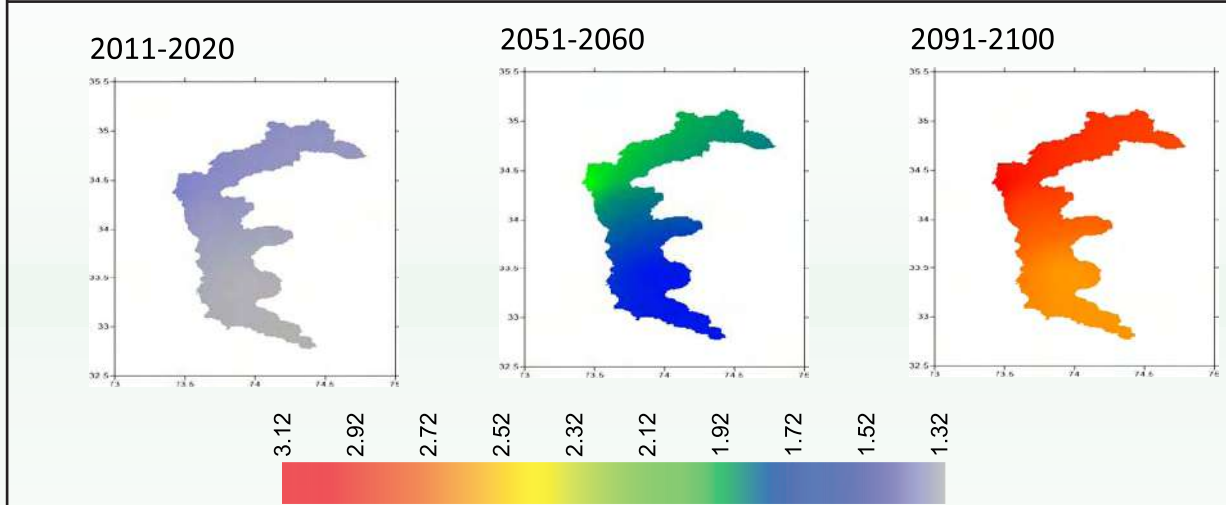


Figure 8: Delta TMAX (°C) at IPCC RCP8.5

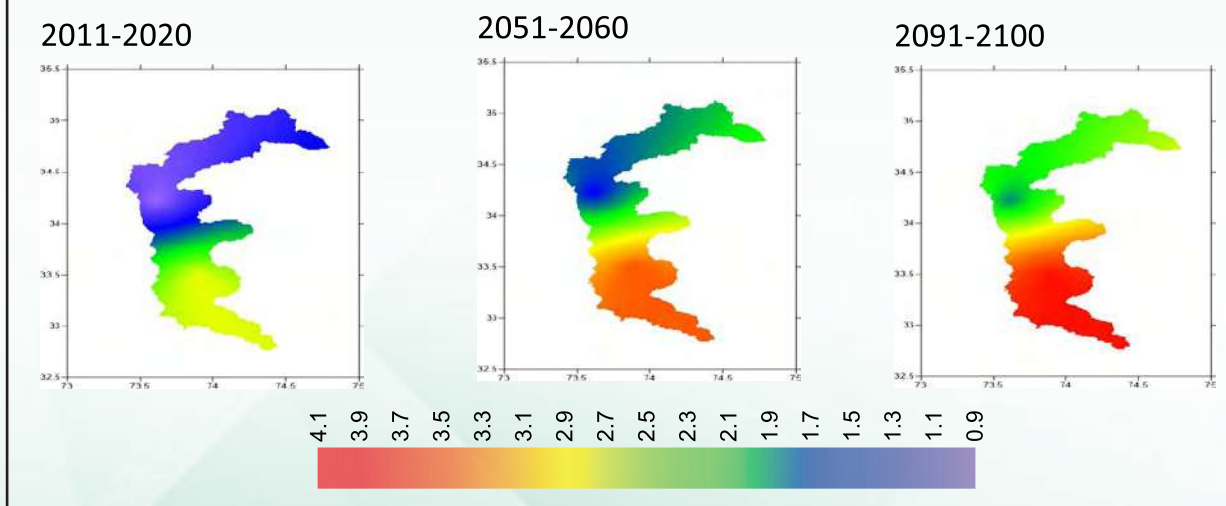


Figure 9: Delta TMIN (°C) at IPCC RCP4.5

(Source: PMD)

Annex-V Maps showing Delta TMAX (°C) Delta TMIN (°C) and Delta Rain (%) at RCP (4.5 and RCP (8.5) in Aj&K

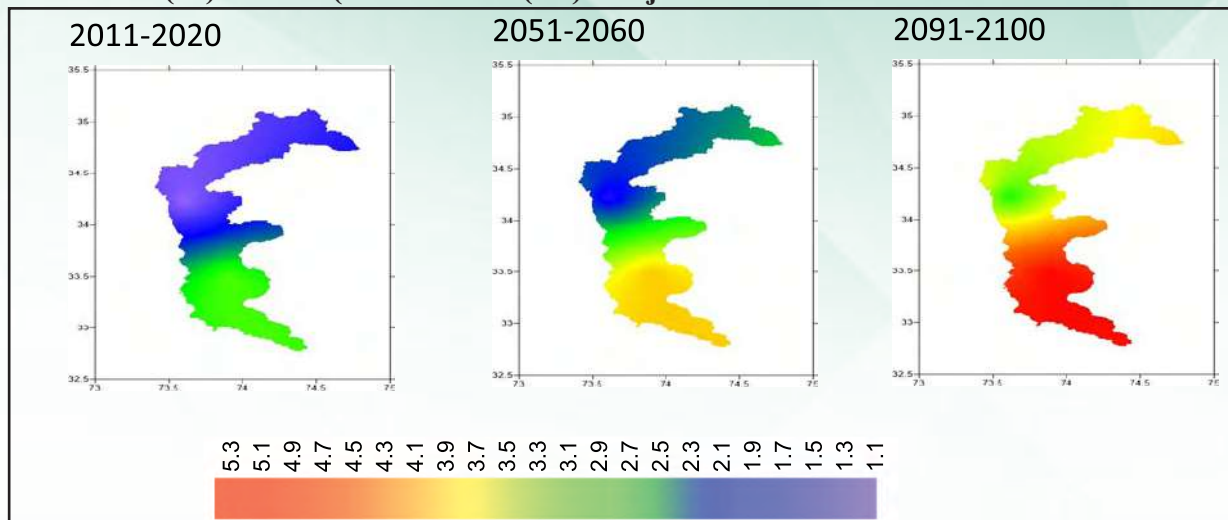


Figure 10: Delta TMIN (°C) at IPCC RCP8.5

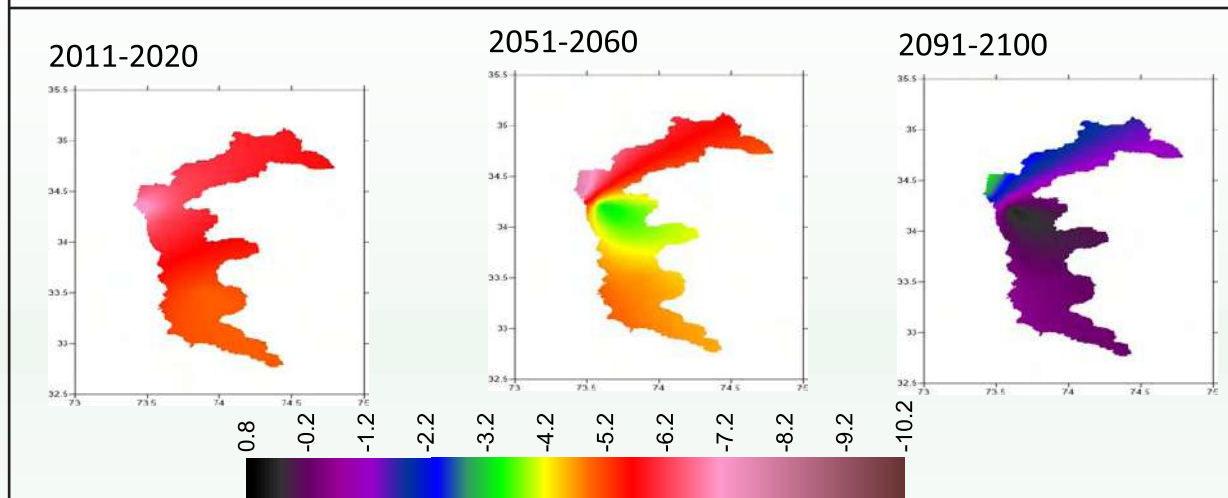


Figure 11: Delta Rain (%) at IPCC RCP4.5

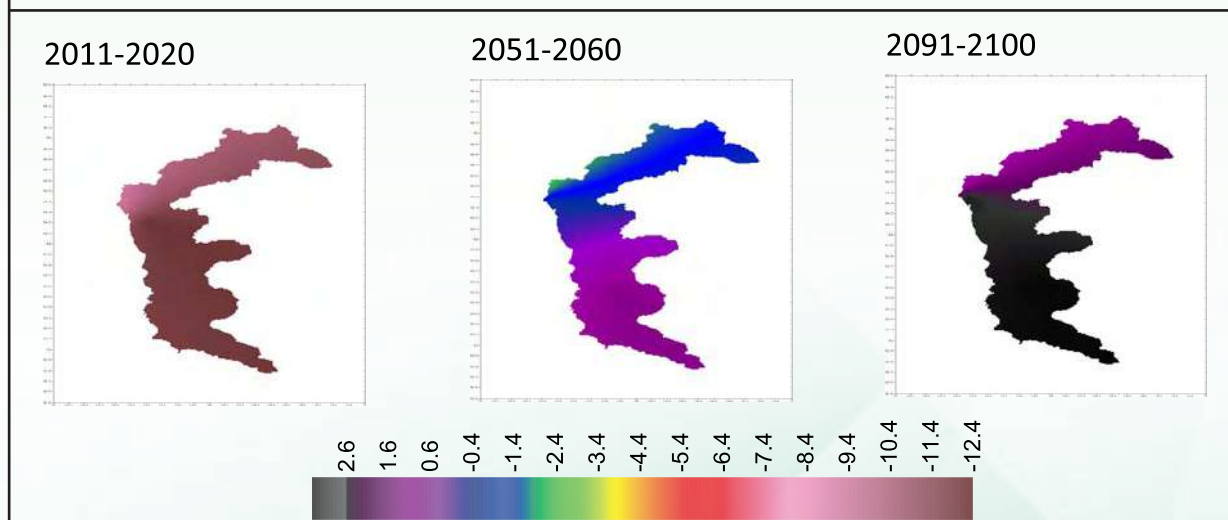


Figure 12: Delta Rain (%) at IPCC RCP8.5

(Source: PMD)

Annex-VI Notification of AJ&K Climate Change Policy

D:\AF English Files 2017\Notification 2017.doc



Azad Govt. of the State of Jammu & Kashmir (Environment Department)

"Muzaffarabad"
Dated: 27th September, 2017

Notification:

No.P&DD/5599-5682/2017, Consequent upon the decision of the Azad Jammu & Kashmir Cabinet on August 24, 2017, the President Azad Jammu & Kashmir has been pleased to approve and promulgate 'Azad Jammu & Kashmir Climate Change Policy -2017' annexed to this notification.

Section Officer (Admin)

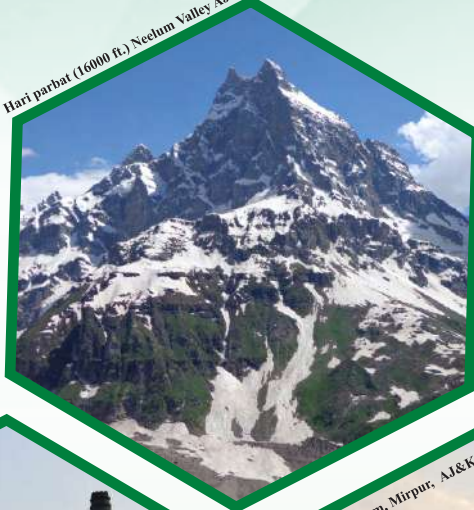
Copy to:

- 1- The Secretary to the President, Azad Jammu & Kashmir, Muzaffarabad.
- 2- The Principle Secretary to the Prime Minister, GoAJ&K, Muzaffarabad.
- 3- PS to the Speaker/Deputy Speaker, AJ&K Legislative Assembly Muzaffarabad.
- 4- PS to the Ministers/Advisors, GoAJ&K, Muzaffarabad.
- 5- PS to the Chief Secretary, GoAJ&K, Muzaffarabad.
- 6- ✓ PS to the Addl. Chief Secretary (Dev.)/Secretary Environment, GoAJ&K Muzaffarabad.
- 7- PS to the Addl. Chief Secretary (Gen), GoAJ&K, Muzaffarabad.
- 8- All Secretaries, GoAJ&K Muzaffarabad.
- 9- Accountant General, AJK Muzaffarabad.
- 10- All Head of the Departments, GoAJ&K, Muzaffarabad.
- 11- The Director General Climate Change Center, Muzaffarabad.
- 12- The Senior Chiefs, P&DD Muzaffarabad.
- 13- The Chief Economist P&DD.
- 14- All Chiefs, P&DD.
- 15- The Controller Printing Press Muzaffarabad.
- 16- Master File.

Section Officer (Admin)



Hari parbat (16000 ft) Neelum Valley AJ&K



Cedrus deodara (Roxb. ex D. Don) G. Don



Industrial Area, Bimber AJ&K



Mangla Dam, Mirpur, AJ&K



Chita Katha Lake, Neelum Valley AJ&K



Betula Forest, Neelum Valley AJ&K

Climate Change Center AJ&K

Flood Emergency Reconstruction & Resilience Project (FERRP), Planning & Dev. Department, Govt. of AJ&K

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