Participatory Forests Management Plan (PFMP)

Forest Area Chinari, Hattian Forests Division
(Designated Forests Area Chinari / DFA Chinari)
2022 - 2031

Forests Department, Azad Government of the State of Jammu & Kashmir

&

Village Community Organizations,
Forest Area Chinari, Hattian Forests Division

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Credentials

Writing and data Analysis

Muhammad Bashir Khan
Abdul Qayum Chaudhry
Dr. Hammad Gilani
Mr. Naveed Aftab Mir
Mr. Rafiq Kiani

Data collection team:
Mr. Irtaza Qureshi, DFO Muzaffarabad / Focal Person REDD+ AJK Forests Department
Mr. Naveed Aftab Mir, ACF/ In-charge DFO P&DD
Mr Rafiq Kiani GIS Expert AJK Forests Department
Mr Imran Block Officer AJK Forests Department and field staff of Chinari Range
Local Community Representatives
Ch. Abdul Qayum Forestry Expert
Muhammad Bashir Khan, Coordinator REDD+ AJ&K

Peer Review
Mr. Irtaza Qureshi, DFO Muzaffarabad
Frans Werter, Consultant
Syed Nadeem Bukhari

Technical assistance:
Helvetas Swiss Intercooperation Pakistan
Forest Department, Azad Government of the State of Jammu & Kashmir

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Participatory Forest Management Plan (PFMP)
Forest Area Chinari, Hattian Forests Division

Endorsement

1. **Chairman, Village Community Organizations**

2. **REDD+ Focal Person, AJK Forest Department**

Disclaimer:
This Participatory Forest Management Plan is not a funding commitment from Forestry, Wildlife & Fisheries Department AJK. It is a proposal to be considered for future implementation of REDD+ Programme if funds are committed by the AJK government and/or any other donor(s). The success of this plan is contingent to the commitment of all stakeholders involved in the implementation of this plan. Benefit Sharing Mechanism and institutional setup for implementation of REDD+ approved by the Government of AJK will form the basis for implementing this Plan. Information on these aspects are suggestive and not binding on the Forestry, Wildlife & Fisheries Department AJK and any other stakeholders mentioned in this document.

وضاحت

آزاد جموں وکشمیر کا محکمہ جنگلات وجنگلی حیات اس منصوبے کے لیے مالی وسائل فراہم کرنے کا پابند نہیں ہوگا۔ اس منصوبہ پر عمل درآمد کرنے کے لیے مالی اور انتظامی سفارشات دی گئی ہیں۔ تاہم ان پر عمل آزاد جموں وکشمیر کے محکمہ جنگلات وجنگلی حیات کے بنائے گئے انتظامی و مالی رہنما اصولوں کے تحت ہوگا۔

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Acronyms

AJ&K	Azad Jammu and Kashmir
FD	Forest Department
BURs	Biennial Update Reports
CERs	Certified Emission Reduction
C & I	Criteria & Indicators
COP	Conference of Parties
Corg	Organic Carbon
DFA	Designated Forest Area
DDFD	Drivers of Deforestation & Forest Degradation
ERPA	Environmental Reduction Payment Agreement
EBA	Ecosystem Based Approach
FPIC	Free, Prior, Informed Consent
FREL	Forest Reference Emission Level
FCPF	Forest Carbon Partnership Facility
GDP	Gross Domestic Product
GHGEs	Green House Gas Emissions
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use, Land Use Change & Forestry
MRV	Measurement, Reporting and Verification
NAPAs	National Adaptation Programme of Actions
NAMS	Nationally Approved Mitigation Actions
PAMs	Policies & Measures
PIU	Plan Implementation Unit
PLRs	Policies, Laws & Regulations
PES	Payment for Ecosystem Services
R-PP	Readiness Preparation Project
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SIS	Safeguard Information System
SGRM	Safeguard Grievance Redressal Mechanism
SFM	Sustainable Forest Management
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
VCS	Verified Carbon Standard

Executive Summary

Chinari Forest located in District Hattian of Azad Jammu Kashmir is one of the two sites selected by the Forest, Wildlife and Fisheries Department (FD) in consultation with key stakeholders as a pilot site to demonstrate implementation of REDD+. This is part of a larger project being implemented by the Ministry of Climate Change, Government of Pakistan, and the Provincial Forest departments in which a total of 15 Participatory Forest Management Plans (PFMP) are being developed for REDD+ implementation in all six entities of Pakistan.

The Government of Pakistan has joined global efforts to address deforestation and forest degradation to mitigate climate change and its impact by initiating REDD+ activities. REDD+ has three phases; (i) readiness, (ii) demonstration through implementation, and (iii) result-based payments. The first two phases when combined are known as the REDD+ Readiness Phase. Pakistan has made substantial progress in meeting REDD+ readiness requirements. Pakistan has developed a National REDD+ Strategy in 2021. Whereas the Azad Jammu & Kashmir (AJK) Forests, Wildlife and Fisheries department has developed a Subnational / Provincial REDD+ Action Plan. This action plan is a decentralised framework for AJK to proceed with REDD+ implementation. PFMP is an important step to implement this action plan by integrating and implementing REDD+ activities in forest management in various socio-ecological systems.

The local stakeholders were engaged in preparation of this PFMP. The plan will guide the implementation of REDD+ by projecting business as usual and reduced emission scenarios derived from detailed participatory assessment of socio-economic circumstances, ecological condition, and challenges (drivers), and assessment of the forest resource which have been described in this plan. The plan also presents stakeholders' analysis with their roles and obligations, use rights of forest dependent communities, conflict resolution and benefit-sharing mechanisms. This information is crucial for determining an inclusive set of activities and successful implementation of REDD+.

The analysis of forest cover revealed that since 2010 the Chinari Forest is decreasing at a small rate of -0.22 hectares per year, causing 672 tonnes CO_2 eq emissions annually. The activities included in this PFMP if properly implemented, will curtail these losses, and further enhance resource base through collaborative forest management efforts of the stakeholders. This plan has proposed distribution of carbon and non-carbon benefits accrued by the implementation of plan according to which 80% benefits will go to the Government, and 20% will go equally to the customary right holders and users. These benefits will only be distributed if the planned emission targets are achieved. The plan provides scenarios so that the stakeholders can enjoy results-based payment and benefits. The success of this plan, therefore, is contingent to the commitment of all the stakeholders involved. A specific and definitive distribution of benefits in case of REDD+ programme is yet to be developed by the government, which will form basis for sharing of benefits in the case of private forests. This proposed ratio will be finalized or confirmed only after finalizing AJK based benefit sharing mechanism.

The initial period of this plan will be 10 years; however, the plan will be a living document and open for annual reviews. A budget forecast to implement activities mentioned is also provided in this plan. The major focus of the plan will be on enhancing forest cover by reforestation and regeneration of forest blanks and reducing the demand for fuel wood from the forest through promotion of energy efficiency and alternate sources of energy.

The implementation of activities described in the plan will be guided by annual operational plans to be developed by the provincial FD in consultation with the relevant stakeholders. The plan will be implemented by village and district committees to be notified by the provincial FD in consultation with the relevant stakeholders.

خلاصہ

آزاد جموں وکشمیر کے ضلع حٹیاں میں واقع چناری جنگل محکمۂ جنگلات، جنگلی حیات اور ماہی پروری کی جانب سے منتخب کردہ اُن دو مقامات میں سے ایک ہے جہاں ایک پائلٹ سائٹ کے طور پر اہم فریقین سے مشاورت کے ساتھ ریڈپلس کے نفاذ کا عملی مظاہرہ کیا جائے گا۔ یہ ایک بڑے منصوبے کا حصہ ہے جو وزارتِ موسمیاتی تبدیلی، حکومتِ پاکستان اور صوبائی محکمۂ جنگلات کے ذریعے لاگو کیا جا رہا ہے جس میں پاکستان کے تمام چھ علاقوں میں ریڈپلس پر عمل درآمد کی غرض سے مجموعی طور پر جنگلات کے شراکتی انتظام کے لیے پندرہ منصوبے بنائے جا رہے ہیں۔

حکومتِ پاکستان نے جنگلات کی کٹائی اور تنزلی سے نمٹنے اور موسمیاتی تبدیلی کے اثرات کم کرنے کے لیے ریڈپلس سرگرمیوں کا آغاز کر کے عالمی کوششوں میں شمولیت اختیار کی ہے۔ ریڈپلس کے تین مراحل ہیں۔ (i) تیاری (ii) عمل درآمد کے ذریعے مظاہرہ، اور (iii) نتائج پر مبنی ادائیگیاں۔ پہلے دو مراحل کو مشترکہ طور پر ریڈپلس کی تیاری کا مرحلہ کہا جاتا ہے۔ پاکستان نے ریڈپلس کی تیاری کی ضروریات کو پورا کرنے کے لیے خاطر خواہ پیش رفت کی ہے۔ پاکستان نے 2021ء میں ایک قومی ریڈپلس حکمتِ عملی تیار کی ہے۔ جب کہ آزاد جموں وکشمیر کے جنگلات، جنگلی حیات اور ماہی پروری کے محکمے نے ریاستی سطح پر ایک جامع ریڈپلس ایکشن پلان تیار کیا ہے۔ آزاد جموں وکشمیر میں ریڈپلس پر عمل درآمد کو آگے بڑھانے کے لیے یہ ایکشن پلان ایک ریاستی فریم ورک ہے۔ مختلف سماجی ماحولیاتی نظاموں میں جنگل کے انتظام کے لیے ریڈپلس سرگرمیوں کو مربوط اور لاگو کر کے جنگلات کے شراکتی انتظام کے منصوبوں کی تیاری اس ایکشن پلان پر عمل درآمد کے لیے ایک اہم قدم ہے۔

مقامی فریقین نے جنگلات کے شراکتی انتظام کے منصوبے کی تیاری میں حصہ لیا۔ ریڈپلس پر عمل درآمد میں رہنمائی کے لیے اس منصوبے کے تحت دو مختلف منظرناموں یعنی موجودہ حالات اور اخراج میں کمی کا اندازہ لگایا جائے گا۔ اس مقصد کے لیے سماجی اقتصادی حالات کے تفصیلی شراکتی تجزیے، ماحولیاتی صورتِ حال اور چیلنجز اور منصوبے میں واضح کردہ جنگلاتی وسائل کا جائزہ لیا جائے گا۔ یہ منصوبہ فریقین کے کردار اور ذمے داریوں کے ساتھ اُن کے تجزیے، جنگلات پر انحصار کرنے والی لوگوں کے حقوق کے استعمال، تنازعات کے حل اور مشترک فوائد کے حصول کا طریقۂ کار بھی پیش کرتا ہے۔ ریڈپلس پر کامیاب عمل درآمد اور شراکتی سرگرمیوں کی تفصیلات کا تعین کرنے کے لیے یہ معلومات ضروری ہیں۔

جنگل کے رقبے کے تجزیے سے پتا چلتا ہے کہ 2010ء کے بعد سے چناری جنگل میں 0.22 ہیکٹر سالانہ کی معمولی شرح سے کمی ہو رہی ہے جس سے سالانہ 672 ٹن کاربن ڈائی آکسائڈ کا اخراج عمل میں آ رہا ہے۔ جنگلات کے شراکتی انتظام کا اس منصوبے میں شامل اقدامات کے عملی اطلاق سے نہ صرف ان نقصانات میں کمی آئے گی بلکہ فریقین کے مشترکہ جنگلات کے انتظامی اقدامات سے جنگلات کے وسائل میں مزید اضافہ ہوگا۔

مجوزہ منصوبے کے مطابق اس منصوبے پر عمل درآمد سے حاصل ہونے والے کاربن اور نان کاربن محصولات میں سے 80 فی صد حکومت کو حاصل ہوں گے اور 20 فی صد جنگل کے حقوق رکھنے والوں اور صارفین کو ملیں گے۔ یہ فوائد صرف اہداف حاصل ہونے کی صورت میں تقسیم کیے جائیں گے اس لیے یہ منصوبہ فوائد میں کمی یا اضافے کا منظرنامہ پیش کرتا ہے تاکہ فریقین نتائج پر مبنی ادائیگی اور فوائد سے مستفید ہو سکیں۔ لہٰذا اس منصوبے کی کامیابی اس میں شامل تمام فریقین کے عزم پر منحصر ہے۔

حکومت کی طرف سے ریڈپلس پروگرام کے معاملے میں فوائد کی ایک مخصوص اور قطعی تقسیم فی الحال تیار نہیں ہوئی ہے جو جنگلات کے سلسلے میں فوائد کے اشتراک کی بنیاد بنائے گی۔ مشترک فوائد پر مبنی آزاد جموں وکشمیر کے طریقۂ کار کے طے ہونے کے بعد ہی اس مجوزہ تناسب کو حتمی شکل دی جائے گی یا اس کی تصدیق کی جائے گی۔

اس منصوبے کی ابتدائی مدت دس سال ہوگی تاہم یہ منصوبہ ایک زندہ دستاویز ہوگا اور سالانہ جائزے کے لیے پیش ہوگا۔ اس منصوبے میں مذکورہ سرگرمیوں پر عمل درآمد کے لیے رہنمائی متعلقہ فریقین کی مشاورت سے ریاستی محکمۂ جنگلات کی طرف سے تیار کیے جانے والے سالانہ آپریشنل منصوبوں کی مدد سے کی جائے گی۔ اس منصوبے کو گاؤں اور ضلعی کمیٹیوں کے ذریعے لاگو کیا جائے گا اور اس کے بارے میں متعلقہ فریقین کی مشاورت سے ریاستی محکمۂ جنگلات کے ذریعے مطلع کیا جائے گا۔

1 Introduction

1.1 The Context of PFMP

The Government of Pakistan (GoP) has joined global efforts to address deforestation and forest degradation to mitigate climate change and its impacts by initiating REDD+ activities. REDD+ has three phases; (1) readiness, (2) demonstration through implementation, and (3) result-based payments. The first two phases when combined are known as the readiness phase. Pakistan has made substantial progress in meeting REDD+ readiness requirements. Currently, efforts are underway to meet the fundamental requirements set by the United Nations Framework Convention on Climate Change (UNFCCC) for participating in REDD+ programme. These include development of a National REDD+ Strategy, Forest Reference Emissions Level (FREL), and National Forest Monitoring System (NFMS) inclusive of Monitoring Reporting and Verification (MRV) System, Satellite-based Land Management System (SLMS) and Safeguard Information System (SIS).

Pakistan has been implementing REDD+ activities since 2010 to mitigate climate change through reduced carbon emissions from the forestry sector and carbon sequestration. The Ministry of Climate Change (MOCC), Government of Pakistan (GoP), is implementing a REDD+ readiness programme funded by the Forest Carbon Partnership Facility (FCPF) of the World Bank. This Participatory Forest Management Plan (PFMP) of Chinari Forest Area Hattian Forests Division has been developed under this REDD+ Readiness Programme.

Within the prevailing socio-economic setting, the Government of Azad Jammu and Kashmir (GoAJ&K) is making modest efforts to create REDD+ enabling environment by reforming the existing institutional structures, awareness raising and capacity building of the partners, preparation, and implementation of PFMP of the two pilot sites, review of policies, laws, and regulations of all the sectors concerned, prior to entering into pilot and full-scale REDD+ Program implementation the State.

The PFMP is meant to demonstrate integration and implementation of REDD+ interventions with forest management in Chinari Forest. The Plan has been developed with extensive professional input from experts of various sectors linked with the climate change mitigation and adaptation and in consultation with the forest dependent/ beneficiary communities.

The PFMPs translate REDD+ concepts and processes at practical level considering complex socio-economic conditions, burden of rights/ concessions, as well as obligations in the forest. This is the reason that in addition to forest stock assessment, the preparation of PFMPs required a detailed assessment of the roles and rights of stakeholders in forest management and revenues so that trade-offs become clearer for redressal and communities are not deprived of their legitimate access to forest for their livelihoods. The core thrust of PFMPs in REDD+ perspective is to find contextually relevant options to address drivers of deforestation and forest degradation and to mitigate local and global climate change adverse impacts. REDD+ program also provides mechanisms for the enhancement, measurement, and trade of forest Carbon.

It is expected that the implementation of the PFMP will enable the stakeholders of Chinari Forest, to trade Carbon Credits in the national and international markets in the foreseeable future, like any other product, by increasing and maintaining the forest Carbon stock. The PFMP will thus act as a road map for implementation, monitoring, reporting and verification of forestry resources improvement and distribution of benefits among the stakeholders.

A budget forecast to implement activities identified is also provided. The planned activity packages include but not limited to; 1) Restoration of Forestry Ecosystems, 2) Introduction of Pasture and Rangeland Management, 3) Social Mobilization for Planning and Implementing REDD+ Support Interventions 4) Sustainable Livelihood Generation, 5) Promotion of Wood Alternative and Energy Conservation, and 6) Human and Institutional Capacity Development, for successful implementation of current Readiness Phase and the full-scale implementation of REDD+ Program in AJ&K.

1.2 Objectives of PFMP

The specific objectives of this plan are as under:

1. To promote sustainable Forest management in Chinari Forests.
2. To protect, improve forest health and enhance Carbon stocks in Chinari Forests while addressing drivers of deforestation and forest degradation
3. To enable the Chinari Forest community and Forest Department staff to manage forests jointly and efficiently for multiple uses.

1.3 Methodology

A multi-disciplinary team consisting of two Participatory Forest Management experts, a sociologist, a GIS specialist, two Range Forest Officers, two Forest Guards and three community representatives (nominated by the community) collected data for preparation of the management plan.

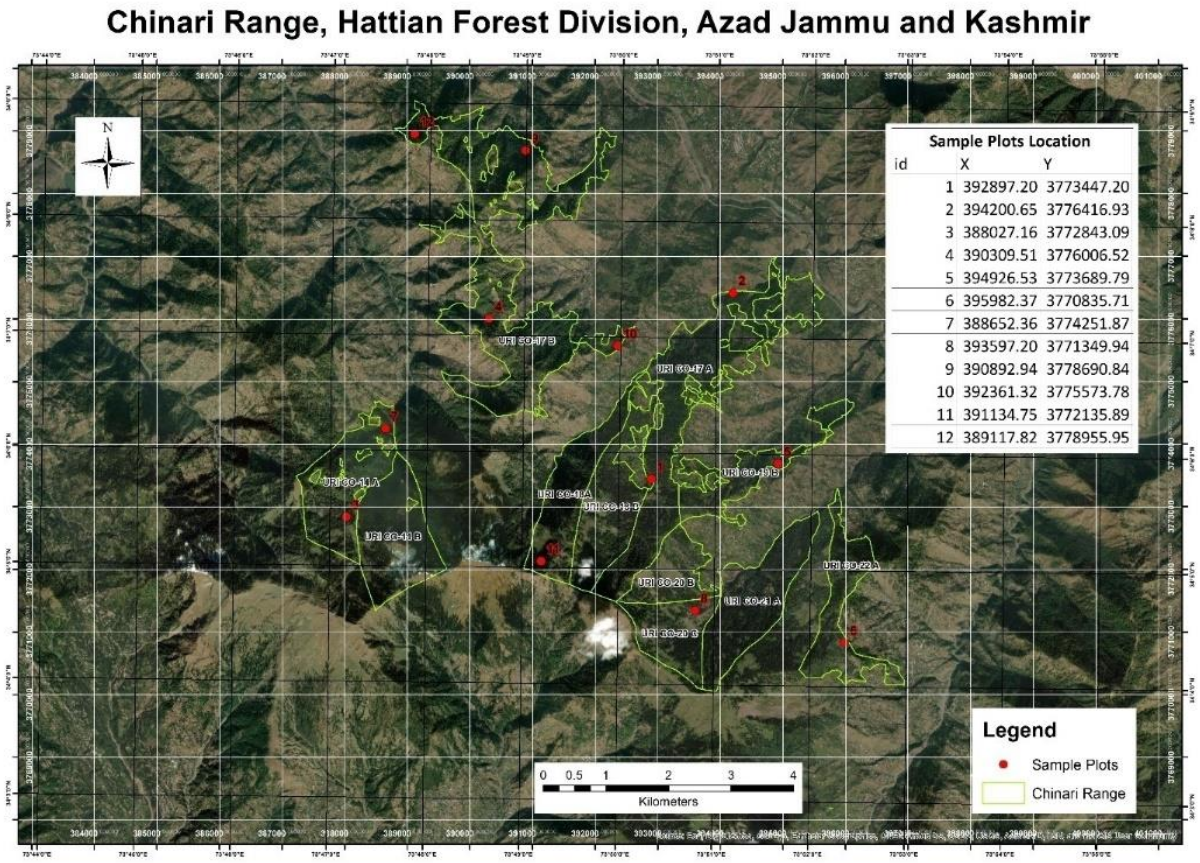
The overall methodology for preparation of the plan has been guided by PFMP Manual (version 1.0, 2021) for practitioners prepared under Forest Carbon Partnership Facility (FPCF) of the Ministry of Climate Change (MOCC), Islamabad. A multi-layered methodology was adapted for the preparation of PFMP, which includes the following steps:

i. Selection of site in light of the REDD+ guidelines and procedure. Chinari forests was one of the two potential sites selected for preparation of PFMP.
ii. Participatory data collection. Local community of Chinari participated in providing socio-economic data and sharing details on forest-community interaction., They also participated in collecting forest resource assessment data. They also participated in identifying forest management activities and implementation mechanism. Under the Free Prior Informed Consent (FPIC), the community was briefed on relevant concepts, causes and effects of activities. They participated in identifying drivers of deforestation and forest degradation and demand of timber and firewood. The solutions to problems and demands of community were translated into interventions in prioritised order and listed. The exercise was conducted through PRA using spot observations, Focused Group discussion, mapping, semi structure interviews, transect walk and ranking.
iii. Participator Forest Inventory was conducted to collect data from 10 sample plots selected in Chinari Forests. The location of sample plots is provided in following map (**Figure 1**). The sample plots were chosen through stratified random sampling among each forest stratum. The soil, topography, water availability, and status of vegetation vary spatially within a land-use category and the overall area proposed for the site. Trees, biomass stock, and growth rate are not distributed uniformly in a site. Therefore, a sampling design is followed for locating the sample plots in each of the selected forest strata. The location of sampling plots could determine the biomass stock or growth rate estimates. Based on forest type and forest density, three forest stratum (>70%, 40%-70%, 10%-40% tree canopy cover) were formed to carry out the systematic stratified sample on the map.
iv. Sample points were nested circular plots of 17.64 m, 5.64 m, and 0.56 m radius. All living trees and standing dead woods with DBH above 5cm, and stumps were measured from the full plot of 17.84 meters (~1000 m^2). Fallen trees and stumps, dead wood with diameter above 5cm

were also recorded from the plot. The plot included two subplots; 5.64 meters (~100 m^2) for collecting data of seedlings and shrubs and 0.56-meter plots (~1 m^2) for data on litter, leaves, grasses, etc. From a plot of 5.64 m, all seedlings were counted, and shrubs were cut down and fresh weight of the sample was recorded. This sample was clipped and collected in the bags to find out oven dried biomass in the lab. The above-ground non-tree biomass including leaves, litter, grasses, etc. collected from 0.56 m radius sub-plot and weighed. Soil organic carbon values were taken from the national forest inventory, carried out in 2018. The data from these samples was analysed for estimation of carbon stock. The coordinates of each sample plot were noted, and fixed-point photos were taken during the inventory

v. Data analysis and development of PFMP: The data were analysed, GIS map prepared and put together in the form of PFMP with a 10-year perspective including an annual forestry operational plan.
vi. The plan was reviewed individually, jointly and sent to experts for peer review. The plan was sent for endorsement by the AJK Forest Department and relevant community.

Figure 1. Location of sample plot



1.4 Policy Alignment

The objectives of this local PFMP are aligned with the following provincial, national, and global policies/strategies/commitments related to REDD+;

1.4.1 Global Commitment:

"Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+), is an essential part of the global efforts to mitigate climate change" (FAO, 2021).

1.4.2 National Policies/ Commitments:

Pakistan's report on intended Nationally Determined Contributions (NDCs) seeks 20% reduction of the current national Green House Gas (GHG) emissions (GoP, 2017). The National Climate Change Policy (NCCP) 2012 under Section 4.4 on Forestry Sector, states that the climate change is likely to have multi-faceted adverse effects on the ecosystem as a whole, particularly on the already vulnerable forestry sector in Pakistan. Mitigations in the forestry sector entail restoration of Pakistan's forests through sustainable forest management, with particular focus on how these are affected by climate change. This will not only benefit the State forests but forest dependent communities and the whole society in general. The most likely impacts of climate change will be decreased productivity, changes in species composition, reduced forest cover, unfavourable conditions for biodiversity, higher flood risks and the like, as portrayed in the Planning Commission Task Force on Climate Change (TFCC) Report (GoP, 2008).

1.4.3 Provincial Policies/ Commitments:

The AJ&K Climate Change Policy 2017, AJ&K Sectoral Action Plan for Climate Change (2019-2030), Strategy for Sustainable Development AJ&K 2018 and Draft AJ&K Forest Policy; call for improvement of the health and condition of forests, acknowledge the role of forests in climate change mitigation and adaptation and most importantly to improve resilience of communities toward disaster risk management and sustainable livelihood generation. The activities mentioned in this PFMP align well with the actions suggested in the policy documents, for managing the State forests and pastures.

2 Participatory Forest Management Planning

The data and information gathered during PFMP survey through, participatory planning with communities were analysed, results compiled, and interventions identified **(Annex 1, data)**.
The results are presented in this chapter.

2.1 Ecological

2.1.1 Location

Hattian Forest Division comprises of three ranges, namely Karnah, Uri and Chakar. Uri Range has been divided in to three blocks, Uri, Kathai and Chakar. Uri block (DFA Chinari) has been selected as one of AJ&K pilot site DFA for implementing REDD+ interventions as demonstration. The total area of DFA Chinari Forest selected for demonstration of REDD+ is 148.25 sq. Km. located at centre Latitude 73.8286N and centre Longitude 34.1007E.

Figure 2. Location Map of DFA Chinari Forest, AJK

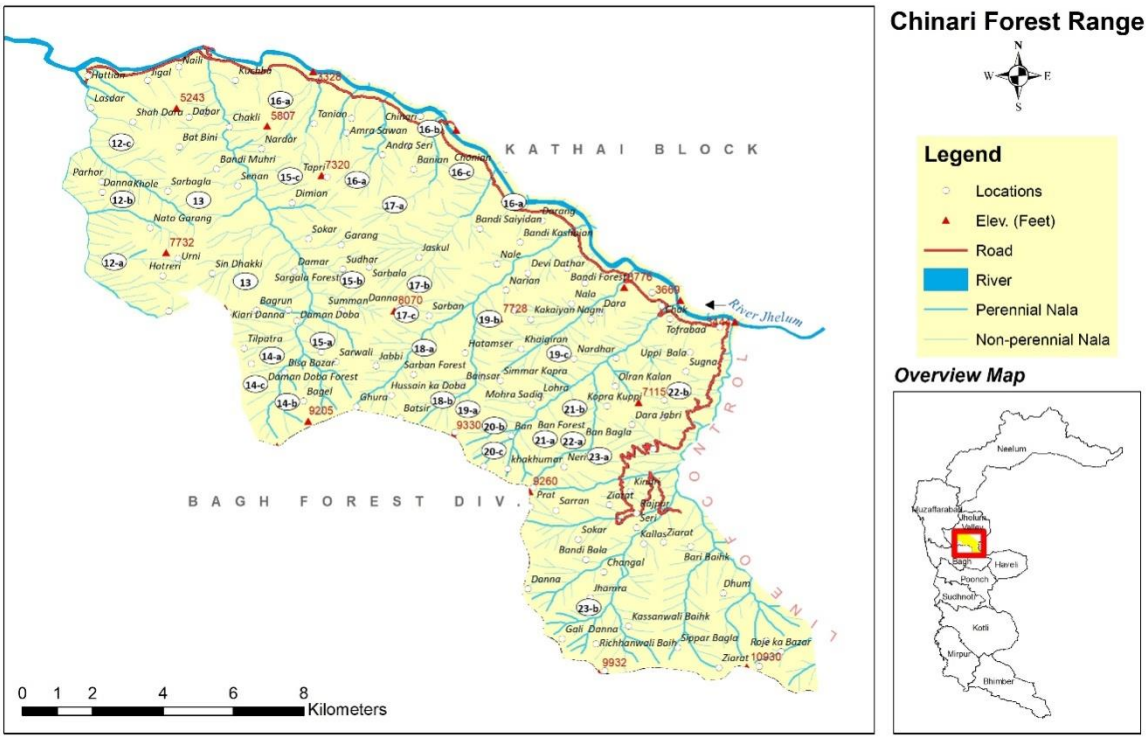
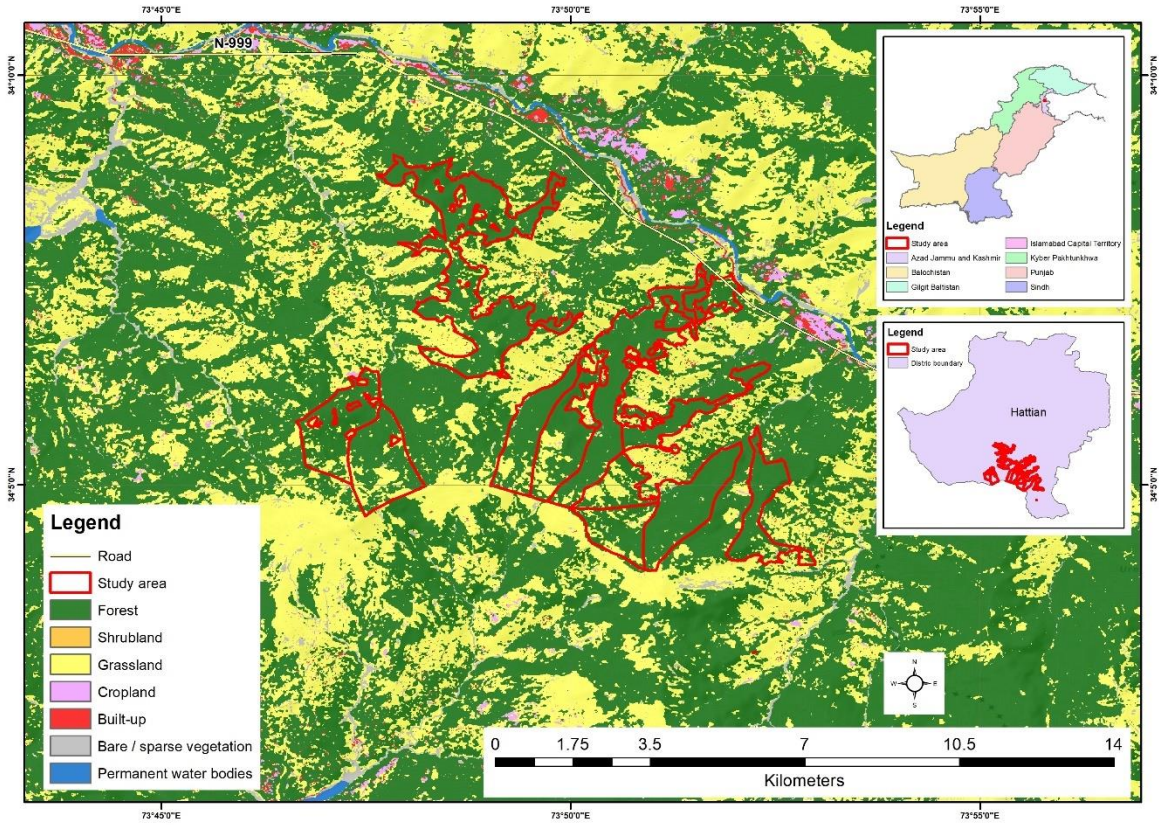


Figure 2 (a): Land Cover Map of DFA Chinari Forest, AJK



2.1.2 Site description

The forests are the property of the State and are under the control of the Forest Department. The pilot area starts from Chattian on left bank of Jhelum River and extends beyond the village Khilana at 40th Km up-stream. The last point of this area is Kandri along LOC. On southern side Kaffar Khen of district Bagh. The track dealt with is mountainous with narrow valleys. Elevation of DFA Chinari Forest ranges between 1,136 – 2,937 meters above sea level (asl) with Tropical Chir Pine Forests at lower elevations and moist Temperate Forests at higher elevations. The gradient is generally steep to precipitous, while moderate slopes are also met with. The slopes along nullahs are invariably very steep. Aspects are very much variable due to formation of side valleys by the spurs originating from the main hill range but mainly occupy northern aspect.

The land cover of the PFMP site is dominantly forest with few grasslands. Areas selected for PFMP are designated forest areas and the areas outside the PFMP boundaries are mostly grasslands and are not under the management of the Forests department.

2.1.3 Climate

In general, the climate is Sub-tropical at foothills, Moist Temperate at middle altitude, Sub-alpine and Alpine at higher altitude. Summer Monsoons are common throughout the area and are followed by dry months of October and November. Snowfall starts on high elevations by about mid-November and descends to forest belt by the end of December. The snowfall, which usually terminates by the end of February, sometime extends up to as late as April in the higher elevations. The thaw sets in by early April and is at its peak by the middle of May. As a result of wide range of altitudinal variations, different climatic conditions prevail in the area. These, in turn, generate certain microclimatic conditions based on aspect and other locality factors. Frost is of common occurrence and starts by mid-November, it is severe in December and January.

The nearest observatory of Pakistan Meteorological department is located at Hattian Town (altitude 3200 feet MSL). The detailed climatic data is available for the DFA, which reveal that May, June and November are dry months, while drought prevails during December. July and August receive the maximum rainfall with annual aver of 997 mm.

There is rapid rise in temperature from February to June, with the start of Monsoon there is steady decrease up to the month of September. After this a marked drop in temperature occurs. The highest maximum and the lowest minimum temperatures recorded are in May and in January. The humidity is at the lowest during the period from April to June. It abruptly rises with commencement of the Monsoon season in July and August.

2.1.4 Species and forest type

The general vegetation types encountered in pilot area can be broadly classified as follows;

1) Sub-tropical Chir Pine Forests
2) Mixed Coniferous Forests/Moist Temperate Forests
3) Sub-Alpine / Alpine Scrubs and Pastures

Sub-tropical Chir pine forest/Moist temperate Forests: At foothills Chir Pine (*Pinusroxburghii*) mingles with Blue Pine (*Pinus wallichiana*) and Oaks (*Quercus incana* and *Quercus dilatata*). The Chir Pine extends to higher elevation on the slopes facing Southern/ hotter aspect and on exposed spurs and ridges but has generally dropped out by 6,000 feet asl. Chir Pine occurs in pure patches at the lower elevations and hotter aspects. The crop is generally of fair density, except at its lower limits near habitations and where it occurs on very steep to precipitous slopes.

Mixed Coniferous Forests/Moist Temperate Forests mainly consist of *Pinus wallichiana and Abies pindrow with Populus ciliata along the streams and nullahs at higher elevations and on the northern aspects.*

Sub-Alpine /Alpine pastures generally occupy over 10,500 feet asl. The transition belt is the mixed Coniferous forests with Alpine vegetation, which is marked by occurrence of trees in scattered groups of Birch (*Betula utilis*) with other shrubs growth of *Juniperus* spp. and *Salix* spp. However, this belt has invariably been destroyed by the activities of summer graziers, with thousands of livestock, who migrate to these and find the Birch a convenient source of fuel. Occasional avalanche tracks have cut across this transition belt and brought down the alpine vegetation below the forest line. The common shrubs are *Juniperus* spp., *Salix* spp., and *Rhododendron arborum*. Ground flora consists of *Anemone* spp., *Artemisia* spp., *Primula* spp., *Euphorbia* spp., *Saxifraga* spp., *Aconitum* spp., *Chenopodium* spp., *Polygonum* spp., *Digitalis purporia*. The upper reaches of most compartments of the pilot site are potential rangelands.

2.2 Socio-economic data

Socio-economic data of the site was collected during Focus Group Discussions and key informant interviews (**Annex 1**). Summary of data is explained in this section:

Socio-economic data of the Chinari was collected during Focus Group Discussion and key informant interviews. Summary of the data is given in **table 1** which is explained below under major headings.

2.2.1 Demography

According to Population Census 2017, (projected 2019) the human population of the DFA Chinari is 61637, with the average growth rate of 1.91 per annum. In segregated terms, the population comprises of 49% male and 51% female. The household average size is 6 family members.

The village settlements in the DFA Chinari are called dhoks/ sub-hamlets and may consist of several rakbas, or smaller clusters of houses/ hamlets, which may be a mohalla in the plains. For administrative purposes, a group of approximately 500 households makes up a revenue village. This can be geographically a fairly vast area as it may take up 15 minutes to walk from one house to the other on an average basis. A rakba is anything from 70 to 150 households and is the functional unit for development implementation.

In the DFA overall, there are no clearly dominant ethnic groups, although certain groups may be numerically dominant in a specific area. The main tribes that constitute the population of the area are Gujars, Syeds, Kashmiris, Moghals, Awans, Mirs and Rajputs. The most commonly spoken dialect, all over the area is Pahari. Kashmiri language is also spoken in Kashmiri families.

The religion plays an important role in everyday life, and religious leaders participate in development related decision-making. The clergy and religious groups are represented in the village body of elders. The elders' group in each village is an important focus for gathering and meeting. The people generally believe much in their customs and are governed by a set rules of customs from cradle to graveyards.

2.2.2 Health and education

All Union Councils of the DFA have high schools for girls and boys. All village have middle and primary schools for girls and boys. As a result of this substantial investment, AJ&K's literacy rate is 76.8 % which is significantly higher than the national average of 62.3 %. At present the gross enrolment rate at primary level is 98% for boys and 89% for girls (between the ages of 5-9). In Hattian tertiary care health facilities are located; e.g., DHQ Hospital. All villages have basic health units or rural health centres.

2.2.3 Livelihoods sources

The mainstay of DFA Chinari local economy is agriculture, livestock, forest, and daily wage employment. Due to small land holding and subsistence agriculture majority of the people are employed in big cities of Pakistan and overseas. The macro-economic setting of AJK brings into focus the importance of the agriculture sector which at present predominantly depends on rain-fed agriculture with only an insignificant contribution from land irrigated by means of small diversion channels to irrigate paddy fields. Land holdings are small and fragmented. Out of the total household average income, 10-18% comes from crop production and 16-40% from livestock, while an average of 60% is from off-farm wages.

On an average livestock consists of 2 and 1 heads per household for small ruminants and cattle/buffalo, respectively. Livestock is kept either to supplement agricultural income or as primary source of livelihood. The malnutrition coupled with poor quality of livestock result into low livestock productivity, low high quality protein availability and rural poverty.

The farming communities depend on sub marginal agriculture and livestock rearing for their subsistence. The high pressure of population on land has led to very small landholdings, which is roughly 0.457 Ha. About 51% of the farmland area is cultivated while the remaining 49% is used as grasslands. Ten percent of the total area under farmland, which is now set aside as grassland, is classified as culture-able waste. Although a vast majority of the farms are owner operated (72%), some farms are jointly managed by the owners and tenants (25%), and only 3% are totally tenant operated. The farm areas comprising slopes where grass is available, are generally utilized for grazing cattle. Wheat, Rice, and Maize are the staple food of the people. Fruit trees are also raised along the cultivated fields. Due to subsistence agriculture, livestock production is integrated with crops. There exist vast potentials of fruit orchards and vegetable cultivation in the DFA Chinari.

2.2.4 Dependence on forests

The entire population of the area depends on forests for meeting their demand of timber, fuel wood, grazing and grass cutting. Timber is still used for construction of houses. The local communities have traditional rights in terms of use of the forests. Daily and unrestricted grazing is allowed throughout the tract, the grass is cut from the nearby forest and private range areas to be stall fed to the livestock during the winter months. Over grazing and trampling leave no chance for the natural regeneration of forests and rejuvenation of pastures.

2.2.5 Forest rights

Forest concessions are granted to Zamindars (those who cultivate the land as landowners, Assamis or tenants) as well as the traditional artisan groups that reside and are employed permanently in villages that lie within five km of the demarcated forest boundary. The concessions are for agricultural and domestic purposes and not for sale, barter, or transfer in any way. They are also subject to the availability of trees, keeping forest conservation in due regard. The concessions include (Source; Forests Law Manual):

- The right to graze livestock and to cut grass;
- To pass livestock freely through the forests;
- Timber for house building and repairing at 12.5 percent of standard rates; zamindars living 5-8 km from the forest boundary are allowed timber at 50 percent of the standard rates;
- Fallen and dead trees are free; and free grants of timber if the house is destroyed by fire or natural disasters;
- Free firewood for domestic use; timber for public use such as building bridges;
- Lopping of branches no thicker than a man's wrist;
- Free access to brush wood.

2.2.6 Changes in forests over time

Forests productivity has gone down over the last thirty years. Forest cover has thinned and reduced. Soil erosion and landslides are common phenomena. Forestry concessions find it more and more hard to benefit from the forest. Exciting wildlife species are scarce and livelihoods from forests are diminishing. The main reason for this degradation is pressure of increasing population demands for firewood and timber. Overgrazing, bushfires, road construction, joblessness and poverty are the main causes of forests degradation.

Forests Department in implementing development projects, also communities have become vigilant to conserve natural resources. Reforestation and watershed projects did good development works. According to the local forest department, the main challenges with respect to forest management include:

- Demographic pressure for fuel and construction timber
- Lack of natural regeneration due to the indiscriminate overgrazing of forests, pastures, and community grasslands;
- Encroachments on forestland for housing and other properties;
- Rural road construction;
- Frequent forests fires which kill natural regeneration;
- The ever-increasing burden of forest concessions on the nearby forests, beyond their sustainable rejuvenation capacity, and;
- Illicit cutting of trees from public forests for personal gains.
- Biomass productivity of rangelands has gone down to almost 35%;
- There is no rest period for flowering and seeding for good fodder and forage species;
- No range rehabilitation or development program is under implementation, and;
- No credible database on range carrying capacity and current status.

At the moment two major projects are implemented in this site: Ten Billion Tree Afforestation Project, and Demarcation of Forests Boundaries.

2.2.7 Stakeholders

Stakeholder analysis is given in **Annex 2** and description of the main stakeholders is given below
During collection of socioeconomic data, stakeholder analysis was conducted to acquire information about major actors, and their interests and influences on forest resources utilization, management, or restoration.

Major stakeholders include the beneficiary communities/ concessionists, transhumant grazers, departments of Forest, Agriculture, Irrigation, Livestock, Mineral, Tourism, Wildlife and Fisheries, Revenue Land Use Planning Cell, Environment Protection Agency and NGOs/ INGOs. The stakeholders identified were categorized as primary and secondary based on the level of their participation and partnership in social, technical, financial, and legal aspects of forest management and REDD+. Interests and influences of the direct and indirect stakeholders, with respect to forest management of Lachrat us given in the table.

A. Community Institutions

Participating VCOs; Beneficiary Communities/ Forest Concessioners: Govt. of AJK has covered whole AJK under a VCOs network by implementing series of the rural development project, with donors' and local ADP's funding. Heads of these VCOs from Chinary DFA were invited to participate in FFMP DFA Chinary planning consultation. They were suggested to organize into VCOs' apex body on *ad hoc* basis for REDD+ Program planning and inception, would be formalized into Chinary Conservation VCO Board on inception of RDD+ Program. They agreed and participated in the planning of PFMP DFA Chinary.

Joint or collaborative management is not possible if the rural communities remain unorganized. Therefore, an essential pre-requisite is to nurture grassroots institutions, and enhance their management and technical skills on the pattern of various rural support programs. As a first step, this process should involve rural communities within the 4.8 KM radius of the demarcated forests. These communities tend to protect forests hence cooperate with FD generally. They are supportive, while retaining concessionary rights. Their interests include but are not limited to; wood/ timber, forage and grazing domestic animals, besides other economic products. VCOs would have to be engaged with implementation of participatory planned intervention packages i.e., joint forest management of DFA Chinary, biodiversity conservation and Carbon sequestration. The VCOs that fail to discharge their duties may be debarred from forest concessions and those who do well may be rewarded by a share from the revenues of forest Carbon sequestration that takes place in the forests of which they act as the custodians.

Jirga and conflict resolution: There is no traditional Jirga for settlement of forest disputes. Jirga in each village is formed by a loose assembly of respectable elderly men who have a proven track record of problem solving and consensus building ability amongst the communities. Jirga members are not necessarily the ones that were chosen to represent sections of the community with outsiders. Qualities such as concern for the community, fairness, honesty, honour, and integrity are considered more important than outside exposure and social contacts. On the knowledge of local forestry staff Jirga Members were invited in the consultation who willingly participated and contributed.

Disputes also arrive to Forests Department around forest offences. Forest courts and higher judiciary settle forest cases in case of appeal whereas Revenue Department settle land ownership issues. The issues often arrive in the following areas:

- Award of forestland for public infrastructure i.e., governance infrastructure;
- Rural road construction through the forests mostly and consequently land encroachment along roadsides by business enterprises;
- Extensive mining in forests areas;
- Intentional bushfires to convert forests into grassland and for encroachment;

B. **Forest Department**

The REDD Cell is conceived as the key implementation arm for the AJK REDD+ programme. The REDD Cell is housed in the Office of CCF (Territorial), which is the most relevant for REDD+ Program. The REDD Cell will be headed by the CCF (Territorial) and coordinated by REDD+ Focal Person. It will be responsible for coordination of all REDD+ activities in the State. The REDD + Focal Person will therefore be directly accountable to the CCF (Territorial). However, the REDD Cell will receive its strategic direction from the REDD+ SC. Terms of reference for the REDD+ Cell are as follows:

- Preparation of recommendation for policy and technical decision;
- Site selection for REDD+ projects;
- Coordinate carbon inventory and reporting through involving MoCC;
- Coordinate MRV operation;
- Resolve legal and policy issues;
- Oversee preparation of project for carbon inventory;
- Endorse research and development of REDD+ related activities done by various agencies;
- Operate REDD register and keep records of REDD+ related activities;
- Keeping liaison with other national and international agencies.

2.2.8 Stakeholder analysis

The stakeholder analysis was conducted to acquire information about major actors, and their interest and influence on forest resources utilization, management, or restoration (**Table 1**). The interest and influence explored through stakeholder analysis indicate who is doing what in managing forest and who has the legal rights in the forest. The stakeholders identified were categorized as primary and secondary based on the level of their participation and partnership in social, technical, financial, and legal aspects of forest management and REDD+.

Forest, Wildlife & Fisheries Departments and Land Use Planning Cell along with NGOs and development organizations are the major players with greater interest and influence in forest management. Beneficiary communities have low interest but high influence on forest management along with various government departments like livestock, tourism departments etc. Transhumant graziers are neglected players with a high interest but little influence on forest management due to their nomadic lifestyles.

Table 1 Interest influence matrix of Forest Management and Carbon pools

	Neglected players: Need special attention to safeguard their interests	**Major players:** Need to be fully involved
INTEREST High Score 2 and 3	Transhumant Graziers (Bakarwals)	Forest Department Wildlife & Fisheries Department (W&FD) AJK Environment Protection Agency Land Use Planning Cell (LUPC) P&DD NGOs/ INGOs, Development/conservation agencies, (e.g., IUCN, WWF, Wildlife Foundation) and rural support programs
	Marginal players Low priority	**Risk factors** Need to be addressed
INTERST Low Score 0 and 1		Beneficiary Communities / Concessioners The Political Government Tourism Department Livestock/ Animal Husbandry Department Irrigation & Small Dams Department Revenue Department
	INFLUENCE Low Score 0 and 1	**INFLUENCE High** Score 2 and 3

2.3 Analysis of drivers of deforestation, forest degradation and barriers to enhancement

In Chinari Forests the major **drivers of deforestation** are:

1) Influential people **steal away trees** from public forests for personal gains;
2) Dense population, land hunger and resource scarcity, and **encroachment** on forest land by adjacent communities

In Chinari Forests the major **drivers of forest degradation** are:

1) Harsh weather conditions in the upper reaches of forests put pressure on forests for **firewood** for heating and cooking
2) With environmental degradation, the tree **diseases and pest attacks** are on increase;

In Chinari Forest major **barriers to forest enhancement** include:

1) **Forest fires** sweep across Sub-tropical Chir Pine forests each year during the hot summer season and moist temperate forests during the drought periods, no comprehensive bush fire preventive mechanism is in place on a permanent basis. There is repeated occurrence of bush fire incidents.
2) **Livestock grazing** is a major barrier to forest enhancement particularly in the regeneration areas.

2.4 Carbon stock assessment of Chinari Forests

This part of field survey was conducted in August 2021 to collect data from 10 sample plots selected in Chinari Forest. The location of sample plots is provided in following map (Figure 2). At the observation points, sample plots were nested circular plots of 17.64 m, 5.64 m, and 0.56 m radius. All

living trees and standing dead woods with DBH above 5cm and stumps were measured from the full plot of 17.84 meters (~1000 m^2). Fallen trees and stumps, dead wood with diameter above 5cm were also recorded from 17.84-meter plot. The plot included two subplots; 5.64 meters (~100 m^2) for collecting data of seedlings and shrubs and 0.56-meter plots (~1 m2) for data on litter, leaves, grasses, etc. From a plot of 5.64 m, all seedlings were counted, and shrubs were cut down and fresh weight of the sample was recorded, collected the sample in bags to find the oven dried biomass in the lab. The above-ground non-tree biomass including leaves, litter, grasses, etc. was collected from 0.56 m radius sub-plot and weighed and soil organic carbon values are taken from the national forest inventory, which was carried out in 2018 as the time required to detect a significant change in soil organic carbon is generally more than 10 years. The data from these samples was analysed for estimation of carbon stock (table 5). The coordinates of each sample plot were noted, and fixed-point photos taken during the inventory.

2.4.1 Plot level Carbon Stock Estimation

Based on the field data carbon stock (tons per hectares) for Above Ground Carbon (AGB) and Below Ground Carbon (BGB) was worked out using the standard sets for tree species, tree DBH and height, and dry biomass of shrubs and litter (**Table 2**). The tree species level carbon stock is given in Annex 1. Based on this data individual plots level carbon stock values are given in table 5. The estimated stock of carbon per hectares (ha) was then used to estimate the total carbon stock in the selected site of Chinary Forest.

Table 2.Plot level above and below ground carbon stock

Plot no.	Average of AGC (ton/ha)	Average of BGC (ton/ha)
1	2.897888077	0.724472019
2	0.71162647	0.177906618
3	5.535051875	1.383762969
4	8.939506074	2.234876519
5	20.72997814	5.182494534
6	8.337326415	2.084331604
7	5.151592879	1.28789822
8	7.735209069	1.933802267
9	3.544699885	0.886174971
10	5.933576536	1.483394134
Average	**6.006819498**	**1.501704875**

2.4.2 Forest Cover Assessment

The change in forest cover was assessed by using Landsat multispectral 30m spatial resolution satellite images on the path (150) and row (36) and google Earth Engine Cloud Computing platform for the classification of forest cover by applying Random Forest Machine Learning Algorithm. The analysis indicates decrease of 2.16 ha in forest cover in the past 10 years at an average rate of 0.22 hectare (ha) per year (**Table 3**).

Table 3. Forest cover assessment (2010 -2020)

No	Landsat Satellite Sensor	Landsat data acquisition	Forest Cover (ha)
1	Landsat-8	2020-10-19	2268.18
2	Landsat-5	2010-11-09	2266.02
Change in Forest Cover in last 10 years			-2.16
Per year change in forest cover			-0.22

Table 4 provides **three scenarios** of forest cover in the coming ten years that can be followed:

1. Add 50% forest cover in addition to reversing the current average annual reduction of 0.22 ha.
2. Add 100% forest cover in addition to reversing the current average annual reduction of 0.22 ha.
3. Add 150% forest cover in addition to reversing the current average annual reduction of 0.22 ha.

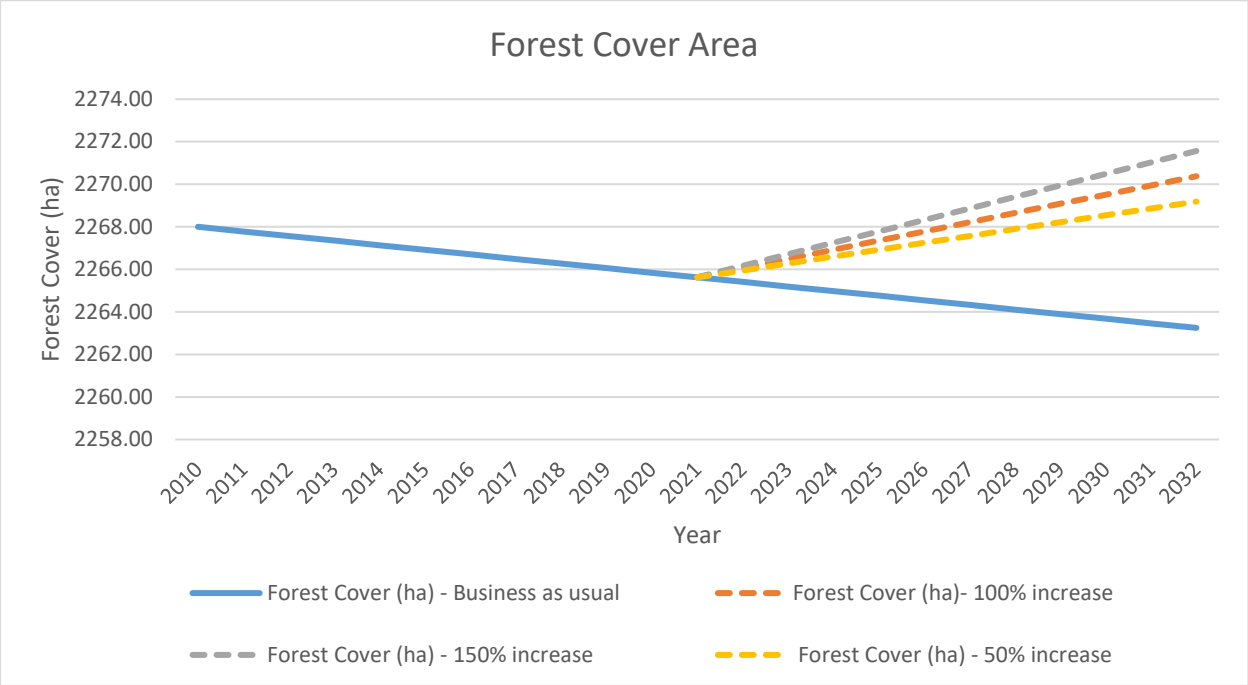
The above scenarios mean that for the forest cover to recover from the current annual loss of 0.22 ha (as observed in the last 10 years) and enhancing it by 50%,6 ha of forest cover would be required to be added in 10 years, which will increase the forest cover to 2269 ha instead of2263 ha in the business-as-usual scenario. Similarly, in 100% and 150% scenarios the total increase in forest cover would be 7 ha and 8 ha which will extend the forest cover to 2270 ha and 2271 ha respectively.

Table 4: Forest Cover Scenarios based on trend in the past 10 years

Rate of change per year	-0.22	-0.11	-0.22	-0.32
Year	**Forest Cover (ha) - Business as usual**	**Forest Cover (ha) - 50% increase**	**Forest Cover (ha)- 100% increase**	**Forest Cover (ha) - 150% increase**
2010	2268.00			
2011	2267.78			
2012	2267.57			
2013	2267.35			
2014	2267.14			
2015	2266.92			
2016	2266.70			
2017	2266.49			
2018	2266.27			
2019	2266.06			
2020	2265.84			
2021	2265.62	2265.62	2265.62	2265.62
2022	2265.41	2265.95	2266.06	2266.16
2023	2265.19	2266.27	2266.49	2266.70
2024	2264.98	2266.60	2266.92	2267.24
2025	2264.76	2266.92	2267.35	2267.78
2026	2264.54	2267.24	2267.78	2268.32
2027	2264.33	2267.57	2268.22	2268.86
2028	2264.11	2267.89	2268.65	2269.40
2029	2263.90	2268.22	2269.08	2269.94
2030	2263.68	2268.54	2269.51	2270.48
2031	2263.46	2268.86	2269.94	2271.02
2032	2263.25	2269.19	2270.38	2271.56

These scenarios are presented visually in **Figure 3** (Forest cover Scenarios).

Figure 3: Forest Cover Scenarios



2.4.3 Carbon stock estimation and CO_2 emissions

The field data and biomass collected from 10 samples was used to calculate Above Ground Biomass (AGB) using locally developed allometric equations (Khan et al., 2021) for 2010-2021 (**Table 5**). In Chinary forest, the cumulative carbon stock in three carbon pools (above, below and soil) was estimated to as 99,970 tonnes back in 2010 which decreased to 98,138tonnes in 2020. This change corresponds to the decrease in forest cover from 2268 ha in 2010 to 2266 ha in year 2020 causing CO_2 emissions at the rate of 672 tonnes of CO_2 eq. per annum (see figure 4 and table 5).

Figure 4: Forest Cover Maps used for Change Analysis

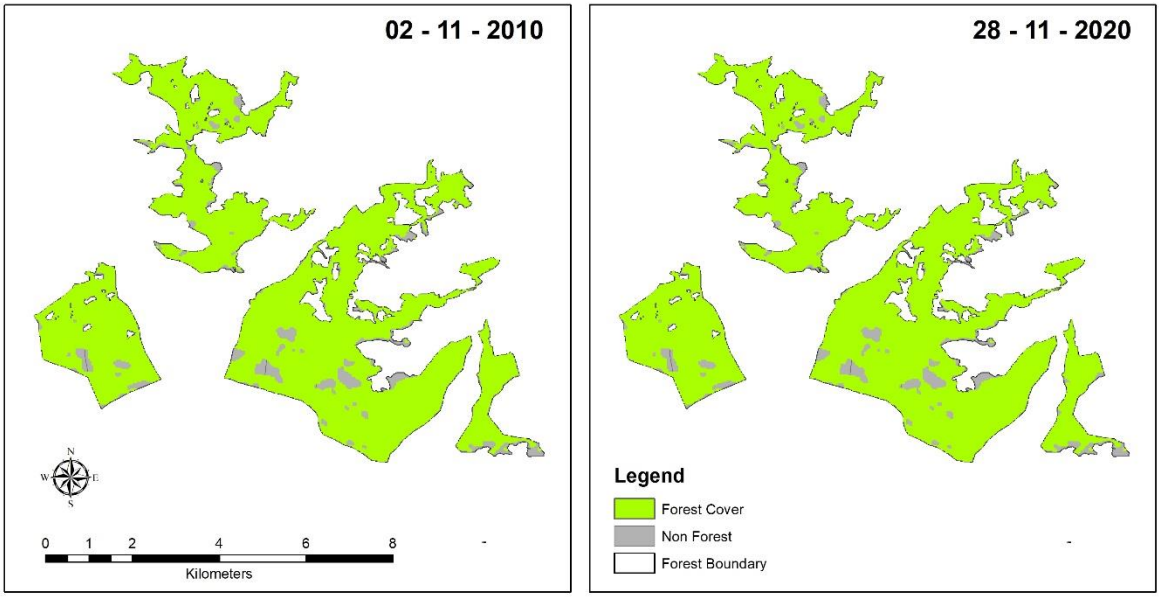


Table 5. Carbon stock estimation (2010-2020)

Carbon pool	Mean carbon stock (ton C stock per hectare)	Forest Cover (ha)	Total stock (ton C stock)	CO_2 (tonnes CO_2 eq)
2010 (2010-Nov-02)				
Above	6.01	2268	13,624.55	
Below	1.50		3,406.14	
Deadwood	0.67		1,521.70	
Litter	0.10		216.43	
Soil*	35.8		81,200.84	
Cumulative			99970	366,555
2020 (2020-Nov-28)				
Above	6.01	2266	13,611.57	
Below	1.50		3,402.89	
Deadwood	0.67		1,520.25	
Litter	0.10		216.23	
Soil	35.8		81,123.52	
Cumulative			98138	59,839
Rate of change per year				
2020-2010		**- 0.22**	**- 183.17**	**672**

* Soil Carbon Value taken from NRO Inventory

2.4.4 CO_2 emissions reduction Scenarios for deforestation

This section presents the future CO_2 emissions reduction scenarios applying 50%, 100% and 150% reduction to current emissions rate over the past 10 years due to deforestation (As per definition of forest adopted by Pakistan for REDD+).

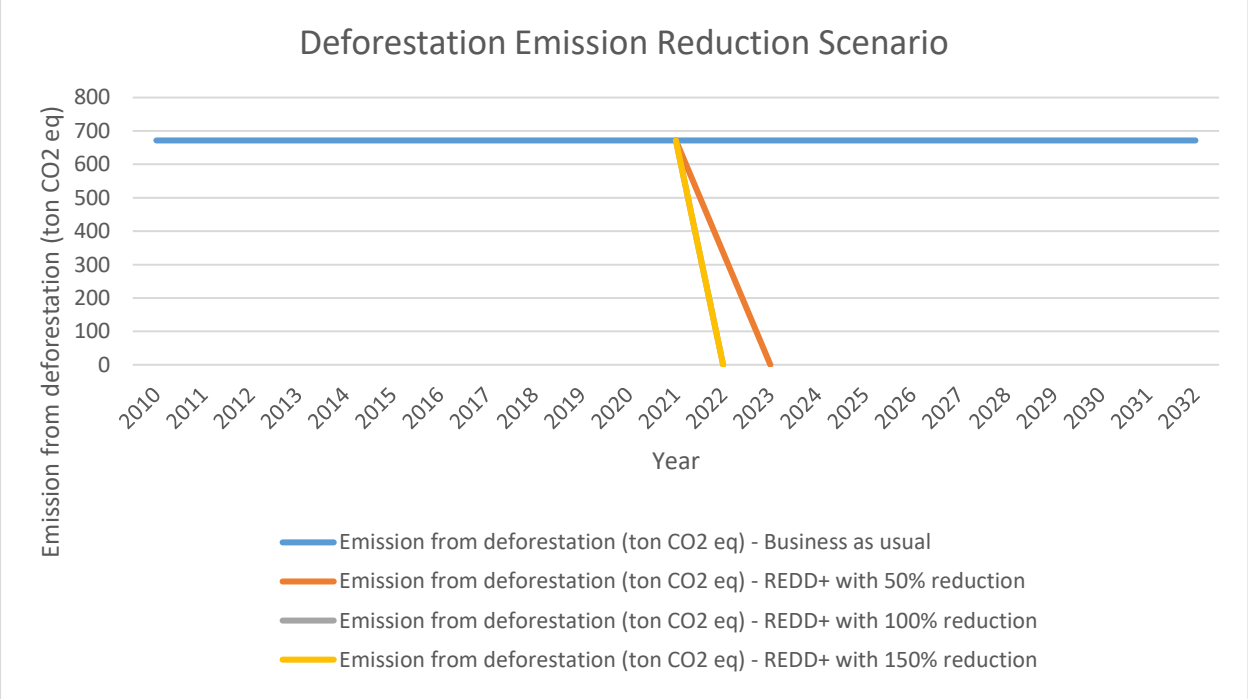
Table 6: Deforestation Emissions trend and Different Emissions reduction scenarios

Rate of change per year	672	-336	-672	-1007
Year	**Emission from deforestation (tonnes CO_2 eq) - Business as usual**	**Emission from deforestation (tonnes CO_2 eq) - REDD+ with 50% reduction**	**Emission from deforestation (tonnes CO_2 eq) - REDD+ with 100% reduction**	**Emission from deforestation (tonnes CO_2 eq) - REDD+ with 150% reduction**
2010	672			
2011	672			
2012	672			
2013	672			
2014	672			
2015	672			
2016	672			
2017	672			
2018	672			
2019	672			
2020	672			
2021	672	672	672	672

2022	672	336	0	0
2023	672	0		
2024	672			
2025	672			
2026	672			
2027	672			
2028	672			
2029	672			
2030	672			
2031	672			
2032	672			

The above table shows that under REDD+ implementation if the deforestation trend is reversed at a rate of 50% then the forest will stop CO_2 emissions due to deforestation by 2023, if the deforestation rate is reduced by 100% and 150% then the deforestation will be controlled after the first year as shown in the figure 5 below.

Figure 5: Emissions reduction scenarios – Deforestation



2.4.5 CO_2 Emissions Trend – forest degradation

Fuelwood and Timber consumption for the pilot site was estimated based on population of the area, population growth rate and per capita fuelwood and timber consumption statistics collected during the field survey. The total population of the pilot site in 2017 was 61,637 with a growth rate of 1.64 per annum. The fuelwood and timber consumption per capita per annum was calculated as 0.364 m^3 and 0.085 m^3, respectively. Based on this data emissions from forest degradation are calculated and presented in the **Table 7**.

Table 7: Forest Degradation Emissions trend

Year	Population	Fuelwood Consumption (FC) (m^3/year)	Timber Consumption (TC) (m3/year)	Fuelwood Emissions[1] (FC*D*BEF2*CF*44/12) (ton CO_2 eq)	Timber Emission (TC*D*BEF2*CF*44/12) (ton CO_2 eq)	Emission from Forest Degradation (ton CO_2 eq) - Business as usual
2010	54900	19984	4666	19424	4536	23960
2011	55815	20317	4744	19748	4611	24359
2012	56746	20655	4823	20077	4688	24765
2013	57692	21000	4904	20412	4767	25178
2014	58654	21350	4986	20752	4846	25598
2015	59632	21706	5069	21098	4927	26025
2016	60626	22068	5153	21450	5009	26459
2017	61637	22436	5239	21808	5092	26900
2018	62648	22804	5325	22165	5176	27341
2019	63675	23178	5412	22529	5261	27790
2020	64720	23558	5501	22898	5347	28245
2021	65781	23944	5591	23274	5435	28709
2022	66860	24337	5683	23656	5524	29179
2023	67956	24736	5776	24043	5615	29658
2024	69071	25142	5871	24438	5707	30144
2025	70203	25554	5967	24839	5800	30639
2026	71355	25973	6065	25246	5895	31141
2027	72525	26399	6165	25660	5992	31652
2028	73714	26832	6266	26081	6090	32171
2029	74923	27272	6368	26508	6190	32699
2030	76152	27719	6473	26943	6292	33235
2031	77401	28174	6579	27385	6395	33780
2032	78670	28636	6687	27834	6500	34334

[1] Wood Density (D)

Pinus roxburghii	*0.43*
Pinus wallichiana	*0.32*
Abies pindrow	*0.42*
Average	*0.39*
Biomass Expansion Factor: BEF2	1.35 (IPCC Table 3A.1.10)
CF = carbon fraction of dry matter	0.5

2.4.6 Net Emissions from Deforestation and Forest Degradation

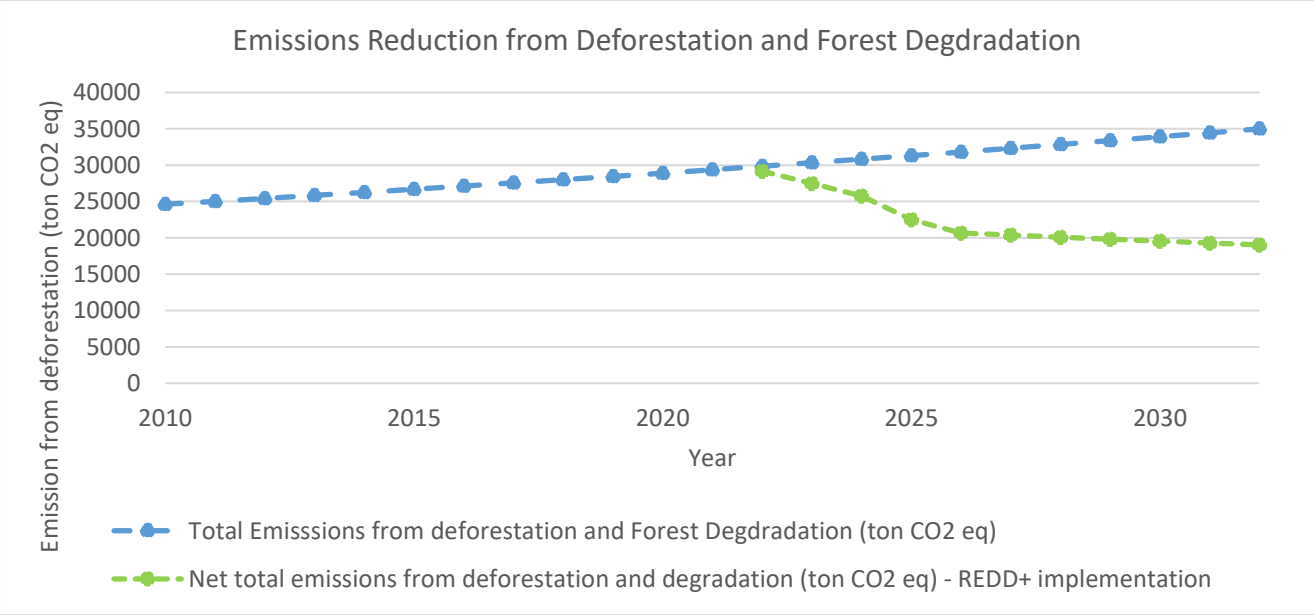
The **table 8** below provides a net CO_2 sequestration scenario based on 100% forest cover enhancement in addition to addressing existing negative trend and reducing emissions from forest degradation in an incremental manner annually from 5% to 25% with REDD+ activity. In this scenario, the net emissions from the forest will start reducing from the onset. Since the deforestation rate is negligible in comparison with the forest degradation, more emphasis is needed to address the pressure for fuelwood and local use timber to enhance the forest carbon pools.

Table 8: Sequestration Scenario from Forest Enhancement and Reducing degradation

Rate of change /year	672					-672	
Year	**Emission from deforestation (tonnes CO_2 eq) -Business as usual**	**Emission from Forest Degradation (tonnes CO_2 eq) - Business as usual**	**Total Emissions from deforestation and Forest Degradation (tonnes CO_2 eq)**	**5-25% Reduction in Degradation emissions**	**Net emissions from degradation**	**Emission from deforestation (tonnes CO_2 eq): REDD+ with 10% reduction**	**Net total emissions: deforestation & degradation (tonnes CO_2eq), REDD+ implementation**
2010	672	23960	24631				
2011	672	24359	25031				
2012	672	24765	25437				
2013	672	25178	25850				
2014	672	25598	26270				
2015	672	26025	26697				
2016	672	26459	27131				
2017	672	26900	27572				
2018	672	27341	28013				
2019	672	27790	28461				
2020	672	28245	28917				
2021	672	28709	29380			672	
2022	672	29179	29851		29179	0	29179
2023	672	29658	30330	1483	28175	-672	27503
2024	672	30144	30816	3014	27130	-1343	25787
2025	672	30639	31310	6128	24511	-2015	22496
2026	672	31141	31813	7785	23356	-2686	20669

Rate of change /year	672					-672	
Year	Emission from deforestation (tonnes CO_2 eq) -Business as usual	Emission from Forest Degradation (tonnes CO_2 eq) - Business as usual	Total Emissions from deforestation and Forest Degradation (tonnes CO_2 eq)	5-25% Reduction in Degradation emissions	Net emissions from degradation	Emission from deforestation (tonnes CO_2 eq): REDD+ with 10% reduction	Net total emissions: deforestation & degradation (tonnes CO_2eq), REDD+ implementation
2027	672	31652	32324	7913	23739	-3358	20381
2028	672	32171	32843	8043	24128	-4030	20099
2029	672	32699	33370	8175	24524	-4701	19823
2030	672	33235	33907	8309	24926	-5373	19553
2031	672	33780	34452	8445	25335	-6045	19290
2032	672	34334	35006	8583	25750	-6716	19034

Figure 6: Sequestration scenarios – Forest Enhancement and Reduced degradation.



3 Proposed Interventions

The following interventions have been identified as a result of a number of consultative meetings with local communities to address the drivers of deforestation and degradation in Chinari forests. In order to achieve effective results for sustainable forest management and incremental Carbon sequestration, the activities required under this PFMP need to cater to the larger Chinari forest related issues. The proposed interventions addressing major drivers of deforestation and degradation have been reflected in the table.

Table 9: Proposed interventions addressing major drivers of deforestation and degradation

Serial Number	Proposed interventions	Major drivers of deforestation and degradation	Remarks
1	Social Mobilization for Planning and Implementing REDD+ Support Interventions under PFMP DFA Chinari	Cutting of Trees for Energy/fuelwood and selling Forest land encroachment	
2	Sustainable Livelihood Generation Interventions for the rural poverty alleviation and incentivizing REDD+ Support Interventions	Timber Smuggling for greed and Profit making Forest land encroachment	
3	Restoration of Pristine Forestry Ecosystems through Recovery of Endangered/ Threatened Flora and Fauna, employing Forest Fire Management, biological, engineering and bio-engineering erosion control measures	Restoration of degraded and deforested areas Manage Forest Fires	Through these interventions, the income of the locals will increase. The burden on forest will be reduced and eliminated.
4	Introduction of Pasture and Rangeland Management, grazing management/controlled grazing and livestock management extension services	Grazing in regeneration areas	These activities will give enough time to regenerate the fodder. Further by artificial insemination improved breed of domestic animals will reduce cattle heads and enhance quality & quantity of products.
5	Promotion of Wood Alternative and Energy Conservation Technologies	Reducing firewood pressure on forest	By empowering locals & their involvement in decision making will resolve this issue.
6	Human and Institutional Capacity Development (HICD)	All drivers	Coordinated efforts by locals will regulate the activities.

Summary of Capital Costs: Summary of the capital costs over 10-Year, for REDD+ Support Interventions under PFMP DFA Chinari, is given in the table blew:

Table 10: Summary of the Capital Costs

S#	Intervention	Justification	Sub-Activity	Unit	Unit Cost (PKR Million)	Quantity	Cost (PKR Million)
1)	Social Mobilization for Planning and Implementing REDD+ Support Interventions under PFMP DFA Chinari	REDD+ Advisory Forum will be constituted; to guide and direct the managers/ stakeholders in implementing REDD+ Support Interventions in the DFA Chinar Pilot Site successfully. The beneficiary communities will be organized/ revamped into VCOs based on the Revenue Villages/ sub-watersheds; dependent on the DFA, to participate in REDD+ Program and meeting their responsibilities. Besides, establishing an apex body of conservation VCOs to nurture grassroots institutions, and enhance their management and technical skills	Mobilization/ revamping of DFA Dependent Village Community Organizations (VCOs) to meet their responsibilities under JFM	# VCO	0.250/FY	8	20.000
			Board of Conservation CVOs: An independent support structure that works closely with the Forest Department would be created to nurture a network of conservation VCOs in a 4.8 KM radius around the high conservation value forests	# Board of CVOs	2.000	1	2.000
			2) REDD+ Advisory Forum, Forest Range Chinari, Hattian Forests Division (Designated Forests Area Chinari / DFA Chinari)	# Forum	0.250/FY	1	2.500
2)	Sustainable Livelihood Generation Interventions for the rural poverty alleviation and incentivizing REDD+ Support Interventions	1) Establishment of Community Enterprises for Processing and Marketing Wild Foods, Vegetables & Fruits, Economic Herbs, Medicinal Plants, and household products etc.	1) Establishing community development enterprises in DFA Chinari through provision of revolving working capital and capacity building training and business linkages	#	0.100	25	2.500
		2) Construction of Forests Tracking Facility across DFA Chinari including interpretation and seasonal camping sites development, with the object of education, research, eco-tourism, awareness raising and community income generation	1) Construction of Forests Tracking Facility across DFA	Lump Sum	10.000	1	10.000
			2) Capacity Building of Communities in Development of Eco-tourism (camp mgt. tourist guide & hospitality)	Lump Sum	0.050/FY	8	4.000

S#	Intervention	Justification	Sub-Activity	Unit	Unit Cost (PKR Million)	Quantity	Cost (PKR Million)
3)	Restoration of Pristine Forestry Ecosystems through Recovery of Endangered/ Threatened Flora and Fauna, employing forest fire management, biological, engineering and bio-engineering erosion control measures	1) Establishment of Forestry Ex-closures for recovery of threatened/ endangered plant species through planting, protection and natural regeneration i.e., support to natural regeneration, for rehabilitation of forestry ecosystems and gene pool conservation	1) Establishment of Forestry Ex-closures on the need-basis for assisted natural regeneration (ANR) and planting of indigenous species	50 Ac Unit	1.5/5-FY	20	30.000
		2) Develop and implement forest Management plans in fire prone areas	1) Forest Fire Management plans developed, necessary firefighting equipment acquired and staff and communities trained in forest fire management.	Fire management plans	37.5	1	37.500
4)	Introduction of Pasture and Rangeland Management, common land grazing management and livestock management extension services	Alpine pastures and degraded forests are being used for free grazing by local communities and nomads, besides; private/ community grasslands and crown land, lack any Management System at the present, need to be brought under some grazing management regime for increasing productivity per unit area, continuous supply of community needs and ecosystem services	1) Establishment of 5 Rotational Grazing Demonstrations (RGDs)	# Demos	0.500	5	2.500
			2) Eradication of obnoxious weeds and reseeding of highly palatable grass species in RDGs	Lump Sum	0.500	5	2.500
			3) Construction of 5 watering points through rainwater harvesting and salting	#	0.500	5	2.500
			4) Multipurpose tree planting on community grassland and crown land	000 Sapling #	0.075	250	18.750
5)	Promotion of Wood Alternative and Energy Conservation Technologies	Pressure of the increasing population demands of construction timber and fuel wood has exceeded sustained supply from nearby forests, resulting into their degradation, which needs to be checked	1) Promotion of Micro-hydel Power, Solar and Wind Power, fuel wood alternatives, cooking and space heating energy saving demonstrations, technology transfer and awareness raising etc.	Lump Sum			12.500
6)	Human and Institutional Capacity Development (HICD)	Tow Field Units and REDD+ Cell in the Office of CCF (Territorial) would be setup by FD mainly through reorganization and relocation, operating	1) Policy & Legal Reforms	Lump Sum			2.000
			2) Office Support and Incremental Staff of the REDD+ Cell	Lump Sum			20.250
			3) Mobility	Lump Sum			14.500

S#	Intervention	Justification	Sub-Activity	Unit	Unit Cost (PKR Million)	Quantity	Cost (PKR Million)
		cost will be provided by the Project. However, incremental staff of REDD+ Cell will be provided from the project. Capacity building of FD staff and communities through training, project site visits.	4) TA/DA	Lump Sum			10.000
			5) PFMP Communication Strategy, Extension Material, Seminar & Workshops, Training and Awareness Raising Campaigns	Lump Sum			6.000
TOTAL							200.000

a. **Activity Implementation Schedule:** The proposed implementation schedule for the main activities is given in the table below:

Table 11: Activity Implementation Schedule

Activity / Sub-Activity	Y-1	Y-2	Y-3	Y-4	Y-5	Y-6	Y-7	Y-8	Y-9	Y-10
1) Social Mobilization										
1) CVO Formulation	X									
2) CVO Operation	X	X	X	X	X	X	X	X	X	X
3) CVO Apex Body Formulation	X									
4) CVO Apex Body Operation	X	X	X	X	X	X	X	X	X	X
5) Preparation of PFMP Information Communication Strategy (ICS)	X									
6) Implementation of ICS	X	X	X	X	X	X	X	X	X	X
2) Staff Fielding										
1) Mobilization of PIU, REDD+ Cell, Advisory Forum	X									
2) REDD+ Institutions Operation	X	X	X	X	X	X	X	X	X	X
3) Human and Institutional Capacity Building										
1) FD Staff & Community Activists' JFM Training	X	X	X							
2) CVO Capacity Building & Management Training	X	X	X							
3) JFM Project Site Visits of FD Staff & Community Activists	X	X	X	X	X					
4) Staff In-service Training	X	X	X	X	X	X	X	X	X	X
5) Micro-credit and Enterprise Development CVO Training	X	X	X	X	X	X	X	X	X	X
6) Diagnostic Studies	X	X	X	X	X	X	X	X	X	X
7) GIS Database Development	X	X	X	X	X	X	X	X	X	X
8) Legal and Policy Reforms	X									
4) Field Interventions										
1) JFM Actions	X	X	X	X	X	X	X	X	X	X
2) Preparation of Participatory Village/ SW Development Plans (VDPs)	X									
3) Departmental & Community Nurseries	X	X	X	X	X	X	X	X	X	X
4) ANR Interventions	X	X	X	X	X	X	X	X	X	X
5) Artificial Planting of Declining Indigenous Species in Blanks' Areas	X	X	X	X	X	X	X	X	X	X
6) Forest fire management plans developed	X									
7) Training of community and staff in fire management		X								

8) Implementation of fire management plans		X	X	X	X	X	X	X	X	X
9) Setting-up of Rotational Grazing Demos & Maintenance	X	X	X	X	X	X	X	X	X	X
10) Rangeland and Pasture Development Extension	X	X	X	X	X	X	X	X	X	X
11) Construction & Maintenance of WHS	X	X	X	X	X	X	X	X	X	X
12) Construction & Maintenance of Forests Tracking Path	X	X	X	X	X	X	X	X	X	X
13) Micro-enterprise Development and Operation	X	X	X	X	X	X	X	X	X	X
14) Promotion of Wood Alternatives & Energy Conservation	X	X	X	X	X	X	X	X	X	X
15) PFMP Joint Review and Improvement	X	X	X	X	X	X	X	X	X	X
16) PFMP Implementation Progress and Performance Reviews	X	X	X	X	X	X	X	X	X	X
17) Mid-term and Completion Review						X				X
5) Office Support	X	X	X	X	X	X	X	X	X	X
1) Office Operation & Maintenance	X	X	X	X	X	X	X	X	X	X
2) Meetings & Training	X	X	X	X	X	X	X	X	X	X
3) Printing of Extension Material	X	X	X	X	X	X	X	X	X	X

4 Implementation Mechanism for the PFMP

4.1 Resources for activities

The Forests department as custodian of the forest and having linkages with national and international funding sources will take a lead. The key stakeholders identified in this plan, especially the Forest department and the Village Conservation Committees will jointly look for resources for implementation of activities identified in this plan. The Forest department will submit proposals for potential funding sources including the Ministry of Climate Change, Annual Development Programme (ADP), international donors and private sector investors.

4.2 Suggested institutional mechanism for implementation of activities

The project will be implemented by the PIU; headed by the DFO Hattian Forests Division, comprising forestry staff of Chinari Range, including Range Officer, within the overall supervision of DFA Advisory Forum, the REDD+ Cell headed by the CCF (Territorial) and the strategic guidance of the PSC, headed by the Secretary Forests and membership from all GLDs concerned with climate change impacts mitigation and adaptation.

Management System: The management system encompasses all components of the Plan i.e., 1) Planning; 2) Implementing; 3) Checking and Monitoring; and 4) Review and Improvement.
The Management System essentially comprises the following procedures;

1) Identify environmental risks;
2) Identify standard operating procedures or develop performance measures to address significant risks;
3) Develop emergency procedures in the event of an incident causing environmental impacts;
4) Review all laws and regulations and reform them to create an enabling situation for PFMP implementation;
5) Establish procedures for training (providing updated information and training to ensure that forestry staff and beneficiary communities stay current with evolving joint forest management information and are trained to address and executive, technical, environmental, and social issues), and;
6) If an incident does occur, conduct an incident review, and develop an action plan to take corrective action, based on the preparation undertaken in steps; 1) to 5).

Within the context of the management system, the effectiveness of the PFMP implementation is continuously improved by monitoring and reviewing the management system and the protocols. This includes a review of ongoing participatory planning and implementation, to ensure that the PFMP is being implemented as effectively and efficiently as possible.

4.3 REDD+ Benefits Sharing Mechanism

Given the fact that the State Government is the legal owner of the demarcated forests, to incentivize REDD+ implementation, she has to confer the carbon rights to DFA dependent communities, household families, individuals, investors, public and private entrepreneurs through mechanism of the usufruct rights. These usufruct rights in the State demarcated forests have been allocated in the form of concessions to local communities/ Zamindars and imply rights to benefit from natural resources and also ecosystem services (ES). Since these usufruct rights are already allocated widely, it makes

sense to align carbon rights with these usufruct rights and the carbon right-holder would have to discharge liability for failure to deliver the specified emission reduction.

Although the State demarcated forests fall within the ambit and domain of the State Government, following the 2016 Paris Agreement, forest Carbon accounting has to be done at the national/federal level, otherwise forest carbon trading may not be permissible. The benefits to be accrued from result-based REDD+ actions would have to be transferred to legal owners and right holders of forests in accordance with the benefit distribution prescribed in Pakistan's national REDD+ strategy. Therefore, implementation of the REDD+ strategy in Pakistan, including AJK, primarily rests with the Ministry of Climate Change at the Federal level. To ensure continuous existence of trees/forests i.e., permanence of emission reduction, linking of the distribution of financial benefits from REDD+ with the forest management and use-rights is therefore a must. A mechanism needs to be worked out to transfer REDD+ benefits from international Carbon markets to MoCC, down to provinces/ areas and to the end use-right holders.

Presently the right to Carbon as a commodity and the right to benefits, from demarcated and un-demarcated forests belong to the State, whereas the right to Carbon on community and private forests belongs to the owners of these forests. The right to Carbon should not necessarily "be based on land ownership and tenure, but should also include customary rights, operating rights, use rights or capital investment". In addition, the State Government should create / transfer public forest Carbon privileges to the concessionaries on equitable proportion basis.

1. Project proponents should have the right to receive payments for emission reductions and to sell carbon from the REDD+ interventions and be made obliged to manage forests within REDD+ implementation. A transparent M & E mechanism to be put in place for disbursement of monetary benefits out of Carbon credit sales.
2. It might be possible to house REDD+ provisions within existing laws (The AJK Forest Regulation Amendment Act, 2017 & Wildlife Act 2015), however, a wider 'umbrella law' capturing many different aspects of REDD+ implementation might be preferable in the longer-term to coordinate the development of REDD+ related rules and enabling environment.
3. Safeguards related to REDD+ within UNFCCC COP decisions aim to prevent REDD+ activities to cause harm to biodiversity and the indigenous people, and also help REDD+ realize multiple benefits, beyond simply emission reductions. This appears to follow a 'rights-based approach' to safeguards, prioritizing the protection of the individual rights of those potentially affected by a REDD+ activities, which need to be fully integrated with the Legal and Compliance Frameworks.
4. Protected Areas' Carbon rights needs to be taken up involving AJ&K Wildlife & Fisheries Department.

This plan has proposed distribution of carbon and non-carbon benefits accrued by the implementation of plan according to which 80% benefits will go to the Government, and 20% will go equally to the customary right holders and users. These benefits will only be distributed if the targets are achieved. The plan therefore provides scenarios to reduce or increase benefits so that the stakeholders can enjoy results-based payment and benefits. The success of this plan, therefore, is contingent to the commitment of all the stakeholders involved. A specific and definitive distribution of benefits in case of REDD+ programme is yet to be developed by the government, which will form basis for sharing of benefits in the case of private forests. This proposed ratio will be finalized or confirmed only after finalizing AJK based benefit sharing mechanism.

5 Conflict and grievance redressal mechanism

Drivers of REDD+ main conflicts

The PRA found the following six drivers of REDD+ main conflicts:

1) Restrictions over access and control of forest resources;
2) Creation of new forest governance structures that change relationships between local communities and the forest;
3) Exclusion of community members from comprehensive project participation;
4) High project expectations that could not be met with;
5) Changes in land tenure policy for any reason, and
6) The aggravation of historic land tenure conflicts.

With the current complexity of issues facing forest and land management, the implementation of the REDD+ initiative comes with significant risks, including conflicts. While the exact nature and shape of conflicts in REDD+ implementation is difficult to pinpoint in anticipation. An attempt was made during PRA to identify possible sources of conflicts over management of forests and other natural resources. The PRA revealed that most of the sources of impairment are present in the DFA.

The conflicts are related to the following thematic areas:

1) **REDD+ program:** Includes the discrepancies and disputes which may arise during the technical design, implementation, and evaluation of activities, which might begin with REDD+ start and would continue for the future.

2) **Rights-based approach to REDD+:** Includes grievances and disputes over processes to acquire (user) rights to land and resources related to the REDD+ program. Historically existing conflict over user rights is automatically embedded in the REDD+ structure and needs to be adequately addressed. Complaints regarding the process of Free and Prior Informed Consent (FPIC) should be handled in compliance with the international guidelines and standards.

3) **Engagement of stakeholders before and during REDD+ implementation:** Includes the sharing of REDD+ information, raising of awareness and enabling participation of stakeholders etc. Compared to others, certain groups are structurally marginalized in society and need special attention for awareness raising and effective participation in the REDD+ program (such as women, landless people and services cast groups, transhumant grazers). Representation of these groups at various levels should be ensured.

4) **Benefit sharing for REDD+:** Includes the distribution of benefits between the different forest users, beneficiary communities and the general public. The majority of forest users are worried about elites capturing the majority benefits when REDD+ is implemented. Other forest users worry about poor groups not benefitting from REDD+ and this concern refers to women, landless people, as well as other relatively poor forest users.

5) **Customary practices:** Includes the internal practices of communities and the position of these communities within society. With the increasing participation of forest user groups in the market economy, communities are likely to face internal conflicts over power. Women inequity, elite capture and other internal power struggles are expected to increase when

benefits of REDD+ are distributed. Also, with the influx of new forest users' i.e., investors and project proponent communities may have difficulty maintaining customary balance with their competitors, which may lead to disputes.

Conflict Resolution Forums and Clientele: Forced ejections from forests, acts of violence, and lawsuits are among the events contributing to the conflict pathways. To prevent them, the rights, livelihoods, and benefits of local communities need to be placed at the centre of the REDD+ projects. Dependent communities/ forest concessions' right holders need empowerment by transferring the forest Carbon rights in the DFA, for successful implementation of REDD+ support interventions. REDD+ potential conflicts' resolution matrix is presented below;

Table 12: REDD+ Potential Conflicts' Resolution Matrix

REDD+ Potential Conflicts' Resolution Matrix			
S#	**Potential Conflict**	**Client**	**Resolution Forum**
1)	Activities, timeline & implementation	Local communities	DFO Office & Advisory Forum
2)	User boundary disputes	VCOs	VCO apex body, DFO and local level Revenue Deptt. Office, courts of law
3)	Land grabbing	GLDs, Local Elite	VCO apex body, DFO and local level Revenue Deptt. Office and SHO
4)	Encroachments	DFO, Communities	DFO Office, District Administration & Police
5)	Community Participation	REDD+ Program & FD	VCO apex body
6)	Benefit sharing	Communities & Individuals	DFO, Advisory Forum, REDD+ Cell, VCO apex body, Revenue Deptt.
7)	Identity claims	Landless people, services cast groups, migratory grazers	DFO, Advisory Forum, REDD+ Cell, VCO apex body, Revenue Deptt.
8)	Elite capture	Communities and REDD+ Program	DFO, Advisory Forum, REDD+ Cell, VCO apex body
9)	Transhumant Grazing	Transhumant grazers	DFO, Advisory Forum, REDD+ Cell, VCO apex body
10)	Technical Issues	PIU & Communities	Advisory Forum, REDD+ Cell, PSC
11)	Policy and legal issues	GLDs, REDD+ Program, Communities	FD, PSC, and the State

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Plot level Carbon Stock

Plot No.	Latitude	Longitude	Tree ID	Species Name	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
1	34.1566	73.8233	1	Chir	*Pinus roxburghii*	53.3	18.6	920.04	9.20	4.32	1.08
1	34.1566	73.8233	2	Chir	*Pinus roxburghii*	48.3	18.3	744.74	7.45	3.50	0.88
1	34.1566	73.8233	3	Chir	*Pinus roxburghii*	74.9	29.8	2,831.83	28.32	13.31	3.33
1	34.1566	73.8233	4	Chir	*Pinus roxburghii*	79.0	25.3	2,675.69	26.76	12.58	3.14
1	34.1566	73.8233	5	Chir	*Pinus roxburghii*	55.9	24	1,292.38	12.92	6.07	1.52
1	34.1566	73.8233	6	Chir	*Pinus roxburghii*	67.3	20.6	1,601.30	16.01	7.53	1.88
1	34.1566	73.8233	7	Chir	*Pinus roxburghii*	50.8	16.5	744.04	7.44	3.50	0.87
1	34.1566	73.8233	8	Chir	*Pinus roxburghii*	12.7	5.5	16.96	0.17	0.08	0.02
1	34.1566	73.8233	9	Chir	*Pinus roxburghii*	33.0	11.5	225.43	2.25	1.06	0.26
1	34.1566	73.8233	10	Chir	*Pinus roxburghii*	30.5	10	168.20	1.68	0.79	0.20
1	34.1566	73.8233	11	Chir	*Pinus roxburghii*	31.2	8.7	154.06	1.54	0.72	0.18
1	34.1566	73.8233	12	Chir	*Pinus roxburghii*	31.8	13.7	247.74	2.48	1.16	0.29
1	34.1566	73.8233	13	Chir	*Pinus roxburghii*	21.6	11.4	97.47	0.97	0.46	0.11
1	34.1566	73.8233	14	Chir	*Pinus roxburghii*	26.7	11.5	148.53	1.49	0.70	0.17
1	34.1566	73.8233	15	Chir	*Pinus roxburghii*	30.5	11.2	187.89	1.88	0.88	0.22
1	34.1566	73.8233	16	Chir	*Pinus roxburghii*	21.6	8.5	73.17	0.73	0.34	0.09
1	34.1566	73.8233	17	Chir	*Pinus roxburghii*	29.2	9.7	150.24	1.50	0.71	0.18
1	34.1566	73.8233	18	Chir	*Pinus roxburghii*	20.3	6	46.26	0.46	0.22	0.05
1	34.1566	73.8233	19	Chir	*Pinus roxburghii*	27.9	8	114.12	1.14	0.54	0.13
1	34.1566	73.8233	20	Chir	*Pinus roxburghii*	35.6	11.8	267.18	2.67	1.26	0.31
1	34.1566	73.8233	21	Chir	*Pinus roxburghii*	33.0	12.3	240.73	2.41	1.13	0.28
2	34.1193	73.8258	1	Kail	*Pinus wallichiana*	38.1	16.2	421.66	4.22	1.98	0.50
2	34.1193	73.8258	2	Kail	*Pinus wallichiana*	45.7	14.4	524.10	5.24	2.46	0.62
2	34.1193	73.8258	3	Kail	*Pinus wallichiana*	29.2	16	261.15	2.61	1.23	0.31
2	34.1193	73.8258	4	Kail	*Pinus wallichiana*	12.7	5.5	23.49	0.23	0.11	0.03
2	34.1193	73.8258	5	Kail	*Pinus wallichiana*	10.2	6.6	18.62	0.19	0.09	0.02
2	34.1193	73.8258	6	Kail	*Pinus wallichiana*	25.4	11.9	157.28	1.57	0.74	0.18
2	34.1193	73.8258	7	Kail	*Pinus wallichiana*	11.4	7	24.13	0.24	0.11	0.03
2	34.1193	73.8258	8	Kail	*Pinus wallichiana*	5.1	4	3.53	0.04	0.02	0.00
2	34.1193	73.8258	9	Kail	*Pinus wallichiana*	5.1	4	3.53	0.04	0.02	0.00
2	34.1193	73.8258	10	Kail	*Pinus wallichiana*	7.6	6.2	10.61	0.11	0.05	0.01
2	34.1193	73.8258	11	Kail	*Pinus wallichiana*	5.1	3	2.74	0.03	0.01	0.00

Plot No.	Latitude	Longitude	Tree ID	Species Name	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
2	34.1193	73.8258	12	Kail	*Pinus wallichiana*	7.6	4.5	8.00	0.08	0.04	0.01
2	34.1193	73.8258	13	Kail	*Pinus wallichiana*	14.0	5.11	26.05	0.26	0.12	0.03
2	34.1193	73.8258	14	Kail	*Pinus wallichiana*	35.6	16.1	371.36	3.71	1.75	0.44
2	34.1193	73.8258	15	Kail	*Pinus wallichiana*	40.6	18	518.39	5.18	2.44	0.61
2	34.1193	73.8258	16	Kail	*Pinus wallichiana*	7.6	4.5	8.00	0.08	0.04	0.01
2	34.1193	73.8258	17	Kail	*Pinus wallichiana*	5.1	3.4	3.06	0.03	0.01	0.00
2	34.1193	73.8258	18	Kail	*Pinus wallichiana*	12.7	5.11	22.02	0.22	0.10	0.03
2	34.1193	73.8258	19	Kail	*Pinus wallichiana*	38.1	15	394.01	3.94	1.85	0.46
2	34.1193	73.8258	20	Kail	*Pinus wallichiana*	30.5	12.5	226.46	2.26	1.06	0.27
3	34.1477	73.8391	1	Kail	*Pinus wallichiana*	55.9	27.1	1,302.86	13.03	6.12	1.53
3	34.1477	73.8391	2	Kail	*Pinus wallichiana*	55.9	27.3	1,311.33	13.11	6.16	1.54
3	34.1477	73.8391	3	Kail	*Pinus wallichiana*	48.3	24.9	933.94	9.34	4.39	1.10
3	34.1477	73.8391	4	Kail	*Pinus wallichiana*	53.3	26.6	1,180.80	11.81	5.55	1.39
3	34.1477	73.8391	5	Kail	*Pinus wallichiana*	45.7	26.6	899.94	9.00	4.23	1.06
3	34.1477	73.8391	6	Kail	*Pinus wallichiana*	55.9	26.1	1,260.41	12.60	5.92	1.48
3	34.1477	73.8391	7	Kail	*Pinus wallichiana*	69.9	30.6	2,148.46	21.48	10.10	2.52
3	34.1477	73.8391	8	Kail	*Pinus wallichiana*	59.7	23.3	1,281.05	12.81	6.02	1.51
3	34.1477	73.8391	9	Kail	*Pinus wallichiana*	74.2	30.4	2,374.21	23.74	11.16	2.79
3	34.1477	73.8391	10	Kail	*Pinus wallichiana*	61.0	28	1,563.08	15.63	7.35	1.84
3	34.1477	73.8391	11	Kail	*Pinus wallichiana*	59.7	29.5	1,577.02	15.77	7.41	1.85
3	34.1477	73.8391	12	Kail	*Pinus wallichiana*	35.6	18.5	419.72	4.20	1.97	0.49
3	34.1477	73.8391	13	Kail	*Pinus wallichiana*	25.4	9.2	125.37	1.25	0.59	0.15
3	34.1477	73.8391	14	Kail	*Pinus wallichiana*	23.9	8.9	109.19	1.09	0.51	0.13
4	34.1323	73.8509	1	Chir	*Pinus roxburghii*	68.6	27.1	2,170.99	21.71	10.20	2.55
4	34.1323	73.8509	2	Chir	*Pinus roxburghii*	64.5	29.2	2,072.49	20.72	9.74	2.44
4	34.1323	73.8509	3	Chir	*Pinus roxburghii*	63.5	29.4	2,022.65	20.23	9.51	2.38
4	34.1323	73.8509	4	Chir	*Pinus roxburghii*	67.6	29.8	2,313.56	23.14	10.87	2.72
4	34.1323	73.8509	5	Chir	*Pinus roxburghii*	72.1	26.6	2,353.12	23.53	11.06	2.76
4	34.1323	73.8509	6	Chir	*Pinus roxburghii*	59.9	22.6	1,397.83	13.98	6.57	1.64
4	34.1323	73.8509	7	Chir	*Pinus roxburghii*	75.9	28.3	2,764.31	27.64	12.99	3.25
4	34.1323	73.8509	8	Chir	*Pinus roxburghii*	58.4	26	1,524.24	15.24	7.16	1.79
4	34.1323	73.8509	9	Chir	*Pinus roxburghii*	51.8	24	1,115.15	11.15	5.24	1.31
4	34.1323	73.8509	10	Chir	*Pinus roxburghii*	54.6	25	1,285.89	12.86	6.04	1.51
5	34.0999	73.8601	1	Kail	*Pinus wallichiana*	105.4	25.3	3,751.92	37.52	17.63	4.41
5	34.0999	73.8601	2	Kail	*Pinus wallichiana*	108.0	29	4,412.63	44.13	20.74	5.18

Plot No.	Latitude	Longitude	Tree ID	Species Name	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
5	34.0999	73.8601	3	Kail	*Pinus wallichiana*	82.6	31	2,916.97	29.17	13.71	3.43
5	34.0999	73.8601	4	Kail	*Pinus wallichiana*	116.8	45	7,470.73	74.71	35.11	8.78
5	34.0999	73.8601	5	Kail	*Pinus wallichiana*	94.0	32	3,769.75	37.70	17.72	4.43
5	34.0999	73.8601	6	Kail	*Pinus wallichiana*	89.4	28	3,069.43	30.69	14.43	3.61
5	34.0999	73.8601	7	Kail	*Pinus wallichiana*	88.1	31.9	3,357.40	33.57	15.78	3.94
5	34.0999	73.8601	8	Kail	*Pinus wallichiana*	116.8	36	6,137.41	61.37	28.85	7.21
5	34.0999	73.8601	9	Kail	*Pinus wallichiana*	96.5	40	4,809.47	48.09	22.60	5.65
6	34.0998	73.8775	1	Kail	*Pinus wallichiana*	76.2	30.2	2,475.58	24.76	11.64	2.91
6	34.0998	73.8775	2	Kail	*Pinus wallichiana*	71.1	31	2,243.29	22.43	10.54	2.64
6	34.0998	73.8775	3	Kail	*Pinus wallichiana*	48.3	17.6	687.96	6.88	3.23	0.81
6	34.0998	73.8775	4	Kail	*Pinus wallichiana*	61.0	29.5	1,636.62	16.37	7.69	1.92
6	34.0998	73.8775	5	Kail	*Pinus wallichiana*	57.2	26.5	1,329.01	13.29	6.25	1.56
6	34.0998	73.8775	6	Kail	*Pinus wallichiana*	91.4	31.1	3,502.92	35.03	16.46	4.12
6	34.0998	73.8775	7	Kail	*Pinus wallichiana*	86.4	31	3,158.34	31.58	14.84	3.71
6	34.0998	73.8775	8	Kail	*Pinus wallichiana*	61.0	27.3	1,528.60	15.29	7.18	1.80
6	34.0998	73.8775	9	Kail	*Pinus wallichiana*	66.0	30.9	1,963.09	19.63	9.23	2.31
6	34.0998	73.8775	10	Kail	*Pinus wallichiana*	61.0	30.5	1,685.40	16.85	7.92	1.98
6	34.0998	73.8775	11	Kail	*Pinus wallichiana*	50.8	28.9	1,165.65	11.66	5.48	1.37
6	34.0998	73.8775	12	Kail	*Pinus wallichiana*	50.8	28.5	1,151.43	11.51	5.41	1.35
6	34.0998	73.8775	13	Kail	*Pinus wallichiana*	61.0	30	1,661.04	16.61	7.81	1.95
6	34.0998	73.8775	14	Kail	*Pinus wallichiana*	68.6	28.5	1,953.82	19.54	9.18	2.30
6	34.0998	73.8775	15	Kail	*Pinus wallichiana*	78.7	28.7	2,507.71	25.08	11.79	2.95
6	34.0998	73.8775	16	Kail	*Pinus wallichiana*	61.0	19.7	1,146.73	11.47	5.39	1.35
6	34.0998	73.8775	17	Kail	*Pinus wallichiana*	38.1	13.5	359.09	3.59	1.69	0.42
7	34.1051	73.8451	1	Kail	*Pinus wallichiana*	58.4	27.3	1,418.17	14.18	6.67	1.67
7	34.1051	73.8451	2	Kail	*Pinus wallichiana*	53.3	25	1,117.99	11.18	5.25	1.31
7	34.1051	73.8451	3	Kail	*Pinus wallichiana*	99.1	27.5	3,619.19	36.19	17.01	4.25
7	34.1051	73.8451	4	Kail	*Pinus wallichiana*	55.9	25.2	1,222.04	12.22	5.74	1.44
7	34.1051	73.8451	5	Kail	*Pinus wallichiana*	53.3	26.1	1,161.22	11.61	5.46	1.36
7	34.1051	73.8451	6	Kail	*Pinus wallichiana*	55.9	23.9	1,166.33	11.66	5.48	1.37
7	34.1051	73.8451	7	Kail	*Pinus wallichiana*	55.9	24.2	1,179.22	11.79	5.54	1.39
7	34.1051	73.8451	8	Kail	*Pinus wallichiana*	40.6	20.6	583.82	5.84	2.74	0.69
7	34.1051	73.8451	9	Kail	*Pinus wallichiana*	45.7	22.11	764.67	7.65	3.59	0.90
7	34.1051	73.8451	10	Kail	*Pinus wallichiana*	50.8	19.3	816.76	8.17	3.84	0.96
7	34.1051	73.8451	11	Kail	*Pinus wallichiana*	45.7	21.3	739.94	7.40	3.48	0.87

Plot No.	Latitude	Longitude	Tree ID	Species Name	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
7	34.1051	73.8451	12	Kail	*Pinus wallichiana*	53.3	21.5	978.89	9.79	4.60	1.15
7	34.1051	73.8451	13	Kail	*Pinus wallichiana*	45.7	21	730.75	7.31	3.43	0.86
7	34.1051	73.8451	14	Kail	*Pinus wallichiana*	53.3	23.7	1,066.61	10.67	5.01	1.25
7	34.1051	73.8451	15	Kail	*Pinus wallichiana*	38.1	21.5	541.07	5.41	2.54	0.64
7	34.1051	73.8451	16	Kail	*Pinus wallichiana*	40.6	21	593.80	5.94	2.79	0.70
7	34.1051	73.8451	17	Kail	*Pinus wallichiana*	43.2	18	576.83	5.77	2.71	0.68
7	34.1051	73.8451	18	Kail	*Pinus wallichiana*	55.9	21.7	1,071.21	10.71	5.03	1.26
7	34.1051	73.8451	19	Kail	*Pinus wallichiana*	58.4	22.8	1,210.06	12.10	5.69	1.42
7	34.1051	73.8451	20	Kail	*Pinus wallichiana*	58.4	26.1	1,363.10	13.63	6.41	1.60
8	34.0947	73.8413	1	Fir	*Abies pindrow*	53.3	30.1	1,284.84	12.85	6.04	1.51
8	34.0947	73.8413	2	Fir	*Abies pindrow*	76.7	32.5	2,653.77	26.54	12.47	3.12
8	34.0947	73.8413	3	Fir	*Abies pindrow*	61.0	29.3	1,595.91	15.96	7.50	1.88
8	34.0947	73.8413	4	Fir	*Abies pindrow*	58.4	32.2	1,609.30	16.09	7.56	1.89
8	34.0947	73.8413	5	Fir	*Abies pindrow*	69.1	32.5	2,196.90	21.97	10.33	2.58
8	34.0947	73.8413	6	Fir	*Abies pindrow*	42.4	26	744.30	7.44	3.50	0.87
8	34.0947	73.8413	7	Fir	*Abies pindrow*	55.9	29.5	1,372.26	13.72	6.45	1.61
8	34.0947	73.8413	8	Fir	*Abies pindrow*	61.0	29.7	1,615.56	16.16	7.59	1.90
8	34.0947	73.8413	9	Fir	*Abies pindrow*	48.3	21.3	784.79	7.85	3.69	0.92
8	34.0947	73.8413	10	Fir	*Abies pindrow*	58.4	26.9	1,368.10	13.68	6.43	1.61
8	34.0947	73.8413	11	Fir	*Abies pindrow*	66.0	35.7	2,204.20	22.04	10.36	2.59
8	34.0947	73.8413	12	Fir	*Abies pindrow*	59.7	31	1,616.64	16.17	7.60	1.90
8	34.0947	73.8413	13	Fir	*Abies pindrow*	71.1	34.6	2,449.61	24.50	11.51	2.88
8	34.0947	73.8413	14	Fir	*Abies pindrow*	71.1	34	2,411.22	24.11	11.33	2.83
8	34.0947	73.8413	15	Fir	*Abies pindrow*	73.7	30.2	2,308.25	23.08	10.85	2.71
8	34.0947	73.8413	16	Fir	*Abies pindrow*	48.3	19.5	724.66	7.25	3.41	0.85
8	34.0947	73.8413	17	Fir	*Abies pindrow*	45.7	19	642.01	6.42	3.02	0.75
8	34.0947	73.8413	18	Fir	*Abies pindrow*	66.0	32.8	2,041.87	20.42	9.60	2.40
9	34.0798	73.8481	1	Fir	*Abies pindrow*	36.8	15.5	361.52	3.62	1.70	0.42
9	34.0798	73.8481	2	Fir	*Abies pindrow*	55.9	28	1,309.10	13.09	6.15	1.54
9	34.0798	73.8481	4	Fir	*Abies pindrow*	51.3	19.7	816.89	8.17	3.84	0.96
9	34.0798	73.8481	5	Fir	*Abies pindrow*	50.8	21	850.00	8.50	4.00	1.00
9	34.0798	73.8481	6	Fir	*Abies pindrow*	61.0	26	1,432.69	14.33	6.73	1.68
9	34.0798	73.8481	7	Fir	*Abies pindrow*	50.8	18.6	761.78	7.62	3.58	0.90
9	34.0798	73.8481	8	Fir	*Abies pindrow*	61.0	25	1,382.84	13.83	6.50	1.62
9	34.0798	73.8481	9	Fir	*Abies pindrow*	25.4	15.4	183.74	1.84	0.86	0.22

Plot No.	Latitude	Longitude	Tree ID	Species Name	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
9	34.0798	73.8481	10	Kail	*Pinus wallichiana*	50.8	28.8	1,162.10	11.62	5.46	1.37
9	34.0798	73.8481	11	Fir	*Abies pindrow*	42.2	15.8	469.60	4.70	2.21	0.55
9	34.0798	73.8481	12	Fir	*Abies pindrow*	40.6	18.9	516.54	5.17	2.43	0.61
9	34.0798	73.8481	13	Fir	*Abies pindrow*	40.6	18.3	501.71	5.02	2.36	0.59
9	34.0798	73.8481	14	Fir	*Abies pindrow*	38.1	18.4	448.72	4.49	2.11	0.53
9	34.0798	73.8481	15	Kail	*Pinus wallichiana*	29.2	12	202.68	2.03	0.95	0.24
9	34.0798	73.8481	16	Kail	*Pinus wallichiana*	50.8	21.9	912.96	9.13	4.29	1.07
10	34.1240	73.8690	b	Fir	*Abies pindrow*	76.2	32	2,585.67	25.86	12.15	3.04
10	34.1240	73.8690	2	Fir	*Abies pindrow*	66.0	27.3	1,730.04	17.30	8.13	2.03
10	34.1240	73.8690	3	Fir	*Abies pindrow*	43.2	18	551.46	5.51	2.59	0.65
10	34.1240	73.8690	4	Fir	*Abies pindrow*	61.0	25.1	1,387.84	13.88	6.52	1.63
10	34.1240	73.8690	5	Fir	*Abies pindrow*	43.2	19	579.05	5.79	2.72	0.68
10	34.1240	73.8690	6	Fir	*Abies pindrow*	55.9	23.3	1,108.97	11.09	5.21	1.30
10	34.1240	73.8690	7	Fir	*Abies pindrow*	71.1	29.5	2,121.13	21.21	9.97	2.49
10	34.1240	73.8690	8	Fir	*Abies pindrow*	45.7	19.5	657.25	6.57	3.09	0.77
10	34.1240	73.8690	9	Fir	*Abies pindrow*	50.8	21.6	871.90	8.72	4.10	1.02
10	34.1240	73.8690	10	Fir	*Abies pindrow*	55.9	21.5	1,031.32	10.31	4.85	1.21

Stakeholders' Inventory, Chinari Range Hattian Forests Division								
STAKEHOLDER	**INTEREST in Forest Management**		**INFLUENCE on Forest mgt.**		**Relevant forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's interest in Forest Management)**		**Influence on forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's influence on Forest Management)**	
	Type of interest	Level of interest	Type of Influence	Level of influence	Type of carbon Pool	Level of interest	Type of influence	Level of influence
Beneficiary Communities / Concessioners	Communities tend to protect forests hence cooperate with FD generally	Medium	Supportive, while, retaining concessionary rights	Medium	Wood/ timber, forage and grazing domestic animals besides other economic products	High	Communities tend to sustain forestry resources to meet their current and the future needs	High
Private Forests Owners	Although private forests' portion in AJK is small but they have stakes /interest in JFM	High	Private forests owners are inclined to protect their carbon rights for themselves	High	All 5 carbon pools	High	Private forest owners are few in number but have strong political backing	High
Forests Department (FD)	All forests are owned by the State Government and Managed by the FD	High	State ownership of the Forestry Resources including the forestland	High	All 5 carbon pools	High	As the owner, regulator and manager of the State Forests FD is decision maker	High
Wildlife & Fisheries Department (W&FD)	Wildlife, particularly the game animals and biodiversity of flora/ fauna conservation and the management	High	Sate own the wildlife resources, there are no concessions and	High	All 5 carbon pools	High	As the owner, regulator and manager of wildlife resources, W&FD is the controller of PA	High

Stakeholders' Inventory, Chinari Range Hattian Forests Division								
STAKEHOLDER	**INTEREST in Forest Management**		**INFLUENCE on Forest mgt.**		**Relevant forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's interest in Forest Management)**		**Influence on forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's influence on Forest Management)**	
	Type of interest	Level of interest	Type of Influence	Level of influence	Type of carbon Pool	Level of interest	Type of influence	Level of influence
	of protection area network		W&FD is vested with the power of mgt.				Network overlapping State Forests	
Tourism Department	Natural resource conservation, forestry extension and water resource development for ecotourism research, education, site seeing and solitude	High	Being GLD can lobby for the forest protection, extension & conservation, besides tourism assets are located in the State Forests	High	All 5 carbon pools	High	Tremendous potential of eco-tourism development in the State makes tourism dept. an important stakeholder	High
AJK Environment Protection Agency	GHG emissions reduction, carbon sequestration/ enhancement with the object of pristine environment protection and enrichment	High	Being GLD can lobby for the forest's protection, extension & conservation. EPA Act promote forests protection	High	All 5 carbon pools	High	Tremendous potential of forests carbon enhancement which exist on the forestland/ forests attracts attention of EPA	High
Land Use Planning Cell P&DD	Afforestation Reforestation	High	Implementation of land use	High	All 5 carbon pools	High	Implementation of Sub-watershed-	High

Stakeholders' Inventory, Chinari Range Hattian Forests Division								
STAKEHOLDER	**INTEREST in Forest Management**		**INFLUENCE on Forest mgt.**		**Relevant forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's interest in Forest Management)**		**Influence on forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's influence on Forest Management)**	
	Type of interest	Level of interest	Type of Influence	Level of influence	Type of carbon Pool	Level of interest	Type of influence	Level of influence
	Forest degradation in terms of land use changes impacting forests carbon stock is the main focus of rural land use planning in AJK which is mandated to LUPC		recommendations				based Land Use Plans/ informal land-use policy of GoAJK	
Transhumant Grazers (Bakarwals)	Grasses, forage, water points and economic herbs. Almost one million goats, sheep, and pack animals graze in AJK pastureland beyond their carrying capacity	Low	Grazing in the pasture is one of their basic human rights, which currently totally unregulated, free	High	All 5 carbon pools	High	Animal grazing in pasture lands is their usufruct right, which needs to be regulated to hold degradation of pasture lands and forests	High
NGOs/ INGOs and Development Agencies pursuing SDGs, NR conservation, environment conservation, rehabilitation, and	Sustainable natural resource management, climate change adverse impacts mitigation and adaptation	High	Promote SDG Environment Protection & Enrichment Bio-diversity Conservation and collective	High	All 5 carbon pools	High	Conservation agencies can help realizing vast potential of Forests Carbon Stock enhancement, which exists in AJK	High

Stakeholders' Inventory, Chinari Range Hattian Forests Division								
STAKEHOLDER	**INTEREST in Forest Management**		**INFLUENCE on Forest mgt.**		**Relevant forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's interest in Forest Management)**		**Influence on forest carbon pools** **(This to be assessed after the stakeholder meeting by the Forest Management Expert based on Stakeholder's influence on Forest Management)**	
	Type of interest	Level of interest	Type of Influence	Level of influence	Type of carbon Pool	Level of interest	Type of influence	Level of influence
enrichment (e.g., IUCN, WWF, Wildlife Foundation) and rural support programs			development of communities					
Mineral Department	Mineral Department can issue permits for mineral exploration and exploitation for forestland without ensuring necessary environment rehabilitation measures	High negative interest	Being GLD can favour miners for obtaining mining permits, who may lobby against forests management and extension	High negative influence	All 5 carbon pools	High negative interest	Miners tend to continue their businesses without due consideration to environment	High negative influence

STAKEHOLDER	INTEREST in Forest Management		INFLUENCE on Forest Management		Interest in carbon pools		Influence on carbon pools	
Beneficiary Communities / Concessioners	Communities tend to protect forests hence cooperate with FD generally	1	Supportive, while, retaining concessionary rights	2	Wood/ timber, forage and grazing domestic animals besides other economic products	3	Communities tend to sustain forestry resources to meet their current and the future needs	3
Mining contractors	Mining contractors have no interest in forest management rather want to continue business at the cost of forests	None	They rather lobby against FD to continue their business on the forestland	Negative	None, they tend to expend mining areas	None	They lobby against forests extension on mining area and use political influence negatively	None
Forests Department	The State Government owns forestry resources including forestland and the management of the State Forests is vested in the FD. Private forests proportion is negligibly small. FD interests includes but not limited to; • Forests management planning and implementation. • Policing forests. • Administering concessions. • Facing accountability	3	Specialized GLD vested with authority of the State Forests management under the Rules of Business of GoAJK.	3	All five carbon pools	3	As the owner, regulator, and manager of forest carbon pools; • Draw legal framework and implement. • Control management, take admin & technical decisions • Owns rights of carbon credit in the State Forests	3

STAKEHOLDER	INTEREST in Forest Management		INFLUENCE on Forest Management		Interest in carbon pools		Influence on carbon pools	
Wildlife & Fisheries Department (W&FD)	Wildlife, particularly the game animals and biodiversity of flora/ fauna conservation and the management of protection area network	3	Sate own the wildlife resources, there are no concessions for hunting etc. and W&FD is vested with the authority of wildlife management of the PA network	3	All 5 carbon pools with respect to PA network	3	As the owner, regulator, and manager of protected area network; • Draw legal framework and implement. • Control management, take admin & technical decisions • Owns rights of carbon credit in PA network	3
Tourism Department	Natural resource conservation, forestry extension and water resource development for ecotourism research, education, site seeing and solitude	1	Being GLD can lobby for the forest protection, extension & conservation with object of promoting eco-tourism	2	Pristine forest areas, wilderness areas and relict tree grooves, besides many historic and religious site in the State Forests area commanding respect from people and conserve lot of carbon stock	2	Tremendous potential of eco-tourism development in the State, which can help conserve and enhance forests carbon stock	2
AJK Environment Protection Agency	GHG emissions reduction, carbon sequestration/ enhancement with the object of pristine environment protection and enrichment	2	Being a GLD can lobby for the forest protection, extension & conservation to sequester atmospheric carbon, besides legal action against environment offenders	2	All 5 carbon pools	2	Lobbying and to some extent legal actions against offenders	2
Land Use Planning Cell (LUPC) P&DD	Afforestation Reforestation Forest degradation in terms of land use changes impacting forests carbon stock, hence is the main	2	LUPC may promote and pursue implementation of land use recommendations through the approval	2	All 5 carbon pools	2	Implementation of Sub-watershed-based Land Use Plans/ informal land-use policy	2

STAKEHOLDER	INTEREST in Forest Management		INFLUENCE on Forest Management		Interest in carbon pools		Influence on carbon pools	
	focus of rural land use planning in AJK which is mandated to LUPC		of the State Land Use Policy					
Transhumant Grazers (Bakarwals)	Grasses, forage, fuel wood and economic herbs	3	Grazing in the pasture is one of their basic human rights	1	Grasses, forage, fuel wood and economic herbs	2	Animal grazing in pasture lands is their usufruct right	2
NGOs/ INGOs and Development Agencies pursuing SDGs, NR conservation, environment protection, rehabilitation, and enrichment (e.g., IUCN, WWF, Wildlife Foundation) and rural support programs	Sustainable natural resource management, climate change adverse impacts mitigation and adaptation through forest conservation, extension, and sustainable management	3	Promote SDG Environment Protection & Enrichment Bio-diversity Conservation Collective development of communities	2	All 5 carbon pools	3	Realizing vast potential of Forests Carbon Stock enhancement, which exist in AJK	2
Mineral Department	Despite being GLD, issues mining permits of coal and dolomite mining in forestland irrespective of environmental consideration	None	Entrusted with mining regulation authority tend to support mining without environment protection measures	3	None	0	Influence on clearing area of vegetation and fertile soils in favour of mining, thus has high negative influence	3

Socio-economic Data Matrix, DFA Chinari

I		**Stakeholder group (name)**	Board of Chinari Conservation VCOs (*Ad hoc*)
II		**General information**	
	1	Social Organizations	Govt. of AJK has covered whole AJK under a VCOs network by implementing series of the rural development project, with donors' and local ADP's funding. Heads of these VCOs from Chinari DFA were invited to participate in FFMP DFA Chanari planning consultation. They were advised to organize into VCOs' apex body on *ad hoc* basis for REDD+ Program planning and inception, would be formalized into Chanari Conservation VCO Board on inception of RDD+ Program. They agreed and participated in the planning of PFMP DFA Chinari.
		Location of stakeholder groups (e.g., different villages/hamlets in and outside forest area): names and indicate on map, if possible	
III		**Social organization in the forest area**	
	2	*Traditional organizations (e.g., Jirga*	
	2.1	Organization (name; purpose; membership)	The traditional Jirga in each village is formed by a loose assembly of respectable elderly men who have a proven track record of problem solving and consensus building ability amongst the communities. Jirga members are not necessarily the ones that were chosen to represent sections of the community with outsiders. Qualities such as concern for the community, fairness, honesty, honour, and integrity are considered more important than outside exposure and social contacts. On the knowledge of local forestry staff Jirga Members were invited in the consultation who willingly participated and contributed.
	3	*Formal organizations (e.g., social welfare organizations; village development committees)*	There is no DFA Chinari specific social welfare organization, however a number NGO with wider coverage also operate in the DFA Lachrat.
IV		**Use of forest and forest area**	
	4	For what are you using the forest area?	Forests are generally used by the local communities for receiving forest concessions. The concessions are granted in the State forests and village forests for domestic and agricultural uses to the landowners and tenant farmers residing within a 4.8 KM radius of the forest boundary. The concession rights include; grazing, grass cutting and the collection of forage and timber (excluding Deodar wood) for domestic/ personal use. The forests are also used by transhumant grazers for summer grazing and for eco-tourism by outside visitors.
	5	What would it mean if you had no access to these forest products? (Any alternatives? Threat to livelihood?)	Only rich and well-off people can by alternatives. Forests concessions are their centuries old traditional right for their survival. These concessions can be exchange with alternative means of livelihood.
V		**Rights and concessions in forest area**	

	6	Do you have formal, legal, or traditional, customary rights on forest products (use)? Which ones? If documented rights, where?	Forest concessions are granted to Zamindars (those who cultivate the land as landowners, Assamis or tenants) as well as the traditional artisan groups that reside and are employed permanently in villages that live within five km of the demarcated forest boundary. The concessions are for agricultural and domestic purposes and not for sale, barter, or transfer in any way. They are also subject to the availability of trees, keeping forest conservation in due regard. The concessions include (Source; Forests Law Manual): • The right to graze livestock and to cut grass; • To pass livestock freely through the forests; • Timber for house building and repairing at 12.5 percent of standard rates; zamindars living 5-8 km from the forest boundary are allowed timber at 50 percent of the standard rates; • Fallen and dead trees are free; and free grants of timber if the house is destroyed by fire or natural disasters; • Free firewood for domestic use; timber for public use such as building bridges; • Lopping of branches no thicker than a man's wrist; • Free access to brush wood. • Fetch water from forest area.
VI		**Control of forest area**	
	7	Who is controlling access to the forest area?	Forests Department controls demarcated forests. Communities help Forests Department in cognizance of forest offences.
	8	What are forest control mechanisms? E.g., watch and ward; herdsmen; fencing; providing permits.	Forest policing by forestry staff. There is no fencing, no permit system. Reforestation plantations are protected by watchers.
	9	Explain control mechanisms	Forest territorial staff with cooperation of concessionary communities protect state demarcated forests. Some villages have constituted informal forest protection committees, who don't allow outsiders to harvest forest products or graze animals.
VI		**Changes over time in forest area**	
	10	What changes took place regarding the availability of forest products (timber; firewood; grasses; NTFP) during the last 30 years?	Forests productivity has gone down. Forest cover has contracted to far flung area. Soil erosion and landslides are common phenomena. Forestry concessions are getting more and more difficult to benefit from. Exciting wildlife species are scarce. Livelihoods are diminishing.
	11	What are according to you the reasons for change?	Pressure of increasing population demands i.e., firewood and timber. Overgrazing, bushfires, road construction, joblessness and poverty are the main causes of forests degradation.
	12	Were there any efforts in the past for forest restoration and by whom?	Yes, Forests Department in implementing development projects, also communities have become vigilant to conserve natural resources. Reforestation and watershed projects did good development works.
VIII	13	**Main problems**	

		What are the main problems in forest management with respect to; rights, protection, conflicting uses, managing drivers of deforestation and degradation etc.	The demographic pressure and finance resource deficiency, which include; 1) Lack of natural regeneration due to the indiscriminate overgrazing of forests, pastures, and community grasslands; 2) Encroachments on forestland; 3) Rural road construction; 4) Forests fires; 5) The ever-increasing burden of forest concessions on the nearby forests, beyond their sustainable rejuvenation capacity, and; 6) Illicit cutting of trees from public forests for personal gains. 7) Biomass productivity of rangelands has gone down to almost 35%; 8) There is no rest period for flowering and seeding for good fodder and forage species; 9) No range rehabilitation or development program is under implementation, and; 10) No credible database on range carrying capacity and current status.
IX		**Conflicts / disputes**	
	14	*On different land uses*: Describe nature of conflict, between which groups and put location on map if possible and impacts of the conflicts.	1) Award of forestland for public infrastructure i.e., governance infrastructure; 2) Rural road construction through the forests mostly and consequently land encroachment along roadsides by business enterprises; 3) Extensive stone quarries in forests areas; 4) Intentional bushfires to convert forests into grassland and for encroachment; All above conflicts impact forests management adversely.
	15	*On social issues*: Describe nature of conflict, between which groups and put location on map if possible	None.
	16	*Existing Conflict resolution mechanisms*: - traditional (e.g., Jirga) - formal (court)	Forests Department compound offence cases, forest courts and higher judiciary settle forest cases in case of appeal, Revenue Department settle land ownership issues. There is no traditional Jirga for settlement of forest disputes.
X		**Other Forest Management Projects**	
	17	There is any other Forest Management Projects in the area? If so, which projects? What are their activities?	Yes, the most promising ones are; 1) Ten Billion Tree Tsunami Project, and; 2) Demarcation of Forests Boundaries.
XI		**Recommendations**	

	18	What are your recommendations for forest management activities?	Possible strategies to combine are: 1) Planting additional trees on forests and private lands; 2) Increasing productivity of public forests by planting blank forest areas and employing joint forests management by the State and beneficiary communities; 3) Reducing inefficient wood utilization; 4) Wasting less wood in dispensing forests concessions; 5) Replacing wood with viable alternatives; 6) Ensuring communities' responsibility for sustainable natural resource management; 7) Exclusion of grazing animals and utilization of range resource by cut and carry; 8) Arranging fodder or increasing range production on marginal agriculture land; 9) Reducing number of animals to range carrying capacity of rangelands; 10) Providing animal health and related services; 11) Re seeding of palatable species and eradication of weeds in pastures; 12) A comprehensive range resources study; 13) Ensuring participation of pastoralist communities in the range management program on the lines of social forestry program, and; 14) Integrating women into livestock management extension services.
	19	Specific Recommendation to embark upon REDD+ Program on pilot and full scale	In order to proceed toward REDD+ implementation on pilot basis and full scale it would be ideal to; 1. Review and work on human and institution capacity building i.e., Forests Department, VCOs and the concerned line departments; 2. Review and implement climate change mitigation options; 3. Review and implement climate change adaptation options; 4. Seek different source and modalities of financing options, and; 5. Integrate REDD+ with forests management and implementation should involve deep engagement with extended stakeholders including beneficiary communities, civil society organization and the finance sector.

Participatory Analysis of REDD+ Mitigation Actions, DFA Chinari AJ&K

REDD+ supported interventions include but not limited to; the implementation of the following mitigation actions:

1) Reducing emissions from deforestation;
2) Reducing emissions from forest degradation;
3) Conservation of forest carbon stocks;
4) Sustainable management of forest; and
5) Enhancement of forest carbon stocks.

A participatory analysis of the DFA Chinari was conducted during the PFMP consultation process. An overview is given in the table below;

s#	REDD+ Activity	Indicator	Methodology & Scope
1	Deforestation	1) Canopy Cover Changes over the given period	There is an estimated loss of forests at the rate of 10,000 ha per annum for AJK. Tree canopy cover changes can be detected from the temporal satellite data/ image interpretation.
		2) Temporal Forests Fire Damage Study in Chir-Pine Forests	Forests Fires are reported by the Forests Department on regular basis. Preventive measures can be put in place, besides RADAR images can be employed for bush firefighting. Contingency Forest fire brigade on regional basis can be explored.
		3) Illicit Tree Cutting / Theft	Illicit Tree Cutting/ theft although a chronic problem but is reported by the Forests Department, damage cases are compounded or prosecuted in the courts of law.
		4) Forests Land Encroachments	The second major threat to the forests is illegal encroachment into the forest boundaries by people for different uses. The inability of Forestry staff to stop encroachment through law enforcement may even be encouraging them to take monetary benefits from the squatters. The only logical solution appears to be to prevent encroachment through custodian communities in return for the concessions they enjoy from forests or for REDD+ benefits. Forests Department takes care of illegal encroachment by the general public and conduct ejectments but not so effective when encroachers are governmental line agencies/ departments.
		5) Forests Landslides	Landslides are widespread throughout the mountain forests. Soil and water conservation agencies have evolved low-priced scientific solutions of the problems. Political commitment, public opinion and resource allocation would have to be promoted. Landslide's areas can be measured on satellite images and cheap soil-bio-engineering techniques are available to control the landslides.

		6) Ban on Commercial Logging	Ban on commercial logging has cancelled tradition timber-based forests management for all practical purposes. We are implementing green felling ban without evolving an efficient alternative of timber-based forests management. Policy makers are not fully convinced to allocate adequate resources for implementing modern forestry approaches e.g. REDD+, ecotourism, climate change mitigation and adaption, without having guaranteed increase in the forestry revenues.
		7) Timber Distribution Quota (EDQ)	Timber distribution quota would have to be cancelled, the sooner the better. It has exceeded the sustainable production limit of the nearby forest. The forests have contracted to mountain tops and far-flung areas. We need to arrange for wood and free grazing alternatives for forestry dependent communities. REDD+ would be the opportunity to capitalize on.
		8) Firewood and Construction Timber Damage by the Upland Communities	Free wood is available to communities from the state forests to meet their genuine needs. There is no alternative for free wood from the state forests for upland communities. Forests Law offence is immaterial to them, given the harsh weather conditions and lack of alternatives.
		9) Depletion of the Capital Growing Stock	After freedom war of 1947, there has been a tendency in AJK to extract timber more than the mean annual increment put on by the growing stock to earn revenue for the State Government, which has resulted into creation of the blanks areas in the State Forests.
		10) Increased Population Demands Pressure on the Mountain Forests	Ninety-one percent of AJK's population is rural and depends on forests for its fuel wood, timber, grazing and water requirements. The area under state forest has not increased since 1947 but the population has increased almost 4-time. Now human population has reached 4.2 million compared to 0.8 million in 1947. This has resulted in extraordinary pressure on the forests.
		11) Wood Consumption and the Future Trends	Information on wood consumption and trends is important to draw the future reforestation programs and the demand side management of the wood, which can be worked out on current and projected population basis. Consumption of fuel wood is estimated @ 0.449 m^3/ capita per annum. Extrapolating this to the population of 4.2 million (2020), estimated consumption is 336,000 m^3 annually, much beyond sustainable production.
		12) Indian Firing Across LoC to Cause Intention Bushfires	Forests damage due to the firing across LoC has significantly increased and is a major cause of deforestation. LoC adjoining areas rehabilitation plan be drafted and implemented. Global community may be mobilized in the wider context (forests, fisheries, international water, conservation areas and wildlife corridors).
		13) Snow Avalanches	Forests damage from snow avalanches can be studied from satellite images, forecasted using weather data freely available to devise some preventive measure/ risk management.

		14) Blanks Area in the Demarcated Forests	Blanks area can be studied from the satellite images and crash reforestation program need to be launched. TBTTP may be a potential option like that MTDF, which was partially funded.
		15) Non-Timber Forests Products (NTFP)	The future is NTFP. NTFP management needs to be upgraded and bring into the limelight. Ethno- botany an emerging discipline in applied sciences offers tremendous potential. Timber focused Forests Management is now almost obsolete. Environmental service of forestry ecosystems cannot be over-emphasized. REDD+ could be the crucial goal to be realized.
		16) Forestry Land Use Change Monitoring	Complete ban on forestry land use change, if inevitable, must be compensated by the land exchanges. Land use changes can be monitored from satellite data.
2	Forest Degradation	1) Uncontrolled Grazing of the State Forests by the Locals	Scientific rangeland management is far away. Rangeland service need to be created/ upgraded. Range carrying capacity has gone down to almost 50% throughout Pakistan. Grazing management regime needs to be embarked upon.
		2) Uncontrolled Grazing by Nomads/ Transhumant Grazers	Nomadic grazing is an efficient way to transfer natural resources of remote upland areas to the markets and contributes toward high quality protein food security. At the present totally unmanaged. We have to devise some mechanism of their management.
		3) Lopping and Browsing of Forests Trees	Lopping and browsing have affected annual tree growth consequently the growing sock per unit area of the forests, which should be permitted only on the silvicultural basis.
		4) Forests Damages	Causes of forest damages are multiple and diverse in nature, which stem from social, economic, political, administrative and technical reasons, which includes; • Upland communities revert to illicit damage for their unavoidable personal needs in harsh weather conditions. • Influential people steal away trees from public forests for personal gains. • Escalation of timber prices rendered forests difficult to protect. • Forests damages sustained in freedom wars and intentional forest fire caused by enemy shelling across LoC. • Encroachment on forest land and cultivation of the steep slopes. • Tree diseases and pest attacks. • Forest fire hazard. Forests damage control regime require substantial boost up and involvement of the beneficiary communities.

		5) Poverty Pervasive and Lack of an Integrated Participatory Development Approach	Poverty leads to natural resource degradation universally. An integrated approach as the process to improve forestry, animal husbandry and agricultural practices, meet community needs and stimulate regional economy needs to be adopted. In order to effectively help the farmers it should be made mandatory for the departments of livestock, agriculture, LG&RD and forestry to jointly plan and implement programs of common interest for farmers especially for fuel wood, fodder and forage production, livelihood generation and embark upon participatory rural development by bringing together extension and technical capabilities of all four Departments into the joint natural resource extension service.
		6) Farmland Trees Survey and Management including the State-run Social Forestry / Farm Forestry Programs	Farmland trees are an important source of fuel wood. Farmland trees need to be estimated by field survey because linear or small blocks of trees are not visible on satellite imagery. Private land is the most potential areas to take away pressure of the increased population demands outside the demarcated state forests. Therefore, critical importance of the social forestry and agroforestry programs cannot be over emphasized.
		7) Soil Erosion	Soil erosion is closely linked with degradation and productivity loss. The highest rates of erosion are in the Jhelum catchment above Mangla reservoir. The average annual soil loss is estimated to be 124 tones/ha between 50 to 110 km above the reservoir and 79 tones/ha between 20 and 50 km above the reservoir. Erosion rates on the stretch of Jhelum above Hattian (flowing from the east) are very low at 6 tones/ ha/ yr. Since the Neelum enters the Jhelum at Hattian, some of the erosion is attributable to that catchment, but no data are available specifically for it. The Kunhar (in KP) also joins the Jhelum at Rara Hattian. Erosion loss in the Kunhar catchment is 18 tones/ ha/ yr. Soil erosion control need to be brought on social and political agenda of the government by all means. Soil erosion studies conducted by WAPDA may be shared with all stakeholders rather dramatized.
		8) Need for Land Use Policy	Land use policy must be pronounced for: • Assessing land capability; • Setting land use standards according to that capability; and • Persuading farmers on these lands to move or change cropping practices.

		9) Strengthening of Land Use Planning Unit of P&DD and Soil Lab of Agriculture Department	Land Use Planning Unit and Soil Lab Wing of Agriculture Department needs to be upgraded to: • Assess the condition of sub-watersheds and their contribution to river silt loads, as a basis for prescribing action; • Conduct discussions with local residents about their concerns, needs and willingness to participate in programs; and • Identify the kinds of intervention needed and prescribe specific action; and • Conduct soil survey of the State to supplement sub-watershed land use planning.
3	Sustainable Forests Management	1) Forests Management Plans	For the long-term maintenance of forest capital (growing stock), the annual out-turn from a forest has to be equal to or less than the net annual increment. The management plans dictate the configuration and scheduling of tree removal and other silvicultural operations to attain optimum stocking i.e. normal forests with 100% crown canopy coverage. Hence forests would have to be worked on the principles of sustained yield. Theoretically all forests of AJK are covered under the Management Plans on sustained yield basis. But the ground situation is far from management plans prescriptions. Traditional Forests Management Plans also require large scale revamping. Forests Management is yet in search of alternate objective of timber-based management. REDD+ may serve the purpose.
		2) Adequate Natural Regeneration	Successful regeneration is the key to sustaining long-term production and to the future survival of these forests. Regeneration of the logged area need to be ensured in any case.
		3) Forests Nurseries	Forests Department should have adequate modern tree sapling nurseries to support reforestation and afforestation programs, besides meeting the sapling requirements of agroforestry / social forestry program for fuel wood and forage production.
		4) HRD	Institutional and human resource capacity building of Forests Department would be required to be able to execute sustainable forests management concepts and activities.
		5) SFM Information Communication Strategy	A comprehensive SFM information communication strategy would be required for awareness raising of all stakeholders regarding SFM, its long-term benefits and technical aspects.
		6) Financial Resource Allocation	Adequate financial resource allocation would be the prerequisite for implementing the sustainable forests management plans' prescriptions.
4	Conservation	1) Protected Area Network	The forests cover 43% of total land areas. Management of wildlife is the responsibility of the Department of Wildlife and Fisheries. Wildlife suffers from human interference because AJK has a dense population that makes heavy demands on forests and rangelands. The Wildlife Department of Azad Kashmir is intending to establish a network of protected areas to improve the population status of key

			wildlife species in general and to protect endangered, rare and unique species in particular. These protected areas are 17 in number (game reserves 11 & National Parks 6). The total area of these protected sites is 57,547 ha, which is about 8.5% of the total land area.
		2) Endangered/Threatened and Exciting Sports Species	AJK has populations of Musk Deer, Kashmir Stag, Grey Goral, Nilgai, Snow Leopard, Hunting Leopard, Black Bear and Pir Panjal Markhor. Among pheasants are the rare Western Horned Tragopan, Himalayan Monal Pheasant, Cheer Pheasant and Koklas Pheasant. Protected species among this list are Musk Deer, Snow Leopard, Cheer Pheasant, and Western Horned Tragopan.
		3) Management of the Protected Areas	Although these protected areas were established with the aim of giving protection and regulation of population status of wildlife species, but due to many reasons, this objective could not be achieved, and the situation remained not much different than the free areas around. All protected area is not covered under scientific management plans, where plans exist, plan prescriptions could be implemented for lack of financial resource allocation.
5	Forests Carbon Stock Enhancement	1) Land Use Cover Change Analysis	Land use cover change analysis could be performed on the temporal satellite data for such type of land use categories; • Degraded Forests Area • Deforested Area • Reforested Area • Plantation Area • Logged Area • Encroached Area • Un-changed Area
		2) Forests Growing Stock	Increase/ decrease in growing stock of forests can be determined through the comparison of the successive inventory data, for various plan period.
		3) Crown Canopy Cover	Crow canopy cover increase/ decrease may be indicative of forests carbon stock enhancement.