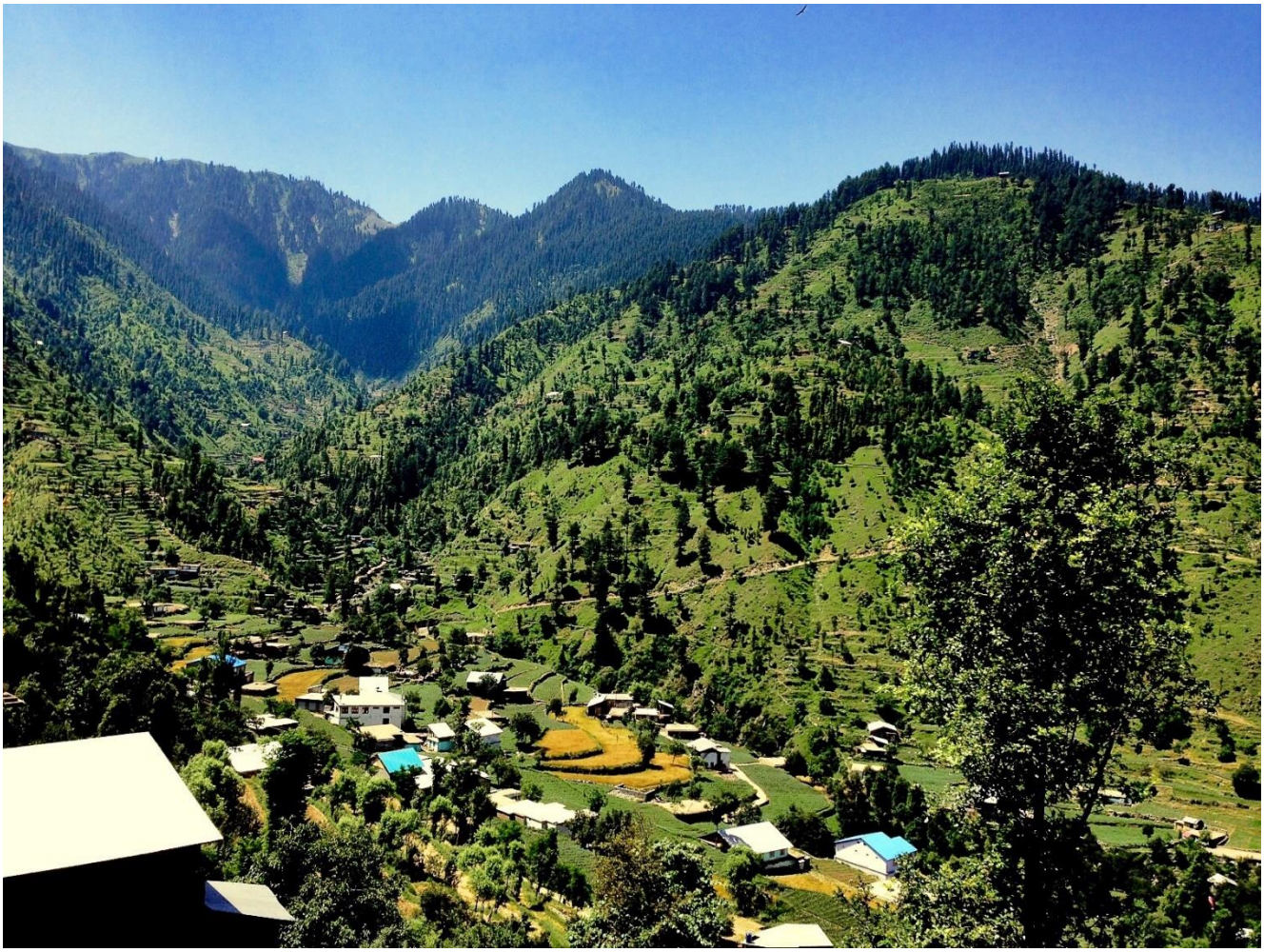
Participatory Forest Management Plan (PFMP)

Miandam Valley Forest Swat

2022 – 2031



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Miandam Forest Velley, Swat

Endorsement

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Disclaimer:
This Participatory Forest Management Plan is not a funding commitment from Forestry, Environment and Wildlife Department Khyber Pakhtunkhwa (KP). It is a proposal to be considered for future implementation of REDD+ Programme if funds are committed by the KP 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 KP will form the basis for implementing this Plan. Information on these aspects are suggestive and not binding on the Forestry, Environment and Wildlife Department KP and any other stakeholders mentioned in this document.

وضاحت

خیبر پختون خواہ کا محکمہ جنگلات، ماحولیات 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 خیبر پختون خواہ کے محکمہ جنگلات، ماحولیات وجنگلی حیات کے بنائے گئے انتظامی ومالی رہنما اصولوں کے تحت ہوگا۔

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Acronyms

AGB	Above Ground Biomass
BGB	Below Ground Biomass
AGC	Above Ground Carbon
BGC	Below Ground Carbon
ANR	Assisted Natural Regeneration
FE&WD	Forestry, Environment & Wildlife Department
FCPF	Forest Carbon Partnership Facility
GIS	Geographic Information System
GOP	Government of Pakistan
JFMC	Joint Forest Management Committee
LPG	Liquid Petroleum Gas
MoCC	Ministry of Climate Change
NCCP	National Climate Change Policy
NTFP	Non-Timber Forest Product
PFMP	Participatory Forest Management Plan
PFRA	Participatory Forest Resource Assessment
PSDP	Public Sector Development Programme
REDD+	Reducing Emission from Deforestation and Forest Degradation
TFCC	Planning Commission Task Force on Climate Change
t CO_2	Tonnes Carbon dioxide (Carbon credit)
VDC	Village Development Committee
10 BTTP	10 Billion Tree Tsunami Project

Executive Summary

Miandam Valley Forest located in Swat Forest Division of Khyber Pakhtunkhwa is one of the three sites selected by the Forest, Environment and Wildlife 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 Khyber Pakhtunkhwa Forests, Environment and Wildlife Department has developed a Provincial REDD+ Action Plan. This action plan is a decentralised framework for KP 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 Participatory Forest Management Plan. 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 Forest in Miandam is increasing at the rate of 23.80 hectares per year, sequestering 6328 tonnes CO_2 eq annually. This shows an increasing trend in this forest. The activities included in this PFMP if properly implemented, will 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 to the customary right holders / concessionists. These benefits will only be distributed if the targets are achieved. The plan 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 KP's 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

خیبر پختونخوا کے ضلع سوات میں واقع میاندم کا جنگل محکمۂ جنگلات، ماحولیات اور جنگلی حیات کی جانب سے منتخب کردہ اُن تین مقامات میں سے ایک ہے جہاں ایک پائلٹ سائٹ کے طور پر اہم فریقین سے مشاورت کے ساتھ ریڈ پلس 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 ریڈ پلس 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 ریڈ پلس سرگرمیوں کا آغاز کر کے عالمی کوششوں میں شمولیت اختیار کی ہے۔ ریڈ پلس 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 ریڈ پلس کی تیاری کا مرحلہ کہا جاتا ہے۔ پاکستان نے ریڈ پلس کی تیاری کی ضروریات کو پورا کرنے کے لیے خاطر خواہ پیش رفت کی ہے۔ پاکستان نے 2021ء میں ایک قومی ریڈ پلس حکمتِ عملی تیار کی ہے۔ جب کہ خیبر پختونخوا کے جنگلات، ماحولیات اور جنگلی حیات کے محکمے نے صوبائی سطح پر ایک جامع ریڈ پلس ایکشن پلان تیار کیا ہے۔ خیبر پختونخوا میں ریڈ پلس پر عمل درآمد کو آگے بڑھانے کے لیے یہ ایکشن پلان ایک صوبائی فریم ورک ہے۔ مختلف سماجی ماحولیاتی نظاموں میں جنگل کے انتظام کے لیے ریڈ پلس 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۔ ریڈ پلس پر عمل درآمد میں رہ نمائی کے لیے اس منصوبے کے تحت دو مختلف منظر ناموں 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 ذمّے 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۔ ریڈ پلس پر کامیاب عمل درآمد اور شراکتی سرگرمیوں کی تفصیلات کا تعیّن کرنے کے لیے یہ معلومات ضروری ہیں۔

جنگل کے رقبے کے تجزیے سے پتا چلتا ہے کہ 2010ء کے بعد میاندم کے جنگل میں 23.8 ہیکٹر سالانہ کی شرح سے اضافہ ہو رہا ہے۔ جس سے سالانہ 6,328 ٹن کاربن ڈائی آکسائڈ کا انجذاب عمل میں آ رہا ہے۔ یہ اضافہ واضح طور پر جنگلات کے رقبے میں مسلسل پیش رفت کی مثال ہے اور 2024 تک یہ جنگل ساری دستیاب زمین پر پھیل جائیگا۔ اس PFMP میں شامل سرگرمیاں اگر مناسب طریقے سے لاگو ہوتی ہیں تو جنگلات کے مربوط انتظام کے لیے فریقین کی کوششیں اس رجحان کو مزید فروغ دیں گی۔

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 منظر نامہ 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 ریڈ پلس 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 پختونخوا 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 مدّت 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 رہ نمائی متعلقہ فریقین کی مشاورت سے صوبائی 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 صوبائی محکمۂ جنگلات کے ذریعے مطلع کیا جائے گا۔

1 Introduction

1.1 The Context of PFMP

Pakistan has been implementing REDD+ activities since 2010 to mitigate climate change through reduced carbon emissions from the forestry sector. The Government of Pakistan (GoP), Ministry of Climate Change (MOCC) is implementing a REDD+ readiness programme funded by the Forest Carbon Partnership Facility (FCPF) of the World Bank. The Khyber Pakhtunkhwa government is committed to pursue REDD+ under its Green Growth initiatives since 2013 to mitigate climate change effects. This Participatory Forest Management Plan (PFMP) is to demonstrate integration and implementation of REDD+ activities in forest management in various socio-ecological systems.

The PFMP translates REDD+ concepts and processes at practical level considering complex socio-economic conditions, burden of rights and concessions, as well as obligations in the forest. This is the reason that in addition to forest stock assessment, the preparation of PFMPs for REDD+ sites require 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 to contribute to mitigate global climate change. REDD+ also provides mechanisms for the enhancement, measurement, and trade of carbon.

This PFMP provides information including description of site, GIS supported forest stock assessment, socio-economic situation, analysis of stakeholders with their interests and influences, emissions reduction scenarios, future interventions with indicative budget estimate, implementation mechanism and key challenges foreseen during implementation. The activities to maintain forest as carbon pool have been explained in this plan. It is expected that the implementation of the PFMP will enable the stakeholders of Miandam Valley Forest to trade carbon credits in the national and international market in foreseeable future like any other product, by increasing and maintaining the carbon stock sequestered in the forest. The PFMP will thus act as a road map for implementation, monitoring, reporting and verification of resources improvement, and distribution of benefits among stakeholders.

The proposed activities include strengthening of social organization for communities to play a role in decision making such as issuance of timber permits, transportation of timber, assistance in regeneration of forests, manage grazing, NTFP promotion, linkages and promotion of tourism and wildlife activities. Due to high dependence of Miandam tribes on livestock, relevant activities have been included to improve quality of and productivity of livestock. The area has a great potential for NTFP as a major source of livelihood. These include walnut, pine-nut, honey, wild cumin seed, and medicinal plants. Budget has been provided to sustainably manage these sources at local level. In order to reduce the pressure on natural forests alternative sources of energy such as solar energy, bio-mass technology, and energy efficient stoves/bio-briquette have been included.

1.2 Objectives of PFMP

The specific objectives of this plan are as under:

1. To promote sustainable Forest management in Miandam Valley Forests.
2. To protect, improve forest health and enhance Carbon stocks in Miandam valley Forests while addressing drivers of deforestation and forest degradation
3. To enable the Miandam 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. Miandam valley was one of the three potential sites selected for preparation of PFMP.

ii. Participatory data collection. Local community of Miandam tribe 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 9 sample plots selected in Miandam Valley Forest. 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.

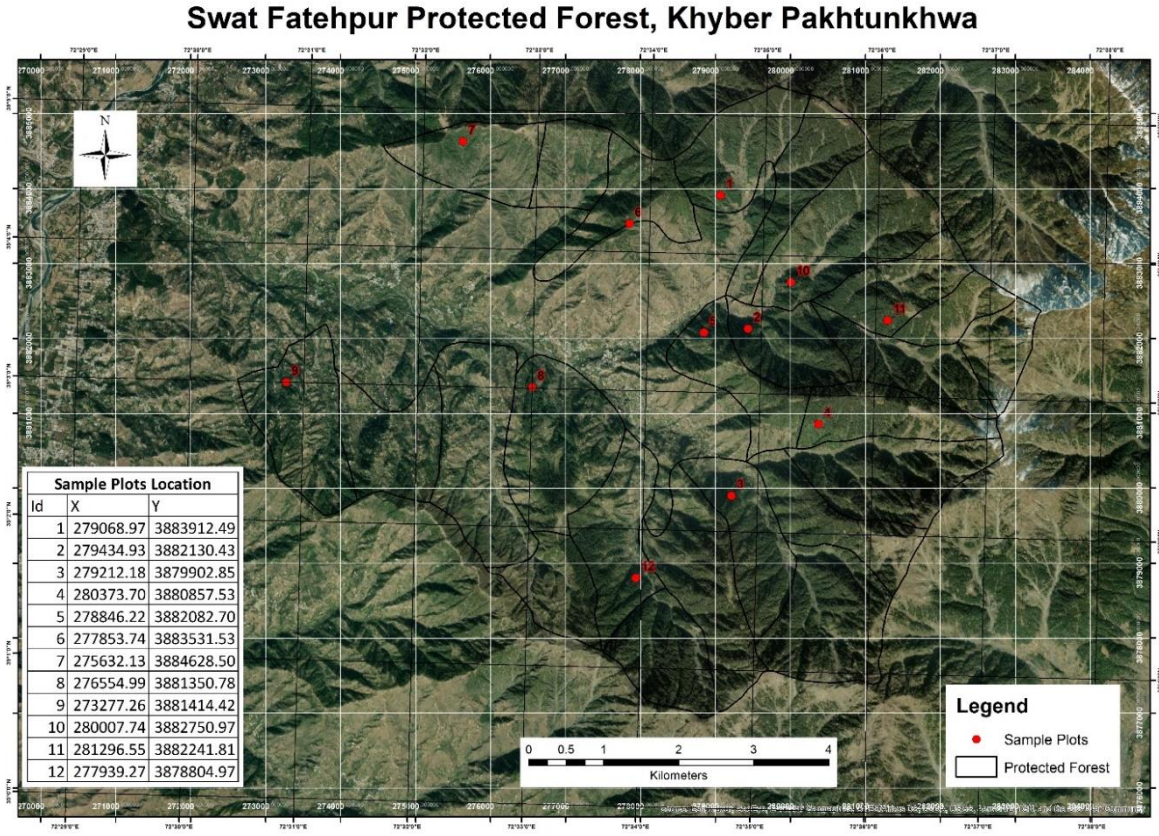

Figure 1. Location of sample plot

v. 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 and endorse by the REDD+ focal person of Khyber Pakhtunkhwa province.

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+.

A. Global commitments

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). The REDD+ is a framework created by Conference of Parties (CoP) of UNFCC to incentivise developing countries either to reduce emissions of Green House Gases (GHGs) or to increase sink of CO2 in forest lands (UNFCC, 2021).

B. National policies and commitments

Pakistan is an active member of the international negotiation forum on climate change and making efforts to reduce emission reduction suiting to the priorities of its citizens (GCISC, 2018). Pakistan's report on intended Nationally Determined Contributions seeks 20% reduction of the current national

GHG emissions (GOP, 2017). From 2016 onwards, continued investments in nature-based solutions (Nbs) through the largest ever afforestation programs in the history of the country Ten Billion Tree Tsunami Program (TBTTP) will sequester 148.76 MtCO2e emission over the next ten years.

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. Mitigation in the forestry sector entails 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 state forests but forests 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 area, unfavourable conditions for biodiversity, higher flood risks and the like, as portrayed in the Planning Commission Task Force on Climate Change (TFCC) Report (GoP, 2010).

Pakistan has also approved its National Forest Policy 2015 with a goal of expansion, protection, and sustainable use of national forests, protected areas, natural habitats, and watersheds for restoring ecological functions, improving livelihoods and human health in line with the national priorities and international agreements.

C. Provincial policies and commitments

Climate Change remains a pressing challenge for KP province due to its vulnerability to its ecological diversity and relatively low coping capacity. KP has announced the country's first Provincial Strategy for Financing Climate Actions in 2018. KP has already promulgated its Forest Policy 1999. The Green Growth Initiatives of the province to enhance climate resilience has a high emphasis on forestry interventions since 2013. The province also pioneered a Billion Trees Afforestation Project. A REDD+ Strategy was drafted, and Environmental and Social Management Framework (ESMF) was developed. Forest Reference Emission Level and Forest Reference Level (FREL/FRL) have also been developed for the province.

KP has more than 50% of the coniferous forests of Pakistan with a potential of 6.000 to 9.000 million tCO_2 (Carbon credit) annually. The role of forests in mitigation, adaptation, enhanced resilience, and improved livelihoods is duly recognized in the Strategy. A Provincial REDD+ Action Plan has also been prepared for KP. Efforts are underway to identify Markets for sale of Carbon credits. Miandam has been identified as a pilot area. The activities mentioned in this PFMP to manage Miandam valley Forest align well with the actions suggested in KP REDD+ Strategy and Action Plan.

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 Site description

The total area of Miandam Forest selected for demonstration of REDD+ is about 4385 hectares comprising of 34 forest compartments. It is located at Latitude 35° 3' 12.24" N and Longitude 72° 35' 1.32" E. Miandam is the northern part of Swat Forest Range in the Moist Temperate Forest. It comprises of two watersheds Shin and Miandam. Miandam union council is part of Khwazakhela Tehsil of District Swat and is at an elevation of 1798 meters above sea level in the foothills of Hindu Kush mountains. Since the merger of the Swat state in 1969, all the forests formerly belonging to "Wali of Swat" have been declared as protected forests, however, these forests are threatened by encroachment and deforestation. The area falls in high mountainous region with maximum precipitation in the form of snow in winter. Mean monthly temperature remain below 10^{o} C for a period of 6 winter months. The major land cover of the PFMP site is forest followed by grasslands. Built up areas and croplands are mostly outside the PFMP site but very close to the boundaries of the site.

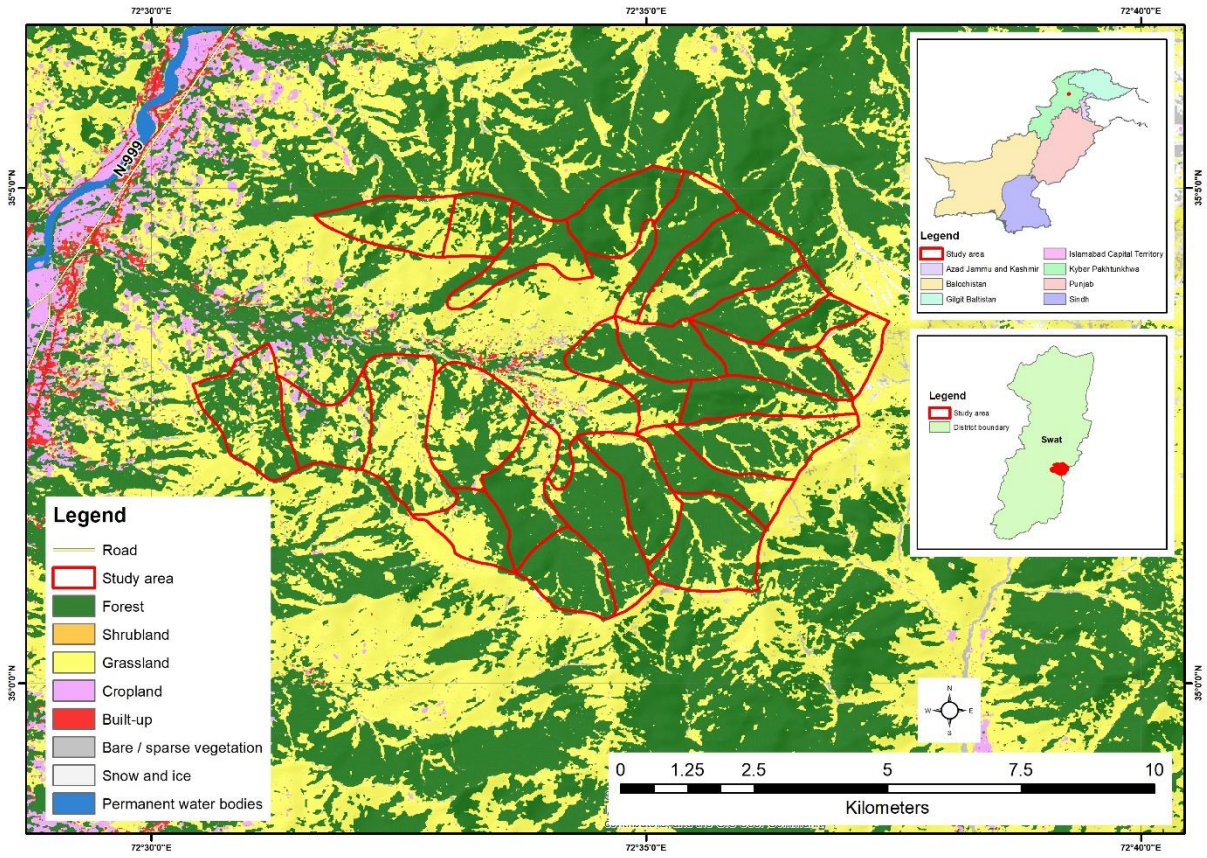

Figure 2: Land Use/Land Cover Map of Miandam Forest

2.1.2 Location

In the north of the Miandam valley is Bishigram village, in the south is UC Shin, in the East is Shangla district and in the west is UC Fatehpur. Miandam is towards to the right of the main Swat-Kalam

Road. Miandam khwar is flowing in the middle of the valley. It is situated at a distance of 55 KM from Mingora. Main villages in the valley are Shahtoot, Jukhtai, Senay, Kolakarin, Dand, Kherababd, Shoonga, Noorabad, Miaganao Jalay, Gujarao Kalay, Swato Kalay and Miandam Bazar.

2.1.3 Vegetation type

Major forest species in the valley are *Pinus willichiana* (blue pine), *Abies pindrow* (fir), *Juglans regia* (walnut), associated with Oak species. NTFP people are collecting and selling mushrooms, wild spinach, wild fruits, medicinal plants and needles and cones. The local people exercise the following rights and concessions in the forests:

1. 60% share in the sale proceed to the entitled /original owners of the agricultural lands
2. Timber for construction and repair of residential buildings to entitled-on permit to be issued
3. Grazing of domestic livestock free of charge.
4. Grass cutting and lopping of fodder trees of charge.
5. Collection of firewood free of charge.

2.2 Socio-economic data

Socio-economic data of the Miandam was collected during Focus Group Discussion and key informant interviews. Summary of the data is explained below under major headings.

2.2.1 Demography

Total population of the valley is 27418 and 3360 households. Main villages in the valley are Shatoot, Jukhtai, Senay, Kolakarin, Dand, Kherababd, Shoonga, Noorabad, Miaganao Jalay, Gujarao Kalay, Swato Kalay and Miandam Bazar. Main tribes are Miangan, Gujjar, Swati, Khadan Khel, Khado Khel and Swati.

2.2.2 Health and Education

There is only one basic health unit and 10 private clinics. On education side there is one higher secondary school, one girl's high school, one combined Govt high/middle/primary school. There are 10 boy's primary and 5 girls' primary schools. For livestock there are two private clinics.

2.2.3 Sources of Livelihoods

The main sources of income are agriculture, remittances (both foreign as well as local), tourism and labour. The community was heavily affected due to terrorism and military operations in the past when tourists stopped coming to these valleys. The tourism has started picking up now and more young people are engaged in these jobs. A lot of people from the households have low paid jobs in other cities and send remittances. Livestock is an important source of livelihoods for subsistence and also cash income. Other source of income is collection and sale of non-timber forest products.

2.2.4 Dependence on forest resources

The people living around the forests and grazing lands depend considerably on income from them. Though local dependence on forests for livelihoods is decreasing, dependence for fodder, fuelwood and timber is increasing in population and lack of alternatives. The use of forest products varies directly with their distance from the forests. In addition to forest resource the residues of agriculture crop, fodder crops and grasses are another most important sources for livestock.

Regarding the NTFP people are collecting and selling mushrooms, wild spinach, wild fruits, medicinal plants and needles and cones.

Due to great potential of hydropower units, a number of units were established through different organizations but unfortunately in absence of a proper operational and maintenance mechanism,

the units are not functional. During meetings with the communities, they demanded for operationalization of the MHPs so that the burden on fuelwood may be decreased.

2.2.5 Forest rights

The local people exercise the following legal and customary rights and concessions in the forests;

- 60% share in the sale proceed to entitled /original owners of the agricultural lands
- Timber for construction and repair of residential buildings to entitled-on permit to be issued.
- Grazing of domestic livestock free of charge.
- Grass cutting and lopping of fodder trees of charge.
- Collection of firewood free of charge in addition to dead fallen, and pruning of trees
- Other products: Medicinal plants, NTFP

2.2.6 Changes in forests over time

Biotic factors such as human and cattle population exert a considerable pressure on forests in the form of illicit cutting, lopping, and grazing with the result that the condition, distribution and quality of forest crop is considerably affected. The main factors include population increase, encroachments, illicit cutting of trees and clearing of trees for cultivation. The whole area is open to uncontrolled grazing seriously hampers the survival of regeneration. Therefore, in summary, heavy load of local rights, multiple demand over forests and conflicts between community and forest department on the matter of permits to outsiders are main issues affecting forests. Currently illegal harvesting of forest by local offenders is on peak. The demand for fuel wood is more that the annual increment of forest.

Current, billion tree Afforestation Programme and Ten Billion Tree Afforestation Programme (BTAP) are active in the area and are able to make a lot of difference in the natural and artificial regeneration.

2.2.7 Stakeholders

Stakeholder analysis is given in **Table 1** and description of the main stakeholders is given below.

The stakeholder analysis reveals that the Forest Department and local community are the major players with greater interest in forest management. The main control of forest area rests with the Forest Department and also Community (JFMC). This is a kind of joint watch & ward system by the forest department and the community. Timber harvesting is based on permits issued by FD. Apart from Forest Guard appointed by Forest Department. Under 10BTTAP Nigehbans are appointed through Village Development Committees for protection and conservation of forests. On the demand of community, the FD has stopped issuing permits for commercial harvesting of forest. The forest users of the forest products having no legal rights fall under neglected players and required special attention to safeguard their interests. The law enforcement agencies also play an active role when needed. They fall in the category of marginal players as this is not their core area of responsibility. Revenue department is a major player by controlling the land. They have very little role in the conservation and management of forests but owns the land. Their services are required only when there is a dispute on the land ownership.

A. **Forest department**

The Miandam Forest fall in the legal category of Protected Forest. The land belong to the provincial government and forests is encumbered with rights of local communities. The community is supposed to provide voluntary assistance to the FD in the protection of forests in events like forest fire and check illegal trade of forest products. The community has also formed a Joint Forest Management Committee (JFMC) for the conservation and protection the forests. At present the JFMC is not very active in playing its due role. Other stakeholders include the Revenue Department as government agency tasked as custodian of land and security agencies.

During stakeholder analysis it was found that the community and the forest department are interested to increase the forest cover through natural as well as artificial regeneration under 10BTTP. For this purpose, 23 enclosures have been established and Naghebans appointed through committees to look after the enclosures. Further free distribution of fast-growing fodder species among community to meet their fodder requirement is regularly carried out.

B. **Community**

The population is slowly switching to other sources of income including Government Jobs, businesses, and trade. Migration to other parts of the district and country in search of job opportunities, education, and health care is also taking place. The uneducated and unskilled individuals are still heavily dependent on farming and natural resources. The community is keen to capitalize on the potentials of eco-tourism, embroidery, and promotion of NTFP to generate alternate employment especially for youth. Local Support Organization, Village Development Committees, Joint Forest Management Committee exist in Miandam. The socioeconomic data of Miandam Forest indicates that the institutions relevant for management of Miandam forests are two.

Traditional *Jirga*

The *Jirgas* system is in place in Miandam. The Jirga members are the notables and respective of the area headed by one of the members among them. The main purpose of the Jirga is to take decision pertaining to all communal matters of the village. This includes conflict resolution. If the *jirga* is not able to resolve any conflict, the parties involved in the conflict may seek support of religious leaders or take the case to the formal judicial system. It is important to note that seeking intervention of the *jirga* for conflict resolution is not mandatory. Most cases which involve conflict over communal resources however are resolved through the *jirga*.

Village Development Committee/Joint Forest Management Committee

In Miandam a Local Support Organization namely MODE (Miandam Organization for Development and Empowerment) established in 2015 with the aim to develop the area. A Joint Forest Management Committee (JFMC) was formed to protect the forests. However, the Village Development Committees (VDC) also formed under 10BTTP in order to protect and conserve the forest. These committees recommended the local for appointment as Naghebans for the conservation and protection of forests by establishing enclosures.

2.2.8 Stakeholder's Analysis

The stakeholder analysis (**Annex 2**) was conducted to acquire information about major actors, and their interest and influence on forest resources utilization, management, or restoration. 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+.

The Miandam Forest fall in the legal category of Protected Forest. The FE&W Department is the manager, and controller of the forest. The communities are concessionists, right-holders or users in forest resources. The community provides voluntary assistance to the FE&W Department in the protection of forests in events of forest fire and check illegal trade of forest products, Protection from grazing and nurturing natural regeneration. The community has formed Joint Forest Management Committee to protect the forests. Other stakeholders include the Revenue Department as government agency tasked as custodian of land and security agencies which intervene only if called by relevant authorities.

Historically, the major source of livelihood in Miandam has been agropastoralism. The population heavily depended on the natural forest for grazing livestock, NTFPs, timber and fuelwood. Located in high altitude, the area experiences harsh and long winter during which the area receives heavy snowfall. In the absence of economical and sustainable substitutes for fuelwood, the population still mainly relies on natural forests for space heating and cooking.

The stakeholders and their roles identified were further analysed by using the influence-interest matrix to explore their type and level of influence and interest in forest management and carbon pools (**Annex 2**). It helps in understanding the actual influence and interests and may help identifying the need for increasing the involvement of specific stakeholders. It was found that the Forest Department and local community are the major players with greater interest in forest management. The law enforcement agencies also occasionally contribute to forest protection when called in events of forest offenses, but since the protection of forest is not their core area of responsibility they fall in the category of marginal players in the matrixes. The Ministry of Climate Change and other projects have a high interest, but until now little influence on local forest management and carbon pools on ground. This may change through REDD+ programme and the distribution of resources for carbon sequestration in future.

The Revenue Department deals with matters related to land as records and decision related to land are entrusted with this department. The Revenue Department has little interest in forest management and only get involved when there is a dispute regarding land ownership or distribution of share to respective shareholders/concessionists received from the forest department. Therefore, it falls in the category of low interest stakeholders.

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	Local community members who harvest for selling (Illegal harvesters) Ministry of Climate Change	Forest Department Local community members with use rights and concessions *10 BTAP*
	Marginal players Low priority	**Risk factors** Need to be addressed
INTERST **Low** Score 0 and 1	Law enforcement agencies Revenue Department	None
	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 Miandam valley most of the Forest is Protected Forest. Degradation of Forests is a common phenomenon in Miandam Valley Forest. These forests are under tremendous pressure to meet timber and firewood requirement of the community. Further purchase of timber at concessional rates is allowed to the non-entitled residing in Swat district after obtaining no objection certificate from the entitled. Of deforestation are cutting and felling of tress for constructional timber (local & outside) and timber smuggling. The major driver of forest degradation is cutting, lopping and removal of trees for firwood, grazing of forest areas. These are followed by encroachment and unplanned tourism activities.

The population of Miandam union council is 27418 with a growth rate of 3.30 per year. The average fuelwood consumption per capita is 0.70 while the timber consumption per capita is 0.30 m3. The

land and Forest belong to the Govt. and community has rights and concessions (Royalty) in the forest. Any violation such as deforestation for greed or encroachment of land are proceeded under the Forest ordinance 2002. **Table 2** documents major drivers of deforestation and forest degradation.

Table 2: Major drivers of deforestation, forest degradation and barriers to enhancement

Serial Number	Major drivers of degradation	Underlying causes	Degree of severity*
Deforestation			
1	Encroachment	1. No demarcation 1. Pressure for tourism activities	2
2	Timber Smuggling	1. Timber demand of coniferous forest 2. Purchase of timber at concessional rates by non-entitled residing in Swat.	2
Forest Degradation			
1	Cutting, lopping and removal of trees for firewood	1. No Alternate Source of energy 2. Harsh climatic condition 3. Poor Communication	3
1	Cutting and felling of Trees for Constructional Timber Local and outside	2. Lack of Alternatives 3. Permit system for outsiders 1. Heavy pressure of the outsiders	3
Barriers to Enhancement			
1	Grazing in Forest Area	4. To gain financial benefits, forest land is offered to the nomads for grazing purpose.	3
2	Unplanned Tourism activities	1. Lack of Coordination between Tourism and Forest Deptt 2. Lack of land use planning	1
Degree of severity: 1: low 2: medium 3: high			

2.4 Carbon stock assessment of Miandam Forest

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 3**). The tree species level carbon stock is given in **Annex 3**. 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 Miandam Forest.

Table 3. Plot level above and below ground carbon stock

Plot No.	Average AGC (ton/ha)	Average of BGC (ton/ha)
1	3.071619269	0.767904817
2	2.584485374	0.646121343
3	1.029829443	0.25606592
5	0.82217595	0.205543987
7	0.85037806	0.212594515
9	0.985844648	0.246461162
10	4.384905774	1.096226443
11	1.638628213	0.405603809
12	2.84778175	0.711945437
Grand Total	**2.190739743**	**0.546972093**

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 an increase of 238 ha in forest cover in the past 10 years at an average rate of 23.8 hectare (ha) per year (**Table 4**).

Table 4. Forest cover assessment (2011 -2021)

No	Landsat Satellite Sensor	Landsat data acquisition	Forest Cover (ha)
1	Landsat-8	2021-09-04	4325
2	Landsat-5	2011-09-25	4087
Change in Forest Cover in last 10 years			238
Per year change in forest cover			23.8

Table 4a provides **the business-as-usual scenario thereby meaning that at the current forest cover increase rate of 23.8 ha per annum the forest will cover all the available area of this site in 2024.** The total area of the PFMP is 4,385 ha and has very little land available for increasing the forest cover.

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

Rate of change per year	23.8
Year	Forest Cover (ha) - Business as usual
2011	4087.00
2012	4110.80
2013	4134.60
2014	4158.40
2015	4182.20
2016	4206.00
2017	4229.80
2018	4253.60
2019	4277.40
2020	4301.20
2021	4325.00
2022	4348.80
2023	4372.60
2024	4396.40
2025	
2026	
2027	
2028	
2029	
2030	
2031	
2032	

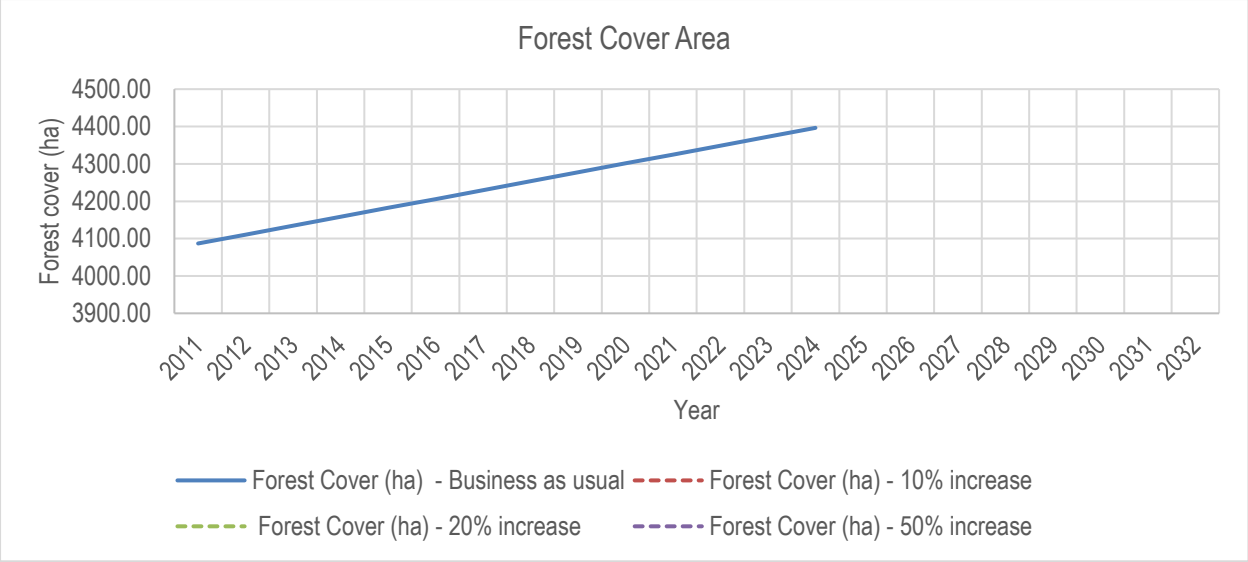

Figure 3: Forest cover area

2.4.3 Carbon stock estimation and CO2 emissions

The field data and biomass collected from 9 samples was used to calculate Above Ground Biomass (AGB) using locally developed allometric equations (Ismail et al, 2018) for 2010-2021. In Miandam forest, the cumulative carbon stock in five carbon pools was estimated to as 296,373.09 tonnes of Organic Carbon (Corg) back in 2011 which increased to 313,631.91 tonnes in 2021.

This change corresponds to the increase in forest cover from 4,087 ha in 2011 to 4,325 ha in year 2021 (see figure 4 and Table 5).

Figure 4: Forest Cover Maps used for Change Analysis

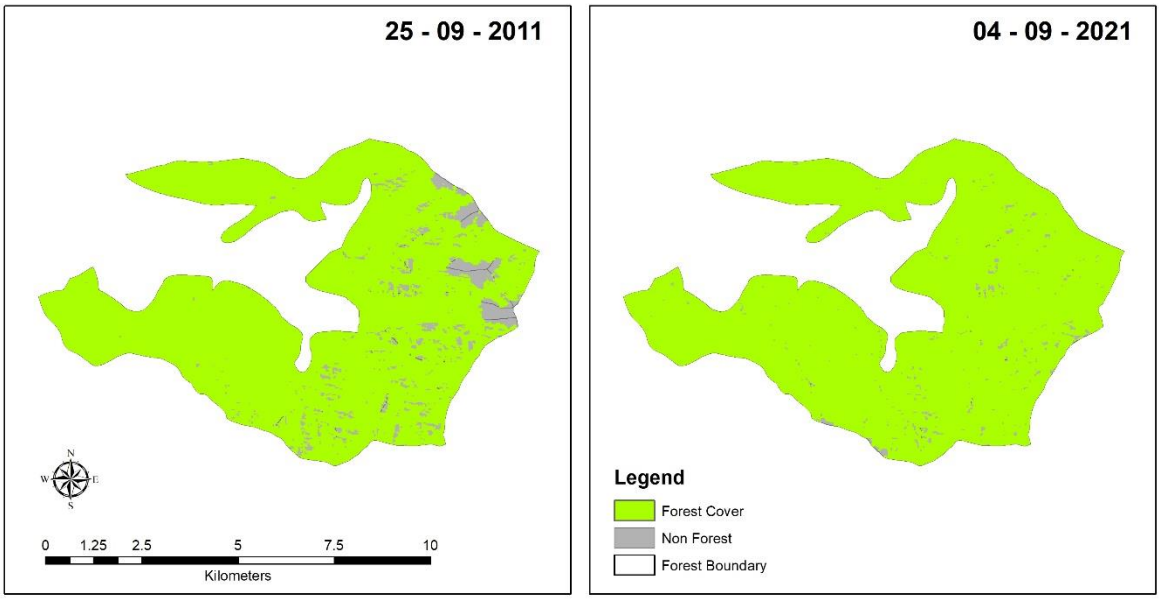

Table 5. Carbon stock estimation (2011-2021)

Carbon pool	Mean carbon stock (tons C stock per ha)	Forest Cover (ha)	Total stock (tons C stock)	CO_2 (tons CO_2 eq)
2011 (2011-09-25)				
Above	2.19	4087	8,953.55	
Below	0.55		2,235.47	
Deadwood	0.23		943.83	
Litter	0.05		193.74	
Soil*	69.5		284,046.50	
Cumulative			296,373.09	1,086,701.34
2021 (2021-09-04)				
Above	2.19	4325	9,474.95	
Below	0.55		2,365.65	
Deadwood	0.23		998.79	
Litter	0.05		205.02	
Soil	69.5		300,587.50	
Cumulative			313,631.91	1,149,983.68
Rate of change per year				
2021-2011		**23.80**	**1,725.88**	**6,328**

*Estimation of soil carbon pools in the forests of Khyber Pakhtunkhwa Province, Pakistan, Anwar Ali

2.4.4 CO2 Sequestration Scenarios from Forest Enhancement

This section presents the future CO_2 emissions sequestration scenarios applying 10%, 20% and 50% enhancement to current sequestration rate over the past 10 years due to forest cover increase (As per definition of forest adopted by Pakistan for REDD+). The current average CO_2 sequestration rate in the PFMP site is 6,328 tonnes CO_2 eq per annum because of forest cover increase which can be boosted further by 633 tonnes with 10% enhancement, 1,266 tonnes with 20% enhancement and 3,164 tonnes with 50% enhancement of forest cover **(Table 6)**. **Figure 5** shows the enhancement trend under above mentioned scenarios.

Table 6: CO_2 Emissions Sequestration trend and Different Enhancement scenarios

Rate of change per year [1]	6328	633	1266	3164
Year	**Sequestration from Forest enhancement (tons CO_2 eq) -Business as usual**	**Sequestration from Forest enhancement (tons CO_2 eq) - REDD+ with 10% addition**	**Sequestration from Forest enhancement (tons CO_2 eq) - REDD+ with 20% addition**	**Sequestration from Forest enhancement (tons CO_2 eq) - REDD+ with 50% addition**
2011	6328			
2012	6328			
2013	6328			
2014	6328			
2015	6328			
2016	6328			
2017	6328			

[1] In tonnes CO_2 eq per annum

2018	6328			
2019	6328			
2020	6328			
2021	6328	6328	6328	6328
2022	6328	6961	7594	9492
2023	6328	7594	8860	12656
2024	6328	8227	10125	15821
2025	6328	8860	11391	18985
2026	6328	9492	12656	22149
2027	6328	10125	13922	25313
2028	6328	10758	15188	28477
2029	6328	11391	16453	31641
2030	6328	12024	17719	34805
2031	6328	12656	18985	37969
2032	6328	13289	20250	41134

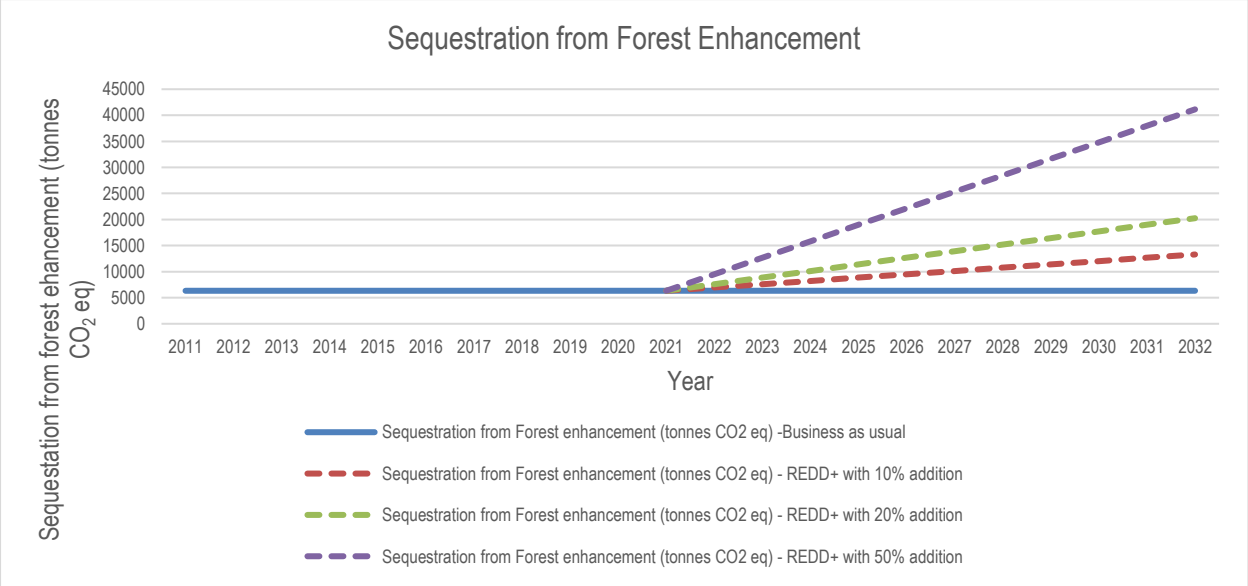

Figure 5: Emissions Reduction Scenarios – Forest Cover Increase

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 27,418 with a growth rate of 3.3 per annum. The fuelwood and timber consumption per capita per annum was calculated as 0.7 m^3 and 0.3 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[2] (FC*D*BEF2*CF*44/12) (tons CO_2 eq)	Timber Emission (TC*D*BEF2*CF*44/12) (tons CO_2 eq)	Emission from Forest Degradation (tons CO_2 eq) - Business as usual
2011	22418	15693	6725	18304	7844	26148
2012	23183	16228	6955	18928	8112	27041
2013	23974	16782	7192	19574	8389	27963
2014	24792	17355	7438	20242	8675	28918
2015	25638	17947	7691	20933	8971	29904
2016	26513	18559	7954	21648	9278	30925
2017	27418	19193	8225	22386	9594	31980
2018	28323	19826	8497	23125	9911	33036
2019	29257	20480	8777	23888	10238	34126
2020	30223	21156	9067	24676	10576	35252
2021	31220	21854	9366	25491	10925	36415
2022	32251	22575	9675	26332	11285	37617
2023	33315	23320	9994	27201	11658	38858
2024	34414	24090	10324	28099	12042	40141
2025	35550	24885	10665	29026	12440	41465
2026	36723	25706	11017	29984	12850	42834
2027	37935	26554	11380	30973	13274	44247
2028	39187	27431	11756	31995	13712	45707
2029	40480	28336	12144	33051	14165	47216
2030	41816	29271	12545	34142	14632	48774
2031	43196	30237	12959	35268	15115	50383
2032	44621	31235	13386	36432	15614	52046

[2] Wood Density (D)

Abies pindrow	*0.42*
Picea smithiana	*0.43*
Pinus wallichiana	*0.43*
Quercus ilex	*0.64*
Average	*0.48*
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 allowing the forest cover to increase at a current rate of 23.8 ha in business as usual scenario (taking the forest cover to 100% by 2024) 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 continue declining till 2026 due to cumulative effect of increasing forest cover and reduction in forest degradation due to REDD+ implementation but will again start climbing due to steady increase in population resulting in increase in demand for fuel and local use timber. A concerted strategy focussing on reducing the demand for firewood and local use timber would be needed to realize the full potential of CO_2 sequestration from the pilot site.

Figure 6 graphically presents the business-as-usual scenario and the REDD+ scenario.

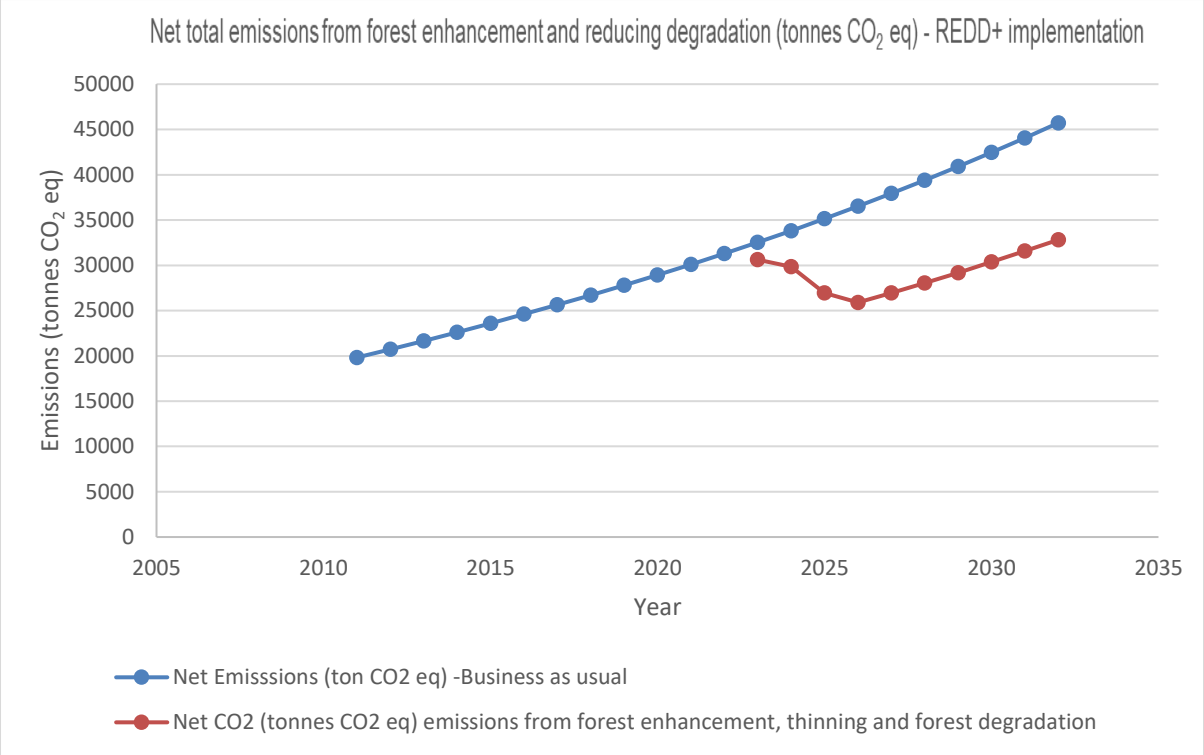

Figure 6: Sequestration scenarios – Forest Enhancement and Reduced degradation

Table 8: Sequestration Scenario from Forest Enhancement and Reducing degradation

Year	Annual Sequestration from forest enhancement (ton CO_2 eq) - Business as usual	5% emissions due to thinning	Net CO_2 sequestered after 5% thinning	Annual Emission from Forest Degradation (ton CO_2 eq) -Business as usual	Net CO_2 emissions from degradation discounting thinning	5-25% Reduction in Degradation emissions (ton CO_2 eq)	Emission from Forest Degradation (tonnes CO_2 eq) - Scenario 5-25 reduction in fuel	Net CO_2 Emissions (ton CO_2 eq) -Business as usual	Net CO_2 (tonnes CO_2 eq) emissions from forest enhancement, thinning and forest degradation
2011	6328			26148				19820	
2012	6328			27041				20712	
2013	6328			27963				21635	
2014	6328			28918				22589	
2015	6328			29904				23576	
2016	6328			30925				24597	
2017	6328			31980				25652	
2018	6328			33036				26707	
2019	6328			34126				27798	
2020	6328			35252				28924	
2021	6328			36415				30087	
2022	6328			37617				31289	
2023	6328	316	6012	38858	38574	1929	36645	32530	30633
2024	6328	316	6012	40141	39856	3986	35870	33813	29859
2025	6328	316	6012	41465	41181	8236	32945	35137	26933
2026	6328	316	6012	42834	42549	10637	31912	36506	25900
2027	6328	316	6012	44247	43963	10991	32972	37919	26960
2028	6328	316	6012	45707	45423	11356	34067	39379	28055
2029	6328	316	6012	47216	46931	11733	35198	40888	29186
2030	6328	316	6012	48774	48489	12122	36367	42446	30355
2031	6328	316	6012	50383	50099	12525	37574	44055	31562
2032	6328	316	6012	52046	51761	12940	38821	45718	32809

3 Proposed Interventions

A number of interventions have been proposed here based on the participatory forest inventory, socio-economic data, drivers of deforestation and degradation, and stakeholders' analysis. The analysis ascertained that 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 Miandam valley related issues. The following interventions are, therefore, suggested for managing the Miandam Valley Forest as a REDD+ pilot site:

Table: 9: Proposed interventions addressing major driver's deforestation and degradation

S. No.	Proposed interventions	Drivers of deforestation and forest degradation and barriers to enhancement addressed	Remarks
1	• Strengthening of Joint Forest Management Committee. • Assessment of genuine timber & firewood need (visits / meetings). Facilitation in rights & concessions and distribution of benefits to local communities • Distribution of fast-growing fodder and firewood trees for planting to reduce fodder and fuelwood needs • Repair of MHPs already constructed • Provision of biomass energy technology • Energy efficient stoves and bio-briquette	**Cutting, lopping and removal of fuelwood**	
2	• Strengthening of Joint Forest Management Committee. • Assessment of genuine timber & firewood need (visits / meetings). Facilitation in rights & concessions and distribution of benefits to communities • Assist in natural regeneration	**Cutting and felling of trees for constructional timber local and outside**	
3	• Rotational grazing (small scale application) by community-based system	**Grazing in Forest Area**	This activity will provide a demonstration to the community to see the results of rotational grazing on small scale
4	• Establish community forest check posts • Promotion & value addition of non-timber forest products (trainings / equipment) • Raising fruit orchards • Distribution of fruit plants • Provision of timber on market-based rates instead of concessional rates to non-entitled persons (through JFMC)	**Timber Smuggling**	Through these interventions, the community will be empowered to check the illicit cutting and smuggling of timber. Further income of the locals will increase due to value chain addition activities thus the burden on forests will be reduced and eliminated
5	• Linkages, facilitation and promotion of Tourism	**Unplanned Tourism activities**	Synchronised efforts by inhabitants will adjust the activities

Picture 1: Dialogue held on the finalization of interventions

The total indicative budget of the PFMP implementation is PKR 73,150,000. (See justification of higher budget in the last paragraph in the section on introduction). Ten years budgeting and proposed operational planning of the PFMP is given in **Table 10**.

Table 10. Indicative operational plan and budget of PFMP for 10 year

S.N.	Activity	Unit	Unit cost	Operational Plan 1	2	3	4	5	6	7	8	9	10	Total units	Total cost
A	**Strengthening of Social Organization**														
1	Strengthening of Joint Forest Management Committees	No	5000	12	12	12	12	12	12	12	12	12	12	120	600,000
2	Establishment of Community Forest Check posts	No	300000		1									1	300,000
3	Assessment of genuine Timber & Firewood need (Visits/ Meetings). Facilitation in rights & concessions and distribution of benefits	LS	5000	6	6	6	6	6	6	6	6	6	6	60	300,000
B	**Forest Regeneration**														
1	Raising of Nursery plants	No	10	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	300,000	3,000,000
2	Raising Energy Plantation	Hectare	200,000	20	20	20	20	20	20	20	20	20	20	200	40,000,000
3	Distribution of Fast-Growing Fodder Tree Species	No	10	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000	1200,000
4	Assisted Natural Regeneration	No	20,000	5	5	5	5	5	5	5	5	5	5	50	1,000,000
C	**Managed Rotational Grazing**														
1	Rotational Grazing (Small Scale Application)	No	100000		3									3	300,000
D	**Promotion of Sustainable Energy Technology**														
1	Repair & Maintenance of Hydle Power plants already constructed	LS			5,000,000		2,500,000		2,500,000						10,000,000
2	Provision of Biomass Energy Technology	No	1,000,000		3	3	3				3	3		15	15,000,000
3	Energy Efficient stoves and bio-briquette	No	3000		100		100		100		100		100	500	15,00,000
E	**Promotion & Value Addition of Non-Timber Forest Products (Trainings/Equipment's)**														
1	Red Persimmon	No	60000		1	1	1	1	1					5	300,000
2	Peach	No	60000		1	1	1	1	1					5	300,000
3	Honey	No	60000		1	1	1	1	1					5	300,000
4	Medicinal Plants	No	60000		1	1	1	1	1					5	300,000
F	**Horticulture Promotion**														
1	Raising fruit orchards	No	100000		3	3	3							9	900,000
2	Distribution of fruit plants	No	25		2000	2000	2000	2000	2000					10000	250,000
	Total														**73,150,000**

4 Implementation Mechanism for the PFMP

4.1 Resources for activities

The FE&WD as custodian of the forest and having linkages with national and international funding sources will take a lead. The key stakeholders identifying in this plan, especially the FE&WD and the Miandam Valley Forest Conservation Committee and *jirgas* of Miandam, will jointly look for resources for implementation of activities identified in this plan. The FE&WD 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 FE&WD in consultation with the community will decide on formation/notification of suitable institutional mechanism for implementation of this plan. It is suggested that village and district level REDD+ implementation committees notified by the FE&WD will oversee implementation of activities. The notifications will include description of responsibilities of FE&WD, the respective communities, and any other relevant stakeholders.

JFMC: In consultation with the community the FE&WD may notify a committee namely Joint Forest Management Committee. The JFMC may consist of representative from the community and the DFFW. The community will nominate representatives for the JFMC to represent them. The representatives of the community will be responsible to ensure and harness community support for the implementation of activities. Representatives of the households having land and settlements inside the forest will be crucial for success of REDD+ activities. The FE&WD will ensure its representation through respective SDFO/RFO. The JFMC may be Co-chaired by a community member nominated by the community and respective SDFO/RFO.

4.3 Benefit Distribution Mechanism

The implementation of the REDD+ interventions package and other support activities will increase the volume of carbon stock in the forest. The increase in carbon stock in the forest pool measured by variable means and the trade of carbon will generate substantial income for the stakeholders of Miandam Forest in due course of time. The income earned by trading carbon stock will be distributed in proportions as per the use rights held by stakeholders. Due to the income the stakeholders can be expected to value standing trees than cut for other uses. Since the community will be reducing harvest of fuel wood, restrict grazing for encouraging regeneration and voluntarily participate in restocking of forest, they will expect a major share from results base payments from reduced carbon emissions. Since there is a clear mechanism for distribution of benefits in vogue and applied in past the same mechanism will be applied. However, there is scope of improvement and as per mutually agreed procedure the example of wildlife like 80:20 benefit sharing mechanism between the community and the FE&WD from trophy hunting programme in Miandam can be adopted for NTFP etc.

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 to the customary right holders / concessionists. These benefits will only be distributed if the targets are achieved. The plan 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 KP's benefit sharing mechanism.

5 Conflict and grievance redressal mechanism

5.1 Conflict within the community

Traditionally, a *jirga* system resolves conflicts within the community and the decisions taken are acceptable for the parties. Under REDD+ redressal, it is suggested that the same *jirga* may take lead role to resolve conflicts arising among the community regarding implementation of REDD+ activities. The structure and function of *jirga* system has been described in earlier section in this document.

5.2 Conflict between the two villages

The JFMC with the help of *jirgas* of both the villages will settle any disputes between the two villages. Any unsettled disputes will be referred to the Divisional Forest Office. If conflicts are still not resolved, the matter will be taken up to the court of the formal judicial system.

5.3 Community's grievance towards the Forest Department

The REDD+ is a new mechanism for communities as well as for the DFFW, therefore both partners (Community and the DFFW might be facing some conflict of interest in due course of time. In case of any such grievances arises, these will be dealt through the grievance redressal mechanism developed under the REDD+ obligation. This mechanism is also reflected well in Provincial REDD+ Environmental and Social Management Framework (ESMF).

References

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3. GCISC (2018). Pakistan's second national communication on climate change. gcisc.org.pk/SNC_Pakistan.pdf.
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7. Working Plan for Swat/Fatehpur Protected Forests of Swat Forest Division Swat (2017-18 to 2026-27)
8. 2017 Forestry Planning and Monitoring Circle Khyber Pakhtunkhwa REDD+ Strategy

I. Stakeholder group (name)	Forest Department, community,
II. General information	**Miandam Forests, Swat**
Location of stakeholder groups (e.g., different villages/hamlets in and outside forest area) and names and indicate on map if possible	The user group community of this site consists of inhabitants of villages Miandam valley.
III. Social organization in the forest area	
2. Traditional organizations (e.g., jirga)	
2.1. Organization (name; purpose; membership)	Local Jirga
2.2. Organization (name; purpose; membership	
2.3. Organization (name; purpose; membership	
3. Formal organization (e.g., social; welfare organization or village development committee	
3.1. Organization (name; purpose; membership)	Local Support Organization & Village Development Committee/Joint Forest Management Committee
3.2 Organization (name; purpose; membership)	
3.3 Organization (name; purpose; membership)	
IV. Use of forest and forest area	
4. For what are you using the forest area?	
Timber for personal use like house construction, etc. (where; locate on the map)	Yes
Timber for commercial selling (where; locate on the map)	No
Firewood (where; locate on the map)	Yes
Grazing (where; locate on the map)	Yes
Grass cutting (where; locate on the map	Yes
Other products, e.g., mushroom, pine nuts, pine needles, vegetables, stones, minerals, medicinal plants (where; locate on the map)	Yes
Forest areas related daily labour/employment (employed by whom; for what?)	Yes / self-employment
Tourism (what; where; locate on the map)	Yes
Hunting/Fishing	Illegal hunting & Fishing by local community for personnel use Illegal hunting
5.What would it mean if you had no access to these forest products? (Any alternatives? Threat to livelihood?)	LPG, timber.
5. 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?	Yes. Under regular land management, the local people have rights and concessions in the forests.
Timber (shares)	Timber as per need through permission from FD
Fodder: grass cutting/grazing	Yes
Firewood	Yes (dead fallen, and pruning of trees)
Other products:	Yes, medicinal plants, NTFP
VI. Control of forest area	
7. Who is controlling access to the forest area?	Forest Department, Community
8. What are forest control mechanisms? E.g., watch and ward; herdsmen; fencing; providing permits.	Joint watch and ward by FD and community. Timber harvesting is based on permits issued by FD.

9. Explain control mechanisms: Are there any traditional mechanisms like nagha; herdsman; watchman? How is it organized? Who pays for it? Are there formal mechanisms like permits by FD; watch and ward by watchman or forest guard? How does it work?	Apart from Forest Guard appointed by Forest Department. Under 10BTTAP Nigehbans are appointed through Village Development Committees for protection and conservation of forests. On the demand of community, the FD has stopped issuing permits for commercial harvesting of forest.
VII. 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?	Biotic factors like human and cattle population exert a considerable pressure on forests in the form of illicit cutting, lopping, and grazing with the result that the condition, distribution and quality of forest crop is considerably affected.
11.What are (according to you) the reasons for change?	Population increases, encroachments, illicit cutting of trees, forests are cleared for cultivation. The whole area is open to uncontrolled grazing seriously hampers the survival of regeneration.
12. Were there any efforts in the past for forest restoration and by whom?	Under BTTAP & 10 BTTAP the area was increased by natural & artificial regeneration.
VIII. Main problems	
13. What are the main problems in forest management with respect to:	
a. rights	None
b. different uses	None
c. control	Conflict between community and FD over permits issued by FD to outsiders.
d. managing drivers (of deforestation, degradation, and forest enhancement)	Illegal harvesting of forest by local offenders. The demand for fuel wood is more that the annual increment of forest.
IX. Conflicts / disputes	
14. On different land uses: Describe nature of conflict, between which groups and put location on map if possible	None
Do they have effect on forest management? And how?	None
15. On social issues: Describe nature of conflict, between which groups and put location on map if possible	None
Do they have effect on forest management? And How?	None
16. Existing Conflict resolution mechanisms: - traditional (e.g., jirga) - formal (court)	Through local Jirga, revenue department, and court of law.
X. Other Forest Management Projects	
17. Are there any other Forest Management Projects in the area? If so, which projects? What are their activities?	Nil
XI. Recommendations	
18. What are your recommendations for forest management activities?	Area should be protected from grazing, cutting of tress supplemented by sowing & planting of the areas.

STAKEHOLDER	INTEREST in Forest Management		INFLUENCE on Forest Management		Relevant forest carbon pools		Influence on forest carbon pools	
	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 Department	For management and conservation of Forests	3	Controller	3	All	3	Owner & Manager	3
Community	Grazing, Grass collection, lopping of forest trees for fodder, collection of fuel wood, Timber, Fuel wood collection, medicinal plants collection, Water	3	Local control on forest benefits	2	Above ground mass, dead wood, litter etc	3	Rights & Concessions	3
Forest Users		3	None	0	Above ground	3	Uncontrolled use of above ground pools	3
Revenue Department	Land management	1	little	1	Below ground biomass	0	Legal control of land	2
10 BTAP	Forest Enhancement	2	Significant	2	Biomass above ground	3	Decision on enhancement	3

Plot #	Latitude	Longitude	Species	Scientific Name	DBH (cm)	Height (m)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
1	35.0738	72.57695	Kail	*Pinus wallichiana*	23	24.2	246.77	2.47	1.16	0.29
1	35.0738	72.57695	Kail	*Pinus wallichiana*	18	16.3	113.11	1.13	0.53	0.13
1	35.0738	72.57695	Kail	*Pinus wallichiana*	21	17.4	157.20	1.57	0.74	0.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	21	17.2	155.61	1.56	0.73	0.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	23	18.4	193.85	1.94	0.91	0.23
1	35.0738	72.57695	Kail	*Pinus wallichiana*	27	18.7	260.82	2.61	1.23	0.31
1	35.0738	72.57695	Kail	*Pinus wallichiana*	17	16.2	101.72	1.02	0.48	0.12
1	35.0738	72.57695	Kail	*Pinus wallichiana*	19	16.8	127.78	1.28	0.60	0.15
1	35.0738	72.57695	Kail	*Pinus wallichiana*	21	17.2	155.61	1.56	0.73	0.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	20	17.1	142.06	1.42	0.67	0.17
1	35.0738	72.57695	Kail	*Pinus wallichiana*	21	17.1	154.81	1.55	0.73	0.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	21	17.1	154.81	1.55	0.73	0.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	19	16.4	125.09	1.25	0.59	0.15
1	35.0738	72.57695	Kail	*Pinus wallichiana*	20	16.2	135.45	1.35	0.64	0.16
1	35.0738	72.57695	Kail	*Pinus wallichiana*	23	19.3	202.17	2.02	0.95	0.24
1	35.0738	72.57695	Kail	*Pinus wallichiana*	23	18.3	192.92	1.93	0.91	0.23
1	35.0738	72.57695	Kail	*Pinus wallichiana*	20	17.5	144.98	1.45	0.68	0.17
1	35.0738	72.57695	Kail	*Pinus wallichiana*	18	16.7	115.56	1.16	0.54	0.14
1	35.0738	72.57695	Kail	*Pinus wallichiana*	32	24.2	441.57	4.42	2.08	0.52
1	35.0738	72.57695	Kail	*Pinus wallichiana*	41	24.6	693.31	6.93	3.26	0.81
1	35.0738	72.57695	Kail	*Pinus wallichiana*	36	120	2,227.15	22.27	10.47	2.62
1	35.0738	72.57695	Kail	*Pinus wallichiana*	44	23.4	751.33	7.51	3.53	0.88
1	35.0738	72.57695	Kail	*Pinus wallichiana*	49	26.2	1,003.31	10.03	4.72	1.18
1	35.0738	72.57695	Kail	*Pinus wallichiana*	41	22.4	638.38	6.38	3.00	0.75
1	35.0738	72.57695	Kail	*Pinus wallichiana*	55	26.8	1,254.56	12.55	5.90	1.47
1	35.0738	72.57695	Kail	*Pinus wallichiana*	41	21.5	615.73	6.16	2.89	0.72
1	35.0738	72.57695	Kail	*Pinus wallichiana*	47	121.8	3,609.76	36.10	16.97	4.24
1	35.0738	72.57695	Kail	*Pinus wallichiana*	51	122.3	4,183.58	41.84	19.66	4.92
2	35.05782	72.58144	Fir	*Abies pindrow*	51	36.4	1406.653393	14.07	6.61	1.65
2	35.05782	72.58144	Fir	*Abies pindrow*	67	39.7	2490.074048	24.90	11.70	2.93
2	35.05782	72.58144	Fir	*Abies pindrow*	56	30.4	1415.477377	14.15	6.65	1.66
2	35.05782	72.58144	Fir	*Abies pindrow*	40	26.2	674.097324	6.74	3.17	0.79
2	35.05782	72.58144	Fir	*Abies pindrow*	58	31.4	1552.79629	15.53	7.30	1.82
2	35.05782	72.58144	Fir	*Abies pindrow*	49	28.6	1052.561323	10.53	4.95	1.24
2	35.05782	72.58144	Fir	*Abies pindrow*	31	21.9	361.8481635	3.62	1.70	0.43

2	35.05782	72.58144	Fir	*Abies pindrow*	36	26.7	566.9000673	5.67	2.66	0.67
2	35.05782	72.58144	Kail	*Pinus wallichiana*	23	19.6	204.94	2.05	0.96	0.24
2	35.05782	72.58144	Kail	*Pinus wallichiana*	22	18.7	181.81	1.82	0.85	0.21
2	35.05782	72.58144	Kail	*Pinus wallichiana*	20	18.3	150.81	1.51	0.71	0.18
2	35.05782	72.58144	Kail	*Pinus wallichiana*	17	17.2	107.24	1.07	0.50	0.13
2	35.05782	72.58144	Kail	*Pinus wallichiana*	19	17.5	132.45	1.32	0.62	0.16
2	35.05782	72.58144	Kail	*Pinus wallichiana*	15	14.8	75.35	0.75	0.35	0.09
2	35.05782	72.58144	Kail	*Pinus wallichiana*	23	18.6	195.70	1.96	0.92	0.23
2	35.05782	72.58144	Kail	*Pinus wallichiana*	21	17.3	156.41	1.56	0.74	0.18
2	35.05782	72.58144	Kail	*Pinus wallichiana*	24	17.8	202.93	2.03	0.95	0.24
2	35.05782	72.58144	Kail	*Pinus wallichiana*	22	17.2	168.90	1.69	0.79	0.20
2	35.05782	72.58144	Kail	*Pinus wallichiana*	19	16.8	127.78	1.28	0.60	0.15
2	35.05782	72.58144	Kail	*Pinus wallichiana*	22	17.3	169.77	1.70	0.80	0.20
2	35.05782	72.58144	Kail	*Pinus wallichiana*	21	16.9	153.22	1.53	0.72	0.18
3	35.03771	72.57959	kail	*Pinus wallichiana*	27	19.3	268.18	2.68	1.26	0.32
3	35.03771	72.57959	kail	*Pinus wallichiana*	26	19.8	256.64	2.57	1.21	0.30
3	35.03771	72.57959	kail	*Pinus wallichiana*	21	19.2	171.45	1.71	0.81	0.20
3	35.03771	72.57959	kail	*Pinus wallichiana*	20	18.7	153.71	1.54	0.72	0.18
3	35.03771	72.57959	kail	*Pinus wallichiana*	18	18.5	126.46	1.26	0.59	0.15
3	35.03771	72.57959	kail	*Pinus wallichiana*	23	19.8	206.78	2.07	0.97	0.24
3	35.03771	72.57959	kail	*Pinus wallichiana*	19	18.6	139.76	1.40	0.66	0.16
3	35.03771	72.57959	Fir	*Abies pindrow*	34	21.3	416.9433074	4.17	1.96	0.49
3	35.03771	72.57959	Fir	*Abies pindrow*	32	20.8	365.7780588	3.66	1.72	0.43
3	35.03771	72.57959	Fir	*Abies pindrow*	38	22.1	526.9427547	5.27	2.48	0.62
3	35.03771	72.57959	Fir	*Abies pindrow*	28	20.3	281.160677	2.81	1.32	0.33
3	35.03771	72.57959	Fir	*Abies pindrow*	31	21.4	354.3806313	3.54	1.67	0.42
3	35.03771	72.57959	Spruce	*Picea smithiana*	34	21.6	391	3.91	0.04	0.00
3	35.03771	72.57959	Spruce	*Picea smithiana*	28	19.8	263	2.63	0.03	0.00
3	35.03771	72.57959	Spruce	*Picea smithiana*	25	19.7	216	2.16	0.02	0.00
5	35.05726	72.575	kail	*Pinus wallichiana*	21	18.7	167.51	1.68	0.79	0.20
5	35.05726	72.575	kail	*Pinus wallichiana*	22	19.3	186.94	1.87	0.88	0.22
5	35.05726	72.575	kail	*Pinus wallichiana*	24	21.5	239.66	2.40	1.13	0.28
5	35.05726	72.575	kail	*Pinus wallichiana*	17	17.8	110.52	1.11	0.52	0.13
5	35.05726	72.575	kail	*Pinus wallichiana*	19	18.5	139.10	1.39	0.65	0.16
5	35.05726	72.575	kail	*Pinus wallichiana*	19	18.3	137.77	1.38	0.65	0.16
5	35.05726	72.575	kail	*Pinus wallichiana*	25	20.6	248.01	2.48	1.17	0.29
5	35.05726	72.575	kail	*Pinus wallichiana*	21	19.3	172.23	1.72	0.81	0.20
5	35.05726	72.575	kail	*Pinus wallichiana*	19	18.4	138.44	1.38	0.65	0.16

5	35.05726	72.575	kail	*Pinus wallichiana*	25	22.6	269.11	2.69	1.26	0.32
5	35.05726	72.575	kail	*Pinus wallichiana*	20	21.4	173.10	1.73	0.81	0.20
5	35.05726	72.575	kail	*Pinus wallichiana*	18	16.9	116.77	1.17	0.55	0.14
7	35.07949	72.5391	kail	*Pinus wallichiana*	26	18.3	239.44	2.39	1.13	0.28
7	35.07949	72.5391	kail	*Pinus wallichiana*	20	16.2	135.45	1.35	0.64	0.16
7	35.07949	72.5391	kail	*Pinus wallichiana*	17	16	100.62	1.01	0.47	0.12
7	35.07949	72.5391	kail	*Pinus wallichiana*	28	18.7	278.08	2.78	1.31	0.33
7	35.07949	72.5391	kail	*Pinus wallichiana*	23	18.1	191.06	1.91	0.90	0.22
7	35.07949	72.5391	kail	*Pinus wallichiana*	24	18.4	208.94	2.09	0.98	0.25
7	35.07949	72.5391	kail	*Pinus wallichiana*	23	17.9	189.20	1.89	0.89	0.22
7	35.07949	72.5391	kail	*Pinus wallichiana*	20	16.8	139.86	1.40	0.66	0.16
7	35.07949	72.5391	kail	*Pinus wallichiana*	24	17.8	202.93	2.03	0.95	0.24
7	35.07949	72.5391	kail	*Pinus wallichiana*	19	16.2	123.75	1.24	0.58	0.15
9	35.05001	72.51417	Oak	*Quercus ilex*	17	16.2	229.37	2.29	1.08	0.27
9	35.05001	72.51417	Oak	*Quercus ilex*	19	16.5	269.23	2.69	1.27	0.32
9	35.05001	72.51417	Oak	*Quercus ilex*	16	14.8	199.24	1.99	0.94	0.23
9	35.05001	72.51417	Oak	*Quercus ilex*	21	16.5	307.60	3.08	1.45	0.36
9	35.05001	72.51417	Oak	*Quercus ilex*	24	17.2	377.73	3.78	1.78	0.44
9	35.05001	72.51417	kail	*Pinus wallichiana*	23	18.2	191.99	1.92	0.90	0.23
9	35.05001	72.51417	kail	*Pinus wallichiana*	22	17.6	172.36	1.72	0.81	0.20
9	35.05001	72.51417	kail	*Pinus wallichiana*	18	16.9	116.77	1.17	0.55	0.14
9	35.05001	72.51417	kail	*Pinus wallichiana*	18	16.9	116.77	1.17	0.55	0.14
9	35.05001	72.51417	kail	*Pinus wallichiana*	22	17.4	170.63	1.71	0.80	0.20
9	35.05001	72.51417	kail	*Pinus wallichiana*	21	17.2	155.61	1.56	0.73	0.18
10	35.06354	72.58755	Fir	*Abies pindrow*	55	37.4	1652.080287	16.52	7.76	1.94
10	35.06354	72.58755	Fir	*Abies pindrow*	52	35.9	1438.772242	14.39	6.76	1.69
10	35.06354	72.58755	Fir	*Abies pindrow*	44	29.7	896.6791596	8.97	4.21	1.05
10	35.06354	72.58755	Fir	*Abies pindrow*	61	36.4	1943.593734	19.44	9.13	2.28
10	35.06354	72.58755	Fir	*Abies pindrow*	65	40.3	2389.611504	23.90	11.23	2.81
10	35.06354	72.58755	Fir	*Abies pindrow*	58	36.5	1778.815614	17.79	8.36	2.09
10	35.06354	72.58755	Fir	*Abies pindrow*	36	34.2	708.8945898	7.09	3.33	0.83
10	35.06354	72.58755	Fir	*Abies pindrow*	42	35.6	970.9708828	9.71	4.56	1.14
10	35.06354	72.58755	Kail	*Pinus wallichiana*	27	20.2	279.17	2.79	1.31	0.33
10	35.06354	72.58755	Kail	*Pinus wallichiana*	25	19.3	234.17	2.34	1.10	0.28
10	35.06354	72.58755	Kail	*Pinus wallichiana*	21	18.4	165.14	1.65	0.78	0.19
10	35.06354	72.58755	Kail	*Pinus wallichiana*	26	19.6	254.36	2.54	1.20	0.30
10	35.06354	72.58755	Kail	*Pinus wallichiana*	23	18.8	197.55	1.98	0.93	0.23
10	35.06354	72.58755	Kail	*Pinus wallichiana*	21	16.7	151.62	1.52	0.71	0.18

11	35.05923	72.6018	Fir	*Abies pindrow*	38	20.3	488.0337157	4.88	2.29	0.57
11	35.05923	72.6018	Fir	*Abies pindrow*	39	22.1	552.2486795	5.52	2.60	0.65
11	35.05923	72.6018	Fir	*Abies pindrow*	38	21.6	516.1666554	5.16	2.43	0.61
11	35.05923	72.6018	Fir	*Abies pindrow*	39	21.9	547.7342438	5.48	2.57	0.64
11	35.05923	72.6018	Fir	*Abies pindrow*	43	23.2	688.2637136	6.88	3.23	0.81
11	35.05923	72.6018	Fir	*Abies pindrow*	38	20.2	485.8625275	4.86	2.28	0.57
11	35.05923	72.6018	Fir	*Abies pindrow*	46	24.2	807.5946276	8.08	3.80	0.95
11	35.05923	72.6018	Fir	*Abies pindrow*	37	21.2	483.6662204	4.84	2.27	0.57
11	35.05923	72.6018	Fir	*Abies pindrow*	39	21.7	543.2158031	5.43	2.55	0.64
11	35.05923	72.6018	Fir	*Abies pindrow*	40	21.7	568.6275021	5.69	2.67	0.67
11	35.05923	72.6018	Fir	*Abies pindrow*	40	21.6	566.2610098	5.66	2.66	0.67
11	35.05923	72.6018	Fir	*Abies pindrow*	43	21.9	653.3452879	6.53	3.07	0.77
11	35.05923	72.6018	Spruce	*Picea smithiana*	39	20.6	472	4.72	0.05	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	37	20.3	427	4.27	0.04	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	42	21.2	548	5.48	0.05	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	38	20.7	454	4.54	0.05	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	32	19.6	326	3.26	0.03	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	27	19.3	242	2.42	0.02	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	42	20.4	530	5.30	0.05	0.00
11	35.05923	72.6018	Spruce	*Picea smithiana*	35	19.6	378	3.78	0.04	0.00
12	35.02754	72.56594	Fir	*Abies pindrow*	41	21.7	594.5563433	5.95	2.79	0.70
12	35.02754	72.56594	Fir	*Abies pindrow*	34	20.6	404.5514634	4.05	1.90	0.48
12	35.02754	72.56594	Fir	*Abies pindrow*	38	20.8	498.8741935	4.99	2.34	0.59
12	35.02754	72.56594	Fir	*Abies pindrow*	45	22.9	738.4227174	7.38	3.47	0.87
12	35.02754	72.56594	Fir	*Abies pindrow*	53	23.6	1019.6193	10.20	4.79	1.20
12	35.02754	72.56594	Fir	*Abies pindrow*	31	21.3	352.8851033	3.53	1.66	0.41
12	35.02754	72.56594	Fir	*Abies pindrow*	29	19.4	287.5364598	2.88	1.35	0.34
12	35.02754	72.56594	Fir	*Abies pindrow*	38	19.7	474.9908123	4.75	2.23	0.56
12	35.02754	72.56594	Fir	*Abies pindrow*	44	22.3	692.2607983	6.92	3.25	0.81
12	35.02754	72.56594	Fir	*Abies pindrow*	49	22.6	850.9793584	8.51	4.00	1.00
12	35.02754	72.56594	Fir	*Abies pindrow*	41	21.8	597.0296384	5.97	2.81	0.70
12	35.02754	72.56594	Fir	*Abies pindrow*	46	22.6	759.2259383	7.59	3.57	0.89

Annex 4: Pictorial view of the discussion with Miandam Community