Participatory Forest Management Plan, (PFMP)

Chilghoza Forests of Gustoi Area, District Zhob

2022 - 2031

Forests and Wildlife Department
Balochistan, Pakistan
&
Village Community Organizations,
Gustoi Area, Zhob Forests Division

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Credentials:

Writing and data Analysis
Syed Ghulam Muhammad
Dr. Zahoor Bazai
Dr. Hammad Gilani

Data collection team
Community members of Gustoi
Jan Muhammad Kakar

Peer Review
Niaz Khan Kakar, REDD+ Focal Person, Balochistan
Sharaf Agha, DFO Zhob
Frans Werter, Consultant
Nadeem Bukhari

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

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Endorsement

1. **Chairman, Village Community Organization**

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

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

وضاحت

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Acronyms

AGB	Above Ground Biomass
BGB	Below Ground Biomass
ANR	Assisted Natural Regeneration
F&WD	Forestry & Wildlife Department
FCPF	Forest Carbon Partnership Facility
GIS	Geographic Information System
GOP	Government of Pakistan
LPG	Liquid Petroleum Gas
MW	Mega Watt
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)
VFP&CC	Village Forest Protection & Conservation Committee
10 BTTP	10 Billion Tree Tsunami Project

EXECUTIVE SUMMARY

Chilghoza Forests of Gustoi Valley are located in Union Council Gustoi of District Zhob Balochistan. Gustoi Valley is one of the three sites selected by the Balochistan Forests and Wildlife Department in consultation with key stakeholders as a pilot site to demonstrate implementation of REDD+ in the province. This is part of a larger project being implemented by the Ministry of Climate Change (MoCC), Government of Pakistan and the Provincial Forest departments in which a total of 15 Participatory Forest Management Plans 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 readiness phase. Pakistan has made substantial progress in meeting REDD+ readiness requirements. Pakistan has developed a National REDD+ Strategy in 2021. Whereas the Balochistan Forests and Wildlife Department has developed a Provincial REDD+ Action Plan. This action plan is a decentralized framework for the province to proceed with REDD+ implementation. Preparation of Participatory Forest Management Plans 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 of Manna Valley were engaged in preparation of the present Participatory Forest Management Plan. Plan will guide the implementation process 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 resources 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 successful implementation of REDD+.

The analysis of forest cover revealed that since 2011, the Chilghoza forests in Gustoi area are increasing at a very nominal rate of 0.7 hectares per year, resulting in sequestering 185 tonnes CO_2 eq emissions annually. Besides Gustoi area, Chilghoza forests in rest of the province are also increasing due to the price escalation of Chilghoza nuts. The activities included in this PFMP if properly implemented, are expected to cause further increase in forest cover and help in achieving the goal and objectives outlined in this plan. 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 communities, and 20% will go to the Government with a proportion of 10% for customary users without ownership rights from the Government share. These benefits will only be distributed if the planned emission reduction targets are achieved. The plan therefore 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 Balochistan'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 Balochistan Forest and Wildlife Department in consultation with the relevant stakeholders. The plan will be implemented by Valley Level REDD+ Implementation Committee and District Level REDD+ Implementation Committee to be notified by the Balochistan Forest and Wildlife Department in consultation with the relevant stakeholders.

خلاصہ

بلوچستان ضلع ژوب کے وادی گستوئی میں واقع چلغوزے کا جنگل محکمۂ جنگلات، جنگلی حیات کی جانب سے منتخب کردہ اُن تین مقامات میں سے ایک ہے جہاں ایک پائلٹ سائٹ کے طور پر اہم شراکت داروں 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 بلوچستان کے جنگلات، جنگلی حیات کے محکمے نے صوبائی سطح پر ایک جامع ریڈ پلس ایکشن پلان تیار کیا ہے۔ بلوچستان 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 2011ء سے چلغوزہ جنگل میں 0.7 ہیکٹر سالانہ کی شرح سے اضافہ ہو رہا ہے جس سے سالانہ 185 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 جب کہ گستوئی کے علاوہ صوبے کے دوسرے علاقوں میں بھی چلغوزہ جنگل زیادہ منافع کے وجہ سے بڑھ رہے ہیں۔ اس PFMP میں شامل سرگرمیاں اگر مناسب طریقے سے لاگو ہوتی ہیں تو جنگلات کے مربوط انتظام کے لیے شراکت داروں 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 متعلقہ لوگوں کو ملیں گے اور 20 فی صد حکومت کو حاصل ہوں گے جس میں سے 10 فی صد جنگل کے غیر مالکانہ 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 بلوچستان 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۔

CHAPTER I: 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 REED+ readiness programme funded by the Forest Carbon Partnership Facility (FCPF) of the World Bank. This Participatory Forest Management Plan (PFMP) is to demonstrate integration and implementation of REDD+ activities in forest management in various socio-ecological systems. The Participatory Forest Management Plans (PFMPs) translate 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 mitigate global climate change. REDD+ also provides mechanisms for the enhancement, measurement, and trade of carbon.

The present PFMP provides information including description of the site, GIS supported forest stock assessment, socio-economic situation, analysis of stakeholders with their interests and influences, emissions reduction scenarios, future interventions with estimated budget and implementation mechanism and key challenges for implementation. The activities that will maintain forest as carbon pool have also been explained in this plan giving a lead and support role to stakeholders, as well as the expected outputs. It is expected that the implementation of the PFMP will enable the stakeholders of Chilghoza Forest of Gustoi Valley 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 is envisaged to act as a road map towards implementation, monitoring, reporting and verification of resources improvement, and distribution of benefits among stakeholders.

These proposed activities will not only benefit the Chilghoza Forest of Gustoi Valley but will also benefit the inhabitants of more than 20 other villages residing in the forest. In addition, to the resident community members residing in the Chilghoza forests, the proposed activities will also prove very useful to the inhabitants of Gustoi and Sambaza area. As compared to the past, Chilghoza Forest of Gustoi Valley have been seen more protected now. Awareness raising among the communities on the importance of Chilghoza forests especially on water conservation/availability has played a key role in the protection of these forests.

1.2. Objectives of Participatory Forest Management Planning

Taking into account the Global, National and Provincial objectives and priorities that have been reflected in the Section 1.4, the plan has been formulated to achieve the following specific objectives for undertaking interventions through the Participatory Forest Management Plan in Chilghoza Forest of Gustoi Valley:

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

1.3. Methodology:

A team of experts comprising 3 members was constituted to collect the socio-economic data and simultaneously register the views of community members towards participatory forest management. While collecting the socio-economic data, the local communities, which were the major stakeholders in this entire process, were given the lead role while the team of experts intervened only where the need was felt. For materialization of this entire process, a meeting of the community members and village elders was scheduled on June 27, 2021, in the Forest Office Zhob. In the meeting, besides the experts, resident community members, Deputy Conservator of Forests, Zhob, Range Forest Officer, Zhob and Forester Zhob of Balochistan Forest and Wildlife Department also participated. In this regard, the meeting began with an introductory session, wherein the expert's team, officers/officials of Balochistan Forest and Wildlife Department and community members introduced themselves to each other. This was followed by a briefing session, wherein the experts explained the aims and objectives of the entire exercised and briefed the community members on the importance of preparation of participatory forest management plans for the Chilghoza forests of Gustoi area, district Zhob, in the aftermath of climate change and $REDD^{+}$. This was followed by a discussion session wherein the community members were allowed to identify their needs and problems related to the forest use such as grazing, collection of Chilghoza nuts and fuel wood, extraction of timber etc. Once these needs and problems related to forests were identified by the community members, they were asked to provide the best possible solution under the prevailing situation for conservation of Chilghoza forest ecosystem of Gustoi area. Community members came up with different sets of solutions for these problems. Team of experts also helped them in identification of the possible solutions keeping in view the long term sustainability of the Chilghoza forest resources of Gustoi area. During this process, community members were asked for provision of data related to Gustoi area. On the completion of process, it was once again explained in detail to the community members that the purpose of present initiative is to prepare participatory forest management plan for Chilghoza forests of Gustoi area under the REDD+ Project so that these forest resources could be conserved/protected as Carbon Stocks.

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. Chilghoza forests was one of the three potential sites selected for preparation of PFMP.
ii. Participatory data collection. Local community of Gustoi 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 12 sample plots selected in Chilghoza 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. The plan was reviewed individually, jointly and sent to experts for peer review.

vi. The plan was sent for endorsement by the Balochistan Forest Department and relevant community.

Chilghoza Forest, Gastoi, Shirani/Zhob District, Balochistan

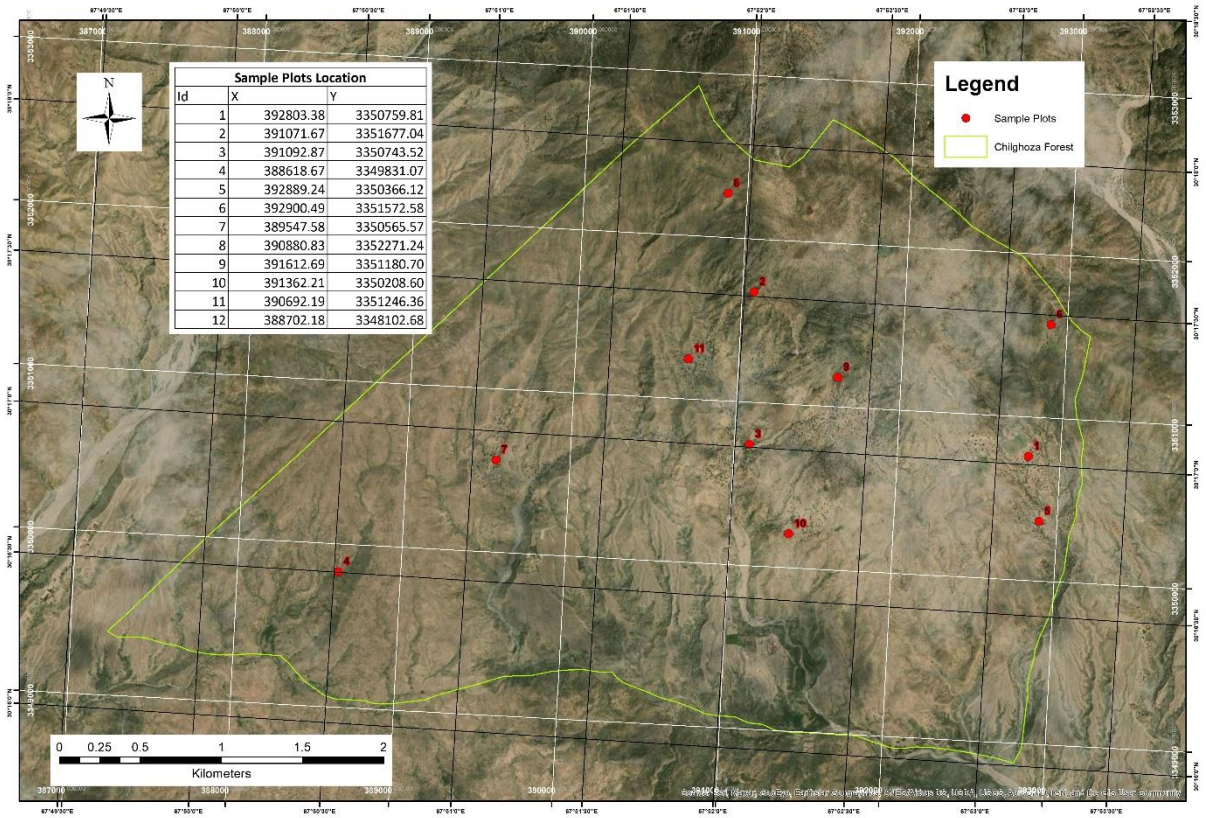


Figure - 1: Location of sample plot

1.4 Policy Alignment:

The objectives of the Participatory Forest Management Plan of Chilghoza Forests Gustoi Valley were aligned with the following provincial, national, and global policies/strategies/commitments related to REDD+.

1.4.1. Global Commitment:

To reduce current global 23% carbon emission contributed from AFOLU sector (IPCC 6th Assessment Report, 2021, p245).

1.4.2. National Policies/commitments:

Pakistan's report on intended Nationally Determined Contributions (NDCs) seeks 20% reduction of the current national 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 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, 2008).

1.4.3. Provincial Policies/commitments:

Balochistan as such has not formulated the Climate Change Policy yet, and similar is the case with the Forest and allied resources i.e. rangelands and watershed management. Due to this very reason, Balochistan Forest and Wildlife Department seeks guidance from the policies formulated at the federal level in both, climate change as well as in forestry sectors. However, besides the Balochistan Forest and Wildlife Department also seeks guidance from the Rules of Business formulated at the provincial level. The activities reflected in this PFMP to manage Chilghoza Forest of Gustoi Valley, District Zhob, are in full alignment with the actions suggested in the national climate change and forest policy of Government of Pakistan as well as with the Rules of Business of Forest and Wildlife Department for managing forest and allied resources at the provincial level. In addition to the above mentioned documents, the activities included in the current Participatory Forest Management Plan for the Chilghoza Forest of Gustoi Valley are also in alignment with the guidance provided in the Balochistan Conservation Strategy (BCS) and Balochistan Comprehensive Development Strategy (BCDS).

CHAPTER II: 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 the following sections.

2.1 Ecological

2.1.1 Site description

Gustoi valley is located at a distance of 91 Km in the West of District headquarter Zhob. At present, Gustoi area is inaccessible due absence of a black top or shingle road. From the district headquarter Zhob town, Gustoi valley is located in the West on the same road that leads of Qamardin Karez. Gustoi area/valley falls in the administrative jurisdiction of Gustoi Union Council. Socio-economic, climatic and geographic conditions of the village follow those prevailing in the district Zhob. Here it is worth mentioning that Zhob is one of the 33 districts of the province. It was elevated to the status of district on July 1, 1986. Previously it was named as Fort Sandeman. Basically, the word Zhob means oozing water. Zhob is located in the north of provincial capital Quetta at distance of about 335 Km. Total area of the district is 12,400 sq. km. Gustoi valley, being part of district Zhob, is one of the major valleys of the district running east – west. The geographical location of village determined through GPS is produced below:

Table 1: Geographical location of Gustoi Valley district Zhob	
Latitude:	30,17
Longitude:	67,50
Altitude:	7200 ft

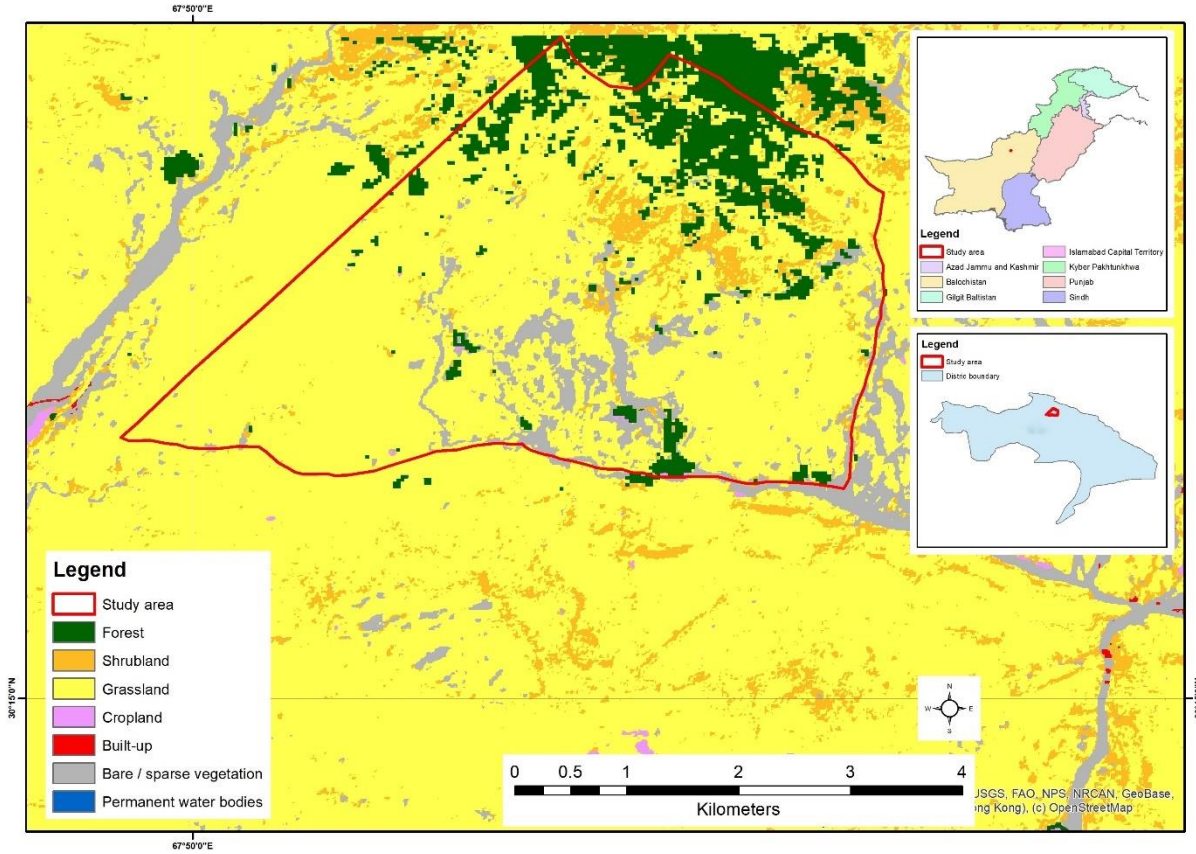


Figure – 2: District Zhob Balochistan showing the Chilghoza Forest of Gustoi Area.

2.1.2 Physiography and soils

Gustoi area is mountainous and in some areas these comprise very precipitous slops. Gustoi area's mountains lie North to south and it stretches from the Sambaza road to the Khyber Pakhtunkhwa. These mountains on one side i.e. eastern drains into Zhob River while on the other side i.e. western side it drains into river Gomal.

Although Zhob valley is an alluvial plain, Gustoi area Chilghoza forest consist of black sandstone and white limestone. Most of the mountains are precipitous and present singular appearance tilted at an angle of 45^0 towards south. Boulders are numerous in the Gustoi Chilghoza forests.

2.1.3 Climatic conditions

For Gustoi valley no separate data in terms of precipitation, temperature, wind speed and other climatic variables is available. Therefore, the climatic data collected for district Zhob applies to the Gustoi valley/area with no major variations. Generally, the area falls in the monsoon belt of the province, where most of precipitation received during monsoon months from July to September in the form of heavy showers. Winter and spring showers are also common that are received during December to March. Winters in the Gustoi area are harsh with temperatures falling below freezing point during December to March. Soils also freeze during this period and most of the vegetation undergoes dormancy starting late November. Summers in Gustoi area, because of the presence of large tract of Chilghoza forests, are pleasant. For the maximum and minimum temperatures and mean annual rainfall the data available for the district Zhob has been used and reflected below. This data can also be applied to the Gustoi valley. The combined effect of climatic and edaphic conditions prevailing in Gustoi valley makes the area suitable for growing deciduous fruits and cultivation of both Kharif and Rabi crops. To have an idea about the maximum and minimum temperatures prevailing during the different months of the year, data of district Zhob is produced below:

Table 2:	**Annual temperature regimes of District Zhob/Gustoi Valley**											
	Months of the year											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Max. Temp. in ºC	10	15	26	28	35	37	36	35	33	30	23	18
Min Temp. in ºC	-5	-2	-6	-9	15	18	18	17	13	9	3	2

As far as the precipitation is concerned, district Zhob falls in monsoon belt of the province and has been classified in the semi-arid climatic zone. For Gustoi valley, following the data recorded for district Zhob, is used, where the mean annual rainfall received is 25.4 mm and the total has been calculated to 305 mm. The data for the rainfall received during the different months of the year for Zhob district is produced below:

Table 3:	**Annual precipitation regime of District Zhob**											
	Months of the year											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Mean Rainfall in mm	21	8	6	21.6	5.3	74.8	122	19	15	0	0	12

Average precipitation received during the year in district Zhob was calculated to 25.4 mm per annum, with the major share received during monsoon i.e. from July to September. Winter showers are also common that are received during December to February. The total precipitation received in district Zhob has been calculated to 305 mm.

2.1.4 Vegetation

In Gustoi area Chilghoza forests, *Pinus gerardian (Chilghoza Pine)* is the dominant tree species along with its associates that comprise *Fraxinus xanthozyloides* and *Pistacia khinjuk*. Besides these tree

species, the shrub species present as associate ground species include: Zarga (*Prunus eburnea*), Makhai (*Caragan ambigua*), Zaralg (*Berberis Balochistanica*), Ghureza (*Sophora lopcuroides*), Tharkha (*Artemisia maritime*). Vegetation in Chilghoza forests of Gustoi area is produce below in Table 4:

Table 4:	**Forest, Rangeland and Wildlife Data of Gustoi Valley**		
Type	**Classification**	**Major Species**	**Status**
Forest trees	Balochistan Dry Temperate Scrub (Steppe)	Chilghoza (Pinus gerardiana), Shana (*Pistacia khinjak*), Shang (Fraxinus xanthoxyloides).	Historically it was dry temperate climax formation of Chilghoza and wild pistachio; along with isolated trees of wild Ash/wild pistachio are best surviving in Zhob, Sherain and Musakhel district that fall in the monsoon belt of the province. Overall the dry temperate forests of Chilghoza is facing heavy grazing and fuel wood pressures. Presently Chilghoza forests are present in open form with fair amount of grasses and herbs.
Shrubs	Central Balochistan Rangelands	Zarga (*Prunus eburnea*), Makhai (*Caragan ambigua*), Zaralg (*Berberis Balochistanica*), Ghureza (*Sophora lopcuroides*), Tharkha (*Artemisia maritime*), Zawal (*Achillea santolina*), Spanda (*Peganum harmala*), *Stipa pennata Pennisetum orientale Cymbopogan*	Rangelands seem degraded as evident from presence of less palatable plants. The degradation is caused by fuel wood collection.
Wildlife Habitat	Dry Steppe	Mammals: Suleiman Markhor (Falca calpinari), Hill fox (*Vulpes griffithi*), Cape hare (*Lepus capensis*), Porcupine (*Hystrix indica*), Afghan Hedgehog (*Hemiechinus auritus megalotis*) Birds: Chukar (*Alectoris chukar*), See (*Ammoperdix griseogularis*), Kestrel (*Falco tinnunculus*), Reptiles: tortoise (*Agrionemys horsfieldii*), Saw-scale viper (*Echis carinatus*), Levantine viper (*Macrovipera lebetina*).	There are no historical bench-marks to determine the status of wildlife in the area. However, the community informs that the number of wildlife species has declined; which could aptly be attributed to casual attitude for hunting and habitat degradation.
Planted species	Amenity and Farm forestry	Safida (*Poplus spp.),* Toot (*Morus alba*), American Saru (*Cupressus arizonica*), *Salix spp*.	Planted along water channels, water storage ponds, round Farmlands and household compounds.

2.2 Socio-economic data:

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

2.2.1 Demography

In Gustoi valley, there are 686 households residing in 11 villages. Total population of valley has been calculated to 7820 individuals. Most of the families in the village live in joint family system wherein the entire family consisting of 4 to 6 brothers lives in single compound with each family having its own kitchen arrangement. Gustoi valley is located at 91km from the Zhob town and due to this reason the number of educational institutions is low in the valley. It is because of this very reason the literacy rate is low in Gustoi valley. In the villages, 1-one Middle school, 5-five primary schools for boys were present. However, no girl's primary school is present in these villages. Besides the schooling, most of the male and female of the villages in the valley also get the religious education in the Mosques. This has enabled them to read the Quraan.

The social structure of Gustoi valley like most of the villages of district Zhob is tribal. Valley is inhabited by a sub-tribe of Mandokhail tribe of Pashtoons. Most of the families live in a joint family system, due to this reason a strong social bonding is prevalent in the Gustoi valley.

2.2.2 Health and education

At present, there are 6 schools, 5 primary and 1 Middle, in the Gustoi valley. In all the schools, teaching facilities are available up to the primary level. All the schools are exclusively for boys. However, in the boy's primary schools, girls are also enrolled for getting education. Present enrollment is low in the schools. In Gustoi valley, basic healthcare facilities are available for the inhabitants in the form of 2 Basic Health Units (BHU). One of the BHU is in village Bahlol Hamzakhail, while the other is stationed in Bagh Duyam. In these BHU is season and routine ailments are treated. However, serious patients are taken to Zhob, Quetta and Dera Ismail Khan for treatment, where District/Provincial Headquarter hospitals are available for treatment. However, serious patients are taken to Quetta for treatment, which is relatively close to Zhob town and has better accessibility.

In Gustoi valley, major source of water for drinking and irrigation are natural springs and dug wells. Due to non-availability of electricity in the valley, no tube wells have been installed either for drinking water supplies or agriculture crop production.

In terms of communication, village is located at about 91 Km from the Zhob town. Initially a black top road that leads to Qamardin Karez is taken for going to Gustoi valley, after covering a distance of 32 km a kacha road peels off towards north from this Zhob – Qamardin Karez road. This road then enters a mountain stream which serves as main pathway leading to Gustoi valley. No phone facilities are available in the village, as no towers have been installed by any mobile phone company. Due to the non-availability of mobile phone facilities, resident community members are facing difficulties in communicating with outside world.

As far as housing is concerned, generally throughout the province and in rural areas of district Zhob, resident of the valley owns their houses. Most of the times, it is the communal land that is used for the construction of houses. Houses are mostly constructed of locally available material such as stone and mud, while for thatching the timber and sometimes the iron girders are used. Except for the Government owned buildings such as schools, where brick or concrete has been used as construction material, all of the houses have been built by using mud/stones.

2.2.3 Livelihood sources

As mentioned above, Gustoi valley is located at a distance of 91 Km from the Zhob town. Due to inaccessibility, absence of better means of communication and remoteness from the district and provincial headquarter, the entire area offers very limited opportunities for livelihoods to its inhabitants. In Gustoi valley, major livelihood sources livestock and agriculture crop production.

However, some members of the community are also busy in daily wage labour and government/private services. Community members informed that majority of the inhabitants of Gustoi valley are dependent upon livestock rearing for their livelihoods. Here it is very pertinent to mention that due to non-availability of livelihood opportunities in Gustoi valley, about 20% of the households/population has already migrated to Zhob town for finding better jobs/employment.

In the agriculture sector, the major emphasizes upon raising field crops. The dominant field crops include maize, sorghum, sweet potatoes, potatoes and vegetables. Among the fruit crops orchards of almonds, pomegranate, apricots are present in the Gustoi area. However, the trend for raising orchards is low. Here it is important to mention that due to inaccessibility most of the vegetables grown in the valley are used by resident community members for household consumption.

During the consultation for land use plan, it was revealed that due to mountainous topography very little flat land is available either for cultivation or building construction. Due to this very reason, very little land is available for cultivation. Land holding of resident community members is less than 5 acres in Gustoi valley. Wherever the flat land is available, resident community members use it for agriculture crop production. For the land areas being cultivated currently, major sources of irrigation are dug well and natural springs. Water from these sources is used to irrigate agriculture crops. At present the water table in the valley is at a level of 50 feet.

Livestock is the major source of livelihood in the Gustoi valley. Due to this very reason, livestock population in the valley is high. It is very pertinent to mention here that due to hilly/mountainous topography and presence of shrubby vegetation in the forested area of Gustoi valley, mostly small ruminant i.e., sheep and goats are being raised by the inhabitants. At the household level, women are also engaging in backyard poultry farming. Backyard poultry not only helps women in improving the nutrition level of households, but the eggs are sold out by the women folk to meet to earn hard cash.

Besides agriculture and livestock, the resident community members are also now benefitting from the sale of Chilghoza nuts. During the past decade the increase in the prices of Chilghoza nuts has proved windfall gain for the communities. Chilghoza cones are now collected through fanfare wherein the entire village takes part. These cones are then brought to the villages where these are dried, and nuts are extracted from them. The nuts extracted are then sold in the market. Earning from the Chilghoza nuts are bringing good income to each household in the village and recent years it has emerged as an important source of livelihoods for the communities of Gustoi area.

2.2.4 Legal position

The Chilghoza forests of Gustoi area belong to the local communities. However the timber is regulated by the Balochistan Forest and Wildlife Department. All other rights are with community (nut and fruit collection, hunting, firewood collection etc.)

Chilghoza forests of Gustoi area belong to the communities. These are, therefore, managed by these communities. Grazing of livestock, firewood and timber extraction, and chilghoza nut collection are regulated by these communities. Area of each community is marked and members belonging to that very tribe graze their livestock, collect fuel wood, extract timber and collect Chilghoza nut from that area. No tribe trespasses the territory of other tribe. In case of any dispute, the matter is taken to the tribal Jirga, which decides/resolves the issue.

2.2.5 Dependence on forests

Gustoi area mainly supports Chilghoza forest, where *Pinus gerardiana* is dominant species, while *Fraxinus xanthoxyloides* and *Pistacia khinjuk* are present as associate species. The resident community members of villages in Gustoi area depend upon Chilghoza forest resources for their domestic needs

for firewood, timber and grazing their livestock and pine and Pistachio nuts. Like other forest resources of the province, Chilghoza Forests of Gustoi area also falls in Protected Forest category that is owned by the local communities. Except for the fuel wood and small quantities of timber that is extracted for domestic consumption by the resident community members, no timber or fuel wood is harvested for commercial purposes.

Due to strict community protection and conservation efforts, the Chilghoza forests of Gustoi valley are present in good shape. Where grazing pressures are low very health and profuse regeneration of Chilghoza can be seen. Although due to increase in prices of Chilghoza nuts, these forests are being managed by the resident community members in a much better, still one aspect related to cone collection needs to be addressed. During cone collection of Chilghoza, resident community member cause injury to the trees which are later on attacked by fungi and insects and in this way the tree finally succumbs to disease and infestations.

Some of the major issues are energy related to the total absence of electricity supply in the valley. Although Chilghoza forests are fulfilling the fuelwood requirements of the resident community members, still during snow and low temperatures during winters, it become very difficult for inhabitants of the villages to stay alive without burning Chilghoza wood.

In Gustoi, the resident community members are dependent upon Chilghoza forests for fulfilling their fuel wood requirements for cooking and heating. Besides, Chilghoza trees, community members also cut down the associated trees such *Pistacia khinjuk, Fraxinus xanthoxyloides*, and shrubs/bushes growing in the Chilghoza forests. This cutting of trees and bushes/shrubs from the forested area has caused the deterioration of forests by paving the way for accelerated erosion. It is estimated that an average family/household of 10 members utilizes half a donkey load (weighing 50 kg) of wood per day during summers, while during winter months the consumption goes 3 times high. Total population of project area is 7820 individuals. As per estimates, the per capital fuel consumption per person has been calculated to 3300 kg per annum by taking 5kg/person/day for 7 months of summer and 15kg/person/day for 5 winter months. As far as timber is concerned, community member are extracting a very small volume of Chilghoza timber, which is negligible.

2.2.6 Changes in forests over time

During the meeting with resident community members, it was concluded that degradation is present in the Chilghoza forests of Gustoi valley. Resident community members informed that the degradation has occurred mainly due to yearlong grazing and high stocking rate. Due to which understory vegetation cover of shrubs and bushes including the young regeneration of Chilghoza pine has been grazed to ground. Besides, the grubbing of shrubs and small trees growing in the forested area for heating and cooking purposes by resident community members has also contributed to removal of vegetation. As result of this vegetation removal not only the grazing/carrying capacity of forested land in the valley has been reduced in terms of livestock raising in the area, but it has also led to soil erosion at many places as a result of increased amount of run off that is generated after high intensity monsoon rainfalls. Decrease in vegetation cover has also caused reduction in infiltration rate/capacity and water holding capacity of soils in the forested land. Therefore, the regeneration of *Pinus gerardiana*, *Pistacia khinjuk*, *Fraxinus xanthoxyloides* and other species of trees and shrubs/bushes/herbs is very low in the Gustoi valley due to low soil moisture availability for germination and growth of plants. The forested land of the valley serves as major watersheds for the entire lowlands lying in the foothills and plain. By virtue of this, the forested land through infiltration and percolation of runoff water contributes towards recharge of grounds for replenishing ground water table in the foothills and plain. Degradation of forested land is directly affecting the recharging of water table and, therefore, water availability in Gustoi Valley is decreasing with time.

Resident community members during the meeting informed that heavy soil erosion is another important form of land degradation in Gustoi Valley. Soil erosion is mainly caused by the high flow of water in mountain streams during monsoon rainfalls. During monsoon seasons, mountain streams present in Gusoti Valley carry runoff water from the upper mountainous areas that serve as watersheds/catchments for these channels. Due to non-availability of vegetation cover, usually large amount of run off is generated that passes through these streams in the form of flash floods. During water flow in rainy season, banks erosion and sometime soils from valuable croplands in the foothills and rains are also eroded. Although farmers and local community members are trying their best to reduce such erosions in the foothills and plain area, in view of low financial and technical resources their efforts have not succeeded.

2.2.7 Stakeholders

Stakeholder analysis is given at **Annex 2** and description of the main stakeholders is given below:

A. Community institution

In Gustoi area, communities living and around the Chilghoza forests are the custodian. All the tribes/sub-tribes have their areas clearly demarcated through the natural features. Chilghoza forests are protected and conserved by these communities/tribes. All the forest products such as grazing, fuel wood, timber, Chilghoza and Pistachio nuts from the Gustoi Chilghoza forests are regulated by these tribes. No tribe/sub-tribe trespasses the territory of other tribe. However, in case of mutual agreements/understandings, grazing, fuel wood collection and timber extraction for domestic purposes is undertaken by one tribe in the territory of another tribe. Due to this strict communal regulations, Chilghoza forests of Gustoi area are in much better shape.

In Gustoi valley, formal organizations in the form of Local Support Organization (LSO)/Community/Village Organizations are present in all of the villages. These Community/Village Organizations have been formed by the Balochistan Rural Support Programme (BRSP). BRSP has organized the village inhabitants into organized structures, while at the valley level these village level organizations have been further organized into a Local Support Organization (LSO). These organizations have been successfully used for implementation of Physical Infrastructure Schemes conceived in the different villages of the valley. Other than the BRSP, no other NGO has worked in the valley.

The key stakeholders in the preparation of Participatory Forest Management Plan include Resident Communities of Gustoi Valley, Balochistan Forest and Wildlife Department, Agriculture and Cooperative Department, Livestock and Dairy Development Department, District Administration of District Zhob, Local market suppliers, Commission Agents, Transporters, BRSP and Non-Government Organizations working in the valley, donor agencies such as FAO interested in management of Chilghoza forests:

While analyzing the data for the stakeholders for the Chilghoza Forests of Gustoi area, it came up that the major players in forest management are those having major interests and influence on using and protecting carbon pools. Although the stakeholders themselves may not be aware of this fact since the concepts are new. However, they may need raising awareness about this, especially of the importance and benefits of management of carbon pools.

In Gustoi valley for resolution of conflicts, a social organization exists in the form of a jirga. It comprises the elders of all the communities/sub-tribe residing in the area. Jirga I the Gustoi area is active at the local level in the valley and resolves all such issues and conflicts that pop up among the residents of villages. The socioeconomic data of Chilghoza forests of Gustoi Area indicates the institutional dimensions that may be relevant in management of drivers of deforestation and maintaining future

trend in favour of REDD+. The following institutions are relevant to the management of Chilghoza Forests of Gustoi area.

B. Balochistan Forest and Wildlife Department

Although the Chilghoza forests of Gustoi area belong to the local communities, still the forest products such as timber are regulated by the Balochistan Forest and Wildlife Department. Besides regulation of forest produce, any agency coming up for forest protection and conservation activities also comes through Balochistan Forest and Wildlife Department. All the technical matter related to the disease and insect attacks are also referred to the Forest and Wildlife Department.

The key stakeholders in the preparation of Participatory Forest Management Plan include Resident Communities of Gustoi Valley, Balochistan Forest and Wildlife Department, Agriculture and Cooperative Department, Livestock and Dairy Development Department, District Administration of District Zhob, Local market suppliers, Commission Agents, Transporters, BRSP and Non-Government Organizations working in the valley, donor agencies such as FAO interested in management of Chilghoza forests.

2.2.8 Stakeholders Analysis

The key stakeholders in the preparation of Participatory Forest Management Plan include: Resident Communities of Gustoi Valley, Balochistan Forest and Wildlife Department, Agriculture and Cooperative Department, Livestock and Dairy Development Department, District Administration of District Zhob, Local market suppliers, Commission Agents, Transporters, BRSP and Non-Government Organizations working in the valley, donor agencies such as FAO interested in management of Chilghoza forests. Details of stakeholders are available in Annex 2.

Table 5: Influence and interest matrix in forest management

	Neglected players: Need special attention to safeguard their interests	**Major players:** Need to be fully involved
INTEREST High Score 2 and 3	Local Market Suppliers, BRSP and other NGOs, Donor Agencies	Local Community Members, Balochistan Forest and Wildlife Department, District Administration
	Marginal players Low priority	**Risk factors** Need to be addressed
INTERST Low Score 0 and 1	Agriculture and Cooperative Department, Livestock and Dairy Development Department, Transporters,	Chilghoza Commission Agents
	INFLUENCE Low Score 0 and 1	**INFLUENCE High** Score 2 and 3

While analyzing the data of the stakeholders for the Chilghoza Forests of Gustoi area, it came up that the major players in forest management and relevant carbon pools are the same. Although the stakeholders themselves may not be aware of this fact since the concepts are new. However, they may need to be made aware about this, especially of the importance and benefits of management of carbon pools. In terms of interest and influence on forest management the major players are communities, Forest department and district administration but active engagement of local market suppliers of chilghoza and Chilghoza commission agents would be important as they along with communities involved in collection of nuts can introduce collection practices that could harm forest trees.

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

Resident community members of villages in Gustoi area depend upon Chilghoza forest resources for their domestic needs for firewood, timber and grazing their livestock and pine and Pistachio nuts. Like other forest resources of the province, Chilghoza Forests of Gustoi area also falls in Protected Forest category that is owned by the local communities. Except for the fuelwood and small quantities of timber that is extracted for domestic consumption by the resident community members, no timber or fuel wood is harvested for commercial purposes.

Due to strict community protection and conservation efforts, the Chilghoza forests of Gustoi valley are on a progression path. Where grazing pressures are low very healthy and profuse regeneration of Chilghoza can be seen. Although due to increase in prices of Chilghoza nuts, these forests are being managed by the resident community members in a much better manner, still one aspect related to cone collection needs to be addressed. During cone collection of Chilghoza, resident community member cause injury to the trees which are later on attacked by fungi and insects and in this way the tree finally succumbs to disease and infestations.

The major drivers of deforestation and forest degradation include:

Drivers of Deforestation:

- With increasing population, timber collection for local use has increased.
- Tribal ownership of the forests and lack of any management plan results in no efforts for forest regeneration and only exploiting for use.

Drivers of Forest degradation:

- Firewood collection for cooking and heating, area being very cold due to high altitude
- Uncontrolled Livestock grazing
- Injuries caused to trees during Chilghoza cone collection making trees susceptible to fungal and pest attacks, finally succumbing to disease and infestations

Barriers to forest restoration / enhancement:

- Uncontrolled grazing
- Availability of planting stock
- Lack of regeneration plans
- Hyper aridity / frequent droughts

2.4. Carbon Stock Assessment of Chilghoza Forests, Zhob

2.4.1 Plot level Carbon Stock Estimation

Based on the field data carbon stock (tonnes 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 6**). 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 6. The estimated stock of carbon per hectare (ha) was then used to estimate the total carbon stock in the selected sites of Gustoi Forest.

Table 6: Plot level above and below ground carbon stock

Plot No.	Average of AGC (tonnes/ha)	Average of BGC (tonnes/ha)
1	8.00357767	2.000894417
2	1.184113671	0.296028418
3	1.432764189	0.358191047
4	1.215284801	0.3038212
5	0.640667727	0.160166932
6	2.088776977	0.522194244
7	1.682304775	0.420576194
8	0.922588711	0.230647178
9	3.626854839	0.90671371
10	1.153690816	0.288422704
11	0.499254703	0.124813676
12	0.791309334	0.197827333
Average	**1.478816763**	**0.369704191**

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 2.34 ha in forest cover in the past 10 years at an average rate of 0.23 hectare (ha) per year (**Table 7**).

Table 7: Forest cover assessment (2010 -2020)

No	Landsat Satellite Sensor	Landsat data acquisition	Forest Cover (ha)
1	Landsat-8	2021-04-18	166.00
2	Landsat-5	2011-04-23	159.00
Change in Forest Cover in last 10 years			7.00
Per year change in forest cover			0.70

Table – 8 provides **three scenarios** of forest cover in the coming ten years that can be followed:

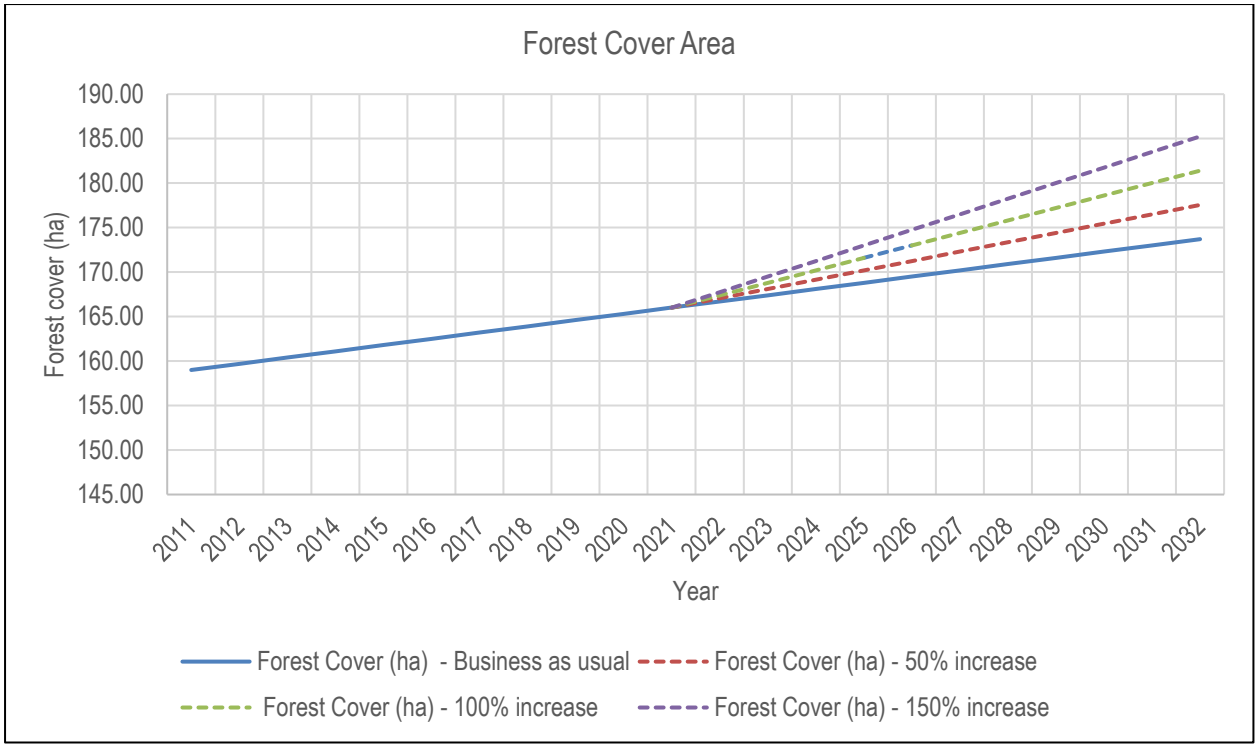
1. Adding 50% more forest cover in addition to the current average annual increase of 0.7 ha.
2. Adding 100% more forest cover in addition to the current average annual increase of 0.7 ha.
3. Adding 150% more forest cover in addition to the current average annual increase of 0.7 ha.

The above scenarios mean that the forest that is already growing annually on average by 0.7 ha (as observed in the last 10 years) and enhancing this growth by 50%, 3.85 ha of forest cover in total would be required to be added, which will increase the forest cover to 177.55 ha instead of 173.70 ha in the business as usual scenario by the year 2032. Similarly, in 100% and 150% scenarios, additional forest cover to be added will be 7.70 ha and 11.55 ha respectively that will increase the total forest cover to 181.40 ha and 185.25 ha respectively. The total area of the PFMP is 1467 ha and has a plenty of land available for increasing the forest cover.

Table 8: Forest Cover Scenarios based on trend in the past 10 years

Rate of change per year (ha)	0.70	0.35	0.70	1.05
Year	Forest Cover (ha) - Business as usual	Forest Cover (ha) - 50% increase (0.7 + 0.35)	Forest Cover (ha)- 100% increase (0.7 + 0.7)	Forest Cover (ha) - 150% increase (0.7 + 1.05)
2011	159.00			
2012	159.70			
2013	160.40			
2014	161.10			
2015	161.80			
2016	162.50			
2017	163.20			
2018	163.90			
2019	164.60			
2020	165.30			
2021	166.00			
2022	166.70	167.05	167.40	167.75
2023	167.40	168.10	168.80	169.50
2024	168.10	169.15	170.20	171.25
2025	168.80	170.20	171.60	173.00
2026	169.50	171.25	173.00	174.75
2027	170.20	172.30	174.40	176.50
2028	170.90	173.35	175.80	178.25
2029	171.60	174.40	177.20	180.00
2030	172.30	175.45	178.60	181.75
2031	173.00	176.50	180.00	183.50
2032	173.70	177.55	181.40	185.25
Additional Forest cover increase in addition to business as usual		3.85	7.70	11.55

These scenarios are presented visually in Figure - 3: (Forest cover Scenarios)



2.4.3 Carbon stock estimation and CO2 emissions

The field data and biomass collected from 12 samples was used to calculate Above Ground Biomass (AGB) using locally developed allometric equations (Ismail et al, 2018) for 2011-2021 (**Table 9**). In Gustoi Forest, the cumulative carbon stock in the carbon pools (above, below, deadwood, litter and soil) was estimated to as 11,468 tonnes back in 2011 which increased to 11,972 tonnes in 2021. This change corresponds to the increase in forest cover from 159 ha in 2011 to 166 ha in year 2021 reducing CO_2 emissions at the rate of 185 tonnes of CO_2 eq. per annum (see **table 7**).

Table 9: Carbon stock estimation (2011-2021)

Carbon pool	Mean carbon stock (tonnes C stock per hectare)	Forest Cover (ha)	Total stock (tonnes C stock)	CO_2 (tonnes CO_2 eq)
2011 (2011-04-23)				
Above	1.48	159.00	235.13	
Below	0.37		58.78	
Deadwood	2.23		355.02	
Litter	0.14		22.55	
Soil*	67.9		10,796.10	
Cumulative			11,468	42,047.79
2021 (2021-04-18)				
Above	1.48	166.00	245.48	
Below	0.37		61.37	
Deadwood	2.23		370.65	
Litter	0.14		23.54	
Soil	67.9		11,271.40	
Cumulative			11,972	43,898.95
Rate of change per year				
2021-2011		**0.70**	**50.49**	**185**

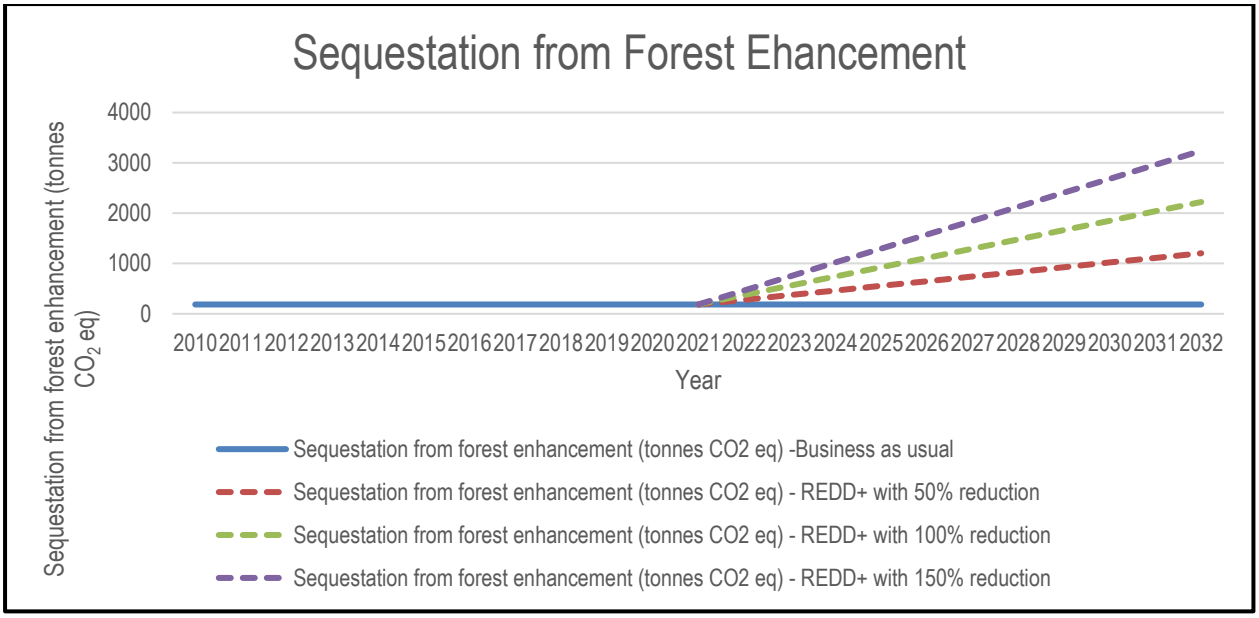
2.4.4 CO_2 Sequestration Scenarios from Forest Enhancement

This section presents the future CO_2 sequestration scenarios applying 50%, 100% and 150% 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 Gustoi is 185 tonnes CO_2 eq per annum because of forest cover increase which can be boosted further by 93 tonnes with 50% enhancement, 185 tonnes with 100% enhancement and 278 tonnes with 150% enhancement of forest cover. Figure - 4 shows the enhancement trend under different scenarios.

Table 10: CO2 Sequestration trend and Different Enhancement scenarios

Rate of change per year	185	93	185	278
Year	**Sequestration from Forest enhancement (tonne CO_2 eq) - Business as usual**	**Sequestration from Forest enhancement (tonne CO_2 eq) - REDD+ with 50% addition**	**Sequestration from Forest enhancement (tonne CO_2 eq) - REDD+ with 100% addition**	**Sequestration from Forest enhancement (tonne CO_2 eq) - REDD+ with 150% addition**
2010	185			
2011	185			
2012	185			
2013	185			
2014	185			
2015	185			
2016	185			
2017	185			
2018	185			
2019	185			
2020	185			
2021	185			
2022	185	278	370	463
2023	185	370	555	740
2024	185	463	740	1018
2025	185	555	926	1296
2026	185	648	1111	1573
2027	185	740	1296	1851
2028	185	833	1481	2129
2029	185	926	1666	2407
2030	185	1018	1851	2684
2031	185	1111	2036	2962
2032	185	1203	2221	3240

Figure - 4: 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 7,820 with a growth rate of 2.51 per annum. The fuelwood and timber consumption per capita per annum was calculated as 0.92 m^3 and 0.25 m^3, respectively. Based on this data emissions from forest degradation are calculated and presented in the Table 11.

Table 11: 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) (tonne CO_2 eq)	Timber Emission (TC*D*BEF2*CF*44/12) (tonne CO_2 eq)	Emission from Forest Degradation (tonne CO_2 eq) -Business as usual
2011	6714	6177	1678	9156	2488	11644
2012	6887	6336	1722	9391	2552	11943
2013	7064	6499	1766	9633	2618	12251
2014	7246	6666	1811	9881	2685	12566
2015	7432	6838	1858	10136	2754	12890
2016	7624	7014	1906	10397	2825	13222
2017	7820	7194	1955	10664	2898	13562
2018	8016	7375	2004	10932	2971	13903
2019	8217	7560	2054	11206	3045	14252
2020	8424	7750	2106	11488	3122	14609
2021	8635	7944	2159	11776	3200	14976
2022	8852	8144	2213	12072	3280	15352
2023	9074	8348	2269	12375	3363	15737
2024	9302	8558	2325	12685	3447	16132
2025	9535	8773	2384	13004	3534	16537
2026	9775	8993	2444	13330	3622	16952
2027	10020	9218	2505	13664	3713	17378
2028	10272	9450	2568	14007	3806	17814
2029	10529	9687	2632	14359	3902	18261
2030	10794	9930	2698	14719	4000	18719
2031	11065	10179	2766	15089	4100	19189
2032	11342	10435	2836	15468	4203	19671

[1] Wood Density (D)

Pinus gerardiana	*0.50*
Pistacia khinjuk	*0.7201*
Average	*0.61*
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

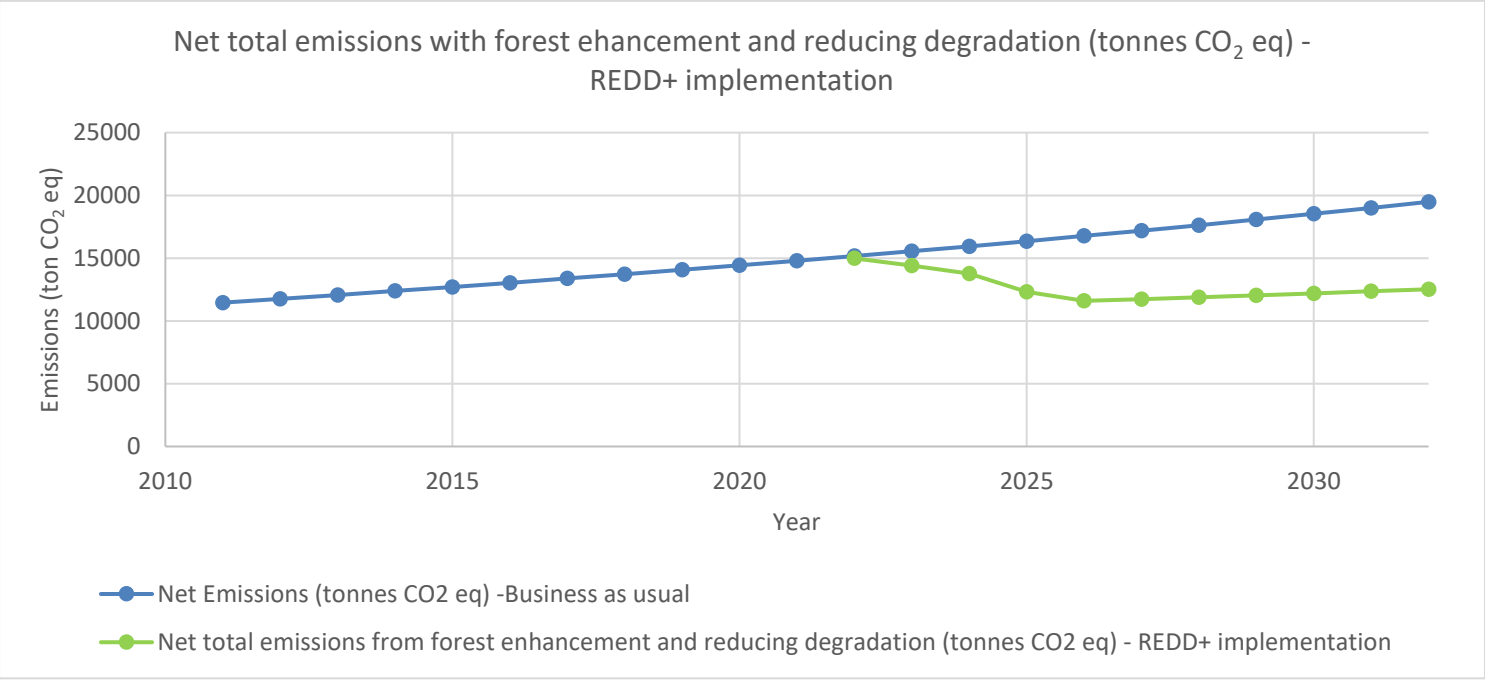
The Table 12 below provides a net CO_2 sequestration scenario based on 100% forest cover enhancement in addition to addressing existing positive trend and reducing emissions from forest degradation in an incremental manner annually from 5% to 25% with REDD+ activity. In this scenario, the net emissions from the forest will 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. Though the forest cover is increasing in the pilot site but the pace of increase in forest cover is very little (0.7 ha) whereas enough area (1467 ha) in the pilot site is available for enhancing forest cover. Even with 100% enhancement efforts only 1.05 ha of additional forest cover would be added annually which will initially reduce the emissions but after 2026 the emissions will start climbing. So, a concerted strategy targeting more forest cover than 100% and focusing on reducing the demand for firewood would be needed to realize the full potential of CO_2 sequestration from the pilot site. Figure - 5 graphically presents the business-as-usual scenario and the REDD+ scenario.

Table 12: Sequestration Scenario from Forest Enhancement and Reducing degradation

Rate of change per year	185					185	
Year	**Annual Sequestration from forest enhancement (tonnes CO_2 eq) -Business as usual**	**Annual Emission from Forest Degradation (tonnes CO_2 eq) -Business as usual**	**Net Emissions (tonnes CO_2 eq) - Business as usual**	**5-25% Reduction in Degradation emissions (tonnes CO_2 eq)**	**Net emissions from degradation (tonnes CO_2 eq)**	**Sequestration from forest enhancement (tonnes CO_2 eq) - REDD+ with 100% enhancement**	**Net total emissions from forest enhancement and reducing degradation (tonnes CO_2 eq) - REDD+ implementation**
2011	185	11644	11459				
2012	185	11943	11758				
2013	185	12251	12066				
2014	185	12566	12381				
2015	185	12890	12705				
2016	185	13222	13037				
2017	185	13562	13377				
2018	185	13903	13717				
2019	185	14252	14066				
2020	185	14609	14424				
2021	185	14976	14791				

2022	185	15352	15167	768	15352	370	14982
2023	185	15737	15552	787	14950	555	14395
2024	185	16132	15947	1613	14519	740	13778
2025	185	16537	16352	3307	13230	926	12304
2026	185	16952	16767	4238	12714	1111	11603
2027	185	17378	17193	4344	13033	1296	11737
2028	185	17814	17629	4453	13360	1481	11879
2029	185	18261	18076	4565	13696	1666	12030
2030	185	18719	18534	4680	14039	1851	12188
2031	185	19189	19004	4797	14392	2036	12356
2032	185	19671	19486	4918	14753	2221	12532

Figure - 5: Sequestration scenarios – Forest Enhancement and Reduced degradation



CHAPTER III: PROPOSED INTERVENTIONS TO ADDRESS DRIVERS AND BARRIERS

Chilghoza is one of the most important ecosystems in the dry temperate zone of Balochistan. In the past, Chilghoza forests have faced an immense pressure from local communities for harvesting for timber/fuel wood extraction and grazing. However, increase in the prices of Chilghoza nut has put a halt on the deforestation activities in the Chilghoza forests of Gustoi area and other valleys of Zhob and Sherani districts. For management of Chilghoza forests under this very plan an integrated approach has been adopted in recommending interventions/activities through Participatory Forests Management Planning. However, it is worth mentioning here that most of population/individuals of Gustoi area fall in the class "poorest of the poor". Community members have very little livelihood sources available to them. Most of them are engage in animal husbandry/livestock rearing. During the past severe and prolong drought livestock sector throughout the province has badly suffered.

For undertaking interventions in Gustoi, it is important that interventions are implemented in all the natural resource sectors i.e. forestry, agriculture, livestock and water. Undertaking activities either in forestry or livestock or any other natural resource sector in STAND ALONE MODE is not going to achieve the desires results of reducing/controlling deforestation and forest degradation. By taking into consideration this very fact into account and integrated approach towards natural resource management has been recommended in the Participatory Forest Management Plan of Chilghoza Forests of Gustoi Area. All the interventions have been, therefore, grouped in terms of relevance to the drivers of deforestation and forest degradation. Detail of these interventions follows:

Interventions addressing Drivers of Deforestation

Timber Extraction for local use

- Community Organizations at tribal level in Gustoi valley to engage local stakeholders in forest management and protection.
- Creating awareness among the people on the importance of these forests and potential revenues to be generated through REDD+ implementation as a result of forest enhancement while sustainably extracting pine nuts.

Lack of Forest Management

- Measures to encourage Assisted Natural Regeneration/ Artificial Regeneration & Improve Chilghoza Harvesting, Sorting/Grading
- Development of regeneration plans

Interventions addressing Drivers of forest degradation

Firewood Collection

- Capacity building of communities in energy conservation measures
- Explore and promote alternate energy sources
- Supporting energy plantations
- Establishment of nurseries for planting in the forest and on rangelands to improve fodder and firewood availability for the local population.

Uncontrolled Livestock grazing

- Capacity building of communities in grazing management and fodder production

- Introduction of appropriate grazing systems and range restoration and improvement measures
- Improving livestock protection and production vaccination against contagious diseases
- Involving women in livestock production initiatives

Injuries caused to trees during Chilghoza cone collection

- Improved cones collection techniques and equipment introduced

Interventions addressing Barriers to forest restoration

Uncontrolled grazing

- Develop participatory grazing management plans for regulating grazing in regeneration areas
- Increasing fodder crops production on agricultural lands

Availability of Planting stock and lack of regeneration plans

- Raising nurseries for re-stocking of forest areas
- Development of regeneration plans for under stocked areas
- Establishment of enclosures for regeneration

The total indicative budget of the PFMP implementation is PKR 43,090,000. Ten years budgeting and operational planning of the PFMP is given in Table 13.

Table 13. Indicative operational plan and Estimated budget of PFMP for 10 years

				Operational Plan											
S.N.	**Activity**	**Unit**	**Unit cost**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total units**	**Total cost**
A	**Participatory Forest Management**														
1	Community Organizations at tribal level in Gustoi valley to engage local stakeholders in forest management and protection.	No	500000	5	5	5								15	7,500,000
2	Creating awareness among the people on the importance of these forests and potential revenues to be generated through REDD+ implementation as a result of forest enhancement while sustainably extracting pine nuts.	No	100000	1	1	1								3	300,000
3	Artificial Regeneration - planting	No.	10	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200000	2,000,000
4	Establishment of enclosures to assist natural regeneration in Chilghoza patches	LS	20000	6	6	6	6	6	6	6	6	6	6	60	1,200,000
B	**Forest Regeneration**														
5	Establishment of nurseries for planting in the forest and on rangelands to improve fodder and firewood availability for the local population	No	10	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	350000	3,500,000
6	Raising Energy Plantation	ha	200000	10	10	10	10	10	10	10	10	10	10	60	12,000,000
C	**Managed Rotational Grazing**														
7	Facilitation in Rotational Grazing planning	No	50000	5	5	5	5							20	1,000,000
8	Rotational Grazing systems established	Herdsman	200000		3	3	3	3	3					15	3,000,000

D	**Promotion of Sustainable Energy Technology**														
9	Provision of Solar Systems as domestic energy alternative	No	1500000		5	5	5	5	5	5				20	3,000,000
10	Provision of Biomass Energy Technology	No	1000000		5	5	5	5	5	5				15	1,500,000
11	Energy Efficient stoves and bio-briquette	No	3000		200	200	200	200	200	200				1200	3,600,000
E	**Promotion & Value Addition of Non-Timber Forest Products (Trainings/Equipment's)**														
12	Training and provision of equipment for improved Chilghoza Harvesting, Sorting/Grading	persons	50000	10	20	20	20							70	3,500,000
13	Medicinal Plants	No	60000		2	2								4	240,000
F	**Livestock Extension Support**														
14	Capacity building on Livestock Management	No	1000	50	50	50	50	50						250	250,000
15	Provision of inputs for better health of livestock like medicines for de-worming, vaccines, etc.	No	100	1000	1000	1000	1000	1000						5000	500,000
	Total														43,090,000

CHAPTER IV: IMPLEMENTATION MECHANISM FOR PFMP

4.1. Resources for implementation of interventions/activities

Balochistan Forest and Wildlife Department is the custodian institution of all the Chilghoza forests in the province including the Chilghoza forests of Gustoi Area. Although the Chilghoza forests belong to local communities, still the timber and other forest produce are regulated by the Forest and Wildlife Department. Balochistan Forest and Wildlife Department has not implemented any restoration or development project in the Chilghoza forests of Gustoi area. In the past, World Wide Fund for Nature and recently Food and Agriculture Organization (FAO) of the United Nations are implementing conservation initiatives in Chilghoza forests but these are being implemented in the Sherani district. Taking into consideration the importance of Chilghoza forests ecosystem, Balochistan Forest and Wildlife Department will take a lead role towards securing necessary financial and human resources for the project. Besides, the Balochistan Forest and Wildlife Department, other key stakeholders identified in this plan will also put up efforts towards resource mobilization.

A total of Rs. 43 million is required for implementation of activities contained in the Participatory Forest Management Plan of Chilghoza forests of Gustoi Area. Arranging this amount is not an easy task in view of the availability of resources with the Balochistan Forest and Wildlife Department and Community Conservation Organizations of Gustoi area in the face of prevailing poverty in the communities. However, for provision of this very amount a number of other options would also be explored to support the activities included in the plan for conservation of Chilghoza forests, rehabilitation of natural resources present in Gustoi area, increasing productivity of productive sectors such as agriculture and livestock and strengthening of village infrastructures. Through implementation of the Participatory Forest Management Plan it is expected that it will not only contribute towards Chilghoza forest conservation but would also help in reducing poverty level in the villages of valley as a result of increased productivity in agriculture and livestock sectors and generation of alternate income earning opportunities. Besides, the Participatory Forests Management Plan will also pave the way towards sustainable resource use. In the long run the implementation of activities through Participatory Forests Management Plan will help in improving the standard of living of the village inhabitants.

For implementation of the activities, initially a donor conference would be called where besides inviting the local donor agencies, the International NGOs especially those working in Balochistan would also be requested to participate. This will provide an opportunity for getting the funding for implementation of activities in different sectors. Another important area, which would be explored for the implementation of the Participatory Forests Management Plan of Gustoi Area, is through arranging coordination meetings with all those partner agencies that are already working in Tehsil Zhob, such as Balochistan Rural Support Programme (BRSP), Food and Agriculture Organization (FAO) of United Nations, World Bank and Asian Development Bank. Besides, the United Nation Development Programme (UNDP) working in the province would also be approached for securing financial support. In these meetings, the plan will be shared with these partners and the sectors where these organizations/agencies are working would be identified for future partnerships. This will provide a very conducive environment for partnerships among the different agencies working in the area of community/rural development and natural resource management/ conservation. Another most important avenue for the implementation of activities is through the Ten Billion Tree Tsunami Project (TBTTP).

As inhabitants of villages of Gustoi Area would be forming a Community Conservation Organizations (CCOs) through/under the project, therefore, they would be working very closely with the project management. They would very actively participate in the preparation of annual/quarterly work plans. It would be thus an excellent opportunity for the project to implement the planned activities on ground that has been identified in the CCOs meeting. Taking these facts into consideration, it would be to the great advantage of the Participatory Forests Management Plan to use the CCOs forum for implementation of the planned activities. Similarly, the Balochistan Forest and Wildlife Department will also play key role in arranging for funding through the Public Sector Development Programme (PSDP) of Balochistan. As the provincial Government of Balochistan has now got many opportunities available to it for natural resource management and rural/community development, therefore, it would not be a difficult task to get their consent for funding a plan where a lot of inputs in terms of survey and preparation of plan have already been added. In terms of resource mobilization for the plan, it is very important to indicate here that as the plan has taken up an integrated approach towards the sustainable management of natural resources and community/rural development, therefore, a multi-dimension approach should be sought for securing funding/sponsoring purposes. In this mechanism, efforts would be put up to secure funding for implementation process from various organizations working in different sectors.

4.2. Suggested institutional mechanism for implementation of activities

Balochistan Forest and Wildlife Department in consultation with the Community Conservation Organizations will decide on formation/notification of suitable institutional mechanism for implementation of this plan. It is proposed d that valley and district level REDD+ implementation committees may be notified by the Balochistan Forest and Wildlife Department that will oversee implementation of activities. The notifications will include description of responsibilities of Balochistan Forest and Wildlife Department, the respective CCOs, and any other relevant stakeholders.

4.2.1. Valley Level REDD+ Implementation Committee (VLRIC):

Balochistan Forest and Wildlife Department in consultation with the CCOs, would notify two committees viz.: A Valley Level REDD+ Implementation Committee (VLRIC) and the District Level REDD+ Implementation Committee (DLRIC). The VLRIC will comprise representative from the CCOs and the Balochistan Forest and Wildlife Department. The community will nominate representatives for the VLRIC to represent them. The representatives of the CCOs will be responsible to mobilize and ensure community support for implementation of activities contained in the Participatory Forest Management Plan. The Balochistan Forest and Wildlife Department will implement the plan activities through the Deputy Conservator of Forests Zhob and Rang Forest Officer Zhob. These officers will be supported by the Deputy Ranger Forest, Foresters and Forest Guard in implementation process. The VLRIC will be Co-chaired by a CCOs member nominated by the communities.

4.2.2. District Level REDD+ Implementation Committee (DLRIC):

The VLRIC in implementation of its activities will be supported by a District Level REDD+ Implementation Committee (DRIC). This committee will be chaired by the Deputy Conservator of Forests, while Divisional Forest Officer Sherani, District Livestock Officer, District Agriculture Officer and Sub-Divisional Officer Irrigation, a representative of CCO would be members of the committee. The responsibility of the DLRIC will be to monitor progress on implementation of activities and secure/extend support from the relevant actors including the government departments.

4.3 Benefit Distribution Mechanism

Implementation of the REDD+ interventions package and other support activities will definitely contribute towards increasing 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 Gustoi Area Chilghoza Forests in due course of time. Major portion of the income earned by trading carbon stock will be distributed among the communities (80%).

Carbon and non-carbon benefits from implementation of this plan will motivate stakeholders to value standing Chilghoza trees rather 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. An example is the 20:80 benefit sharing mechanism between the Balochistan Forest and Wildlife Department and the community from trophy hunting programme in Torghar, Dureiji and Shah Noorani areas of the province. A specific distribution of benefits in case of REDD+ programme will be developed by the Balochistan Forest and Wildlife Department in due course of time which will form basis for sharing of benefits in the Chilghoza Forests of Gustoi Area, District Zhob. The success of this plan 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 Balochistan's benefit sharing mechanism.

CHAPTER V: CONFLICTS AND GRIEVANCES REDRESSAL MECHANISM

5.1 Conflict within the community

Traditionally, a tribal jirga system resolves conflicts within the community in Gustoi Area and the decisions taken are acceptable to all the tribes/parties. Under REDD+ redressal, it is proposed that the same tribal jirga should take lead role for resolving conflicts arising among the communities/villages 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 CCOs formed under/through the project with the help of tribal jirga will settle any disputes between the two villages. Any unsettled disputes will be referred to the District Level REDD+ Implementation Committee (DLRIC). 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 Balochistan Forest and Wildlife Department

The REDD+ is a new mechanism for communities as well as for the Balochistan Forest and Wildlife Department, therefore both partners (Community and the Balochistan Forest and Wildlife Department) may be facing some conflict of interests 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+ Action Plan.

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Annex 1: Socio-economic data of Chilghoza Forests of Gustoi Area, District Zhob

I. Stakeholder group (name)	**Community and Balochistan Forest and Wildlife Department**
II. General information	
Location of stakeholder groups (e.g. different villages/hamlets in and outside forest area) and names and indicate on map if possible	Gustoi Chilghoza forest is present in district Zhob, Balochistan. Gustoi is located at about 90 km from the Zhob town towards Sambaza road. These forests are owned by the local communities. There are 11 villages in this forested rea. Local community members are dependent upon these forests for their livelihoods in terms of Chilghoza nuts, Wild Pistachio seeds, timber, fuel wood, water and grazing of livestock.
III. Social organization in the forest area	
2. Traditional organizations (e.g. jirga)	**Yes**
2.1. Organization (name; purpose; membership)	
2.2. Organization (name; purpose; membership	
2.3. Organization (name; purpose; membership	
3. Formal organization (e.g. social; welfare organization or village development committee	**Yes**
3.1. Organization (name; purpose; membership)	Local Support Organization / Village and community level organizations formed by the Balochistan Rural Support Programme (BRSP) for organizing village inhabitants into formal organizations to implement community development activities.
IV. Use of forest and forest area	
4. For what are you using the forest area?	Grazing, firewood, Collection of Chilghoza Nuts, Wild Pistachio seeds and extraction of timber
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)	Pinus gerardiana (Chilghoza Pine) nuts, Pistacia khinjuk seeds,
Forest areas related daily labor/employment (employed by whom; for what?)	NO
Tourism (what; where; locate on the map)	No
Hunting/Fishing	Yes
5.What would it mean if you had no access to these forest products? (Any alternatives? Threat to livelihood?)	Communities living in and around the Gustoi Chilghoza Forests are completely dependent upon these forests for their livelihoods. Due to remoteness and lack of communication roads that makes this forest area inaccessible, as such no alternatives can be provided to local communities. In case the communities are barred from using these forest resources, it would not be possible for them to live in and around these forests.
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?	Gustoi Forests belong to local communities. This forest has not been declared as state/protected forests by the Government of Balochistan. So local communities are exercising all the rights.
Timber (shares)	Yes
Fodder: grass cutting/grazing	Yes
Firewood	Yes
Other products:	Chilghoza nuts, Wild Pistachio seeds.

Annex 2: Stakeholder analysis of Gustoi Valley, District Zhob, Balochistan

STAKEHOLDER	INTEREST in Forest		INFLUENCE on Forest		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
Local Community	Timber, fuel wood, grazing, Chilghoza nuts, water	3	Overall management of Chilghoza forest	3	All Carbon pool	3	Management decisions especially on collection of NTFP such as Chilghoza nuts and Wild Pistachio seeds	3
Forest and Wildlife Department	Forest conservation	3	Conservation of Chilghoza forests	3	All Carbon pool	3	Regulation of forest tree harvesting and transportation	3
Agriculture and Cooperative Department	Water and soil conservation	0	Lobbying	0	Above ground and below ground carbon pool	0	Lobbying for water and soil conservation	0
Livestock and Dairy Development Department	Forage/grazing of livestock (the main livelihood source of communities)	1	Lobbying	1	Above ground carbon pool	1	Lobbying for forage production/grazing livestock	1
District Administration	Forest conservation	2	Conservation of Chilghoza forests	2	All Carbon pool	2	Regulation of forest produce	2
Local Market Suppliers (Chilghoza nuts suppliers)	Production of Non-Timber forest produce (NTFP) Chilghoza nuts	2	Lobbying	0	Above ground	0	Lobbying	0

STAKEHOLDER	INTEREST in Forest		INFLUENCE on Forest		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
Commission Agents (for Chilghoza nuts)	Production of Non-Timber Forest Produce (NTFP) Chilghoza nuts, Wild Pistachio	1	Lobbying	2	Above ground	0	Lobbying	0
Transporters	Transportation of NTFP (Chilghoza & Wild Pistachio), livestock	0	Lobbying	0	Above ground	0	Lobbying	0
BRSP and other Non-Governmental Organizations (NGOs)	Forest and Biodiversity conservation	2	Lobbying	1	All Carbon pool	1	Lobbying	1
Donor Agencies	Forest and Biodiversity Conservation, Promotion of Chilghoza Nut and other NTPF production	2	Lobbying	2	All Carbon pool	1	Lobbying	1

*Scale	Level of interest	level of influence
0	None	Negligible or ignored
1	Little	Little
2	Significant	Significant
3	High/vital for existence	Controller

Annex 3: Plot level Carbon stocks

Plot No.	Latitude	Longitude	Tree ID	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	Wood Density (g/cm3)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
1	30.28380528	67.8854	1	*Pinus gerardiana*	82	6.4		2476.126933	24.76	11.64	2.91
1	30.28380528	67.8854	2	*Pinus gerardiana*	80	11.6		2321.711648	23.22	10.91	2.73
1	30.28380528	67.8854	3	*Pinus gerardiana*	37	4.4		310.8280165	3.11	1.46	0.37
2	30.29192639	67.86730333	1	*Pinus gerardiana*	67	6.5		1462.095647	14.62	6.87	1.72
2	30.29192639	67.86730333	2	*Pinus gerardiana*	14	4.7		24.65350091	0.25	0.12	0.03
2	30.29192639	67.86730333	3	*Pinus gerardiana*	22	4.2		80.12280518	0.80	0.38	0.09
2	30.29192639	67.86730333	4	*Pinus gerardiana*	17	5		40.90366035	0.41	0.19	0.05
2	30.29192639	67.86730333	5	*Pinus gerardiana*	24	6		100.530392	1.01	0.47	0.12
2	30.29192639	67.86730333	6	*Pinus gerardiana*	9	5.4		7.789305063	0.08	0.04	0.01
2	30.29192639	67.86730333	7	*Pinus gerardiana*	18	6.1		47.47824233	0.47	0.22	0.06
3	30.28350583	67.86762028	1	*Pinus gerardiana*	28	7.5		150.2707727	1.50	0.71	0.18
3	30.28350583	67.86762028	2	*Pinus gerardiana*	26	3.7		123.864405	1.24	0.58	0.15
3	30.28350583	67.86762028	3	*Pinus gerardiana*	18	4.8		47.47824233	0.47	0.22	0.06
3	30.28350583	67.86762028	4	*Pinus gerardiana*	50	8.6		681.5921838	6.82	3.20	0.80
3	30.28350583	67.86762028	5	*Pinus gerardiana*	25	2.9		111.8223672	1.12	0.53	0.13
3	30.28350583	67.86762028	6	*Pinus gerardiana*	46	3.9		548.3957986	5.48	2.58	0.64
3	30.28350583	67.86762028	7	*Pinus gerardiana*	41	3.9		406.234669	4.06	1.91	0.48
3	30.28350583	67.86762028	8	*Pinus gerardiana*	35	4.1		268.8974975	2.69	1.26	0.32
3	30.28350583	67.86762028	9	*Pinus gerardiana*	26	9.2		123.864405	1.24	0.58	0.15
3	30.28350583	67.86762028	10	*Pinus gerardiana*	47	7.8		580.029531	5.80	2.73	0.68
3	30.28350583	67.86762028	11	*Pinus gerardiana*	37	6.4		310.8280165	3.11	1.46	0.37
4	30.27504833	67.84199556	1	*Pinus gerardiana*	31	7.5		195.949613	1.96	0.92	0.23
4	30.27504833	67.84199556	2	*Pinus gerardiana*	34	8.7		249.3205597	2.49	1.17	0.29
4	30.27504833	67.84199556	3	*Pinus gerardiana*	27	7		136.6745992	1.37	0.64	0.16

Plot No.	Latitude	Longitude	Tree ID	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	Wood Density (g/cm3)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
4	30.27504833	67.84199556	4	*Pinus gerardiana*	25	7.2		111.8223672	1.12	0.53	0.13
4	30.27504833	67.84199556	5	*Pinus gerardiana*	24	10.9		100.530392	1.01	0.47	0.12
4	30.27504833	67.84199556	6	*Pinus gerardiana*	23	8.9		89.97009917	0.90	0.42	0.11
4	30.27504833	67.84199556	7	*Pinus gerardiana*	49.5	9.1		663.96089	6.64	3.12	0.78
4	30.27504833	67.84199556	8	*Pinus gerardiana*	43	12.1		459.9559198	4.60	2.16	0.54
4	30.27504833	67.84199556	9	*Pinus gerardiana*	53	11.5		793.4411243	7.93	3.73	0.93
4	30.27504833	67.84199556	10	*Pinus gerardiana*	15	7.7		29.51302308	0.30	0.14	0.03
4	30.27504833	67.84199556	11	*Pinus gerardiana*	11	6.6		13.14498898	0.13	0.06	0.02
5	30.28026083	67.88633389	1	*Pinus gerardiana*	43.5	5.6		474.033415	4.74	2.23	0.56
5	30.28026083	67.88633389	2	*Pinus gerardiana*	9.5	5.5		8.968717955	0.09	0.04	0.01
5	30.28026083	67.88633389	3	*Pinus gerardiana*	27	11		136.6745992	1.37	0.64	0.16
5	30.28026083	67.88633389	4	*Pinus gerardiana*	31	11.6		195.949613	1.96	0.92	0.23
5	30.28026083	67.88633389	5	*Pinus gerardiana*	7	3		4.044666147	0.04	0.02	0.00
5	30.28026083	67.88633389	7	*Pinus gerardiana*	20.5	7.3		66.64707051	0.67	0.31	0.08
5	30.28026083	67.88633389	8	*Pinus gerardiana*	27	6.7		136.6745992	1.37	0.64	0.16
5	30.28026083	67.88633389	9	*Pinus gerardiana*	25	10		111.8223672	1.12	0.53	0.13
5	30.28026083	67.88633389	10	*Pinus gerardiana*	31	9.7		195.949613	1.96	0.92	0.23
5	30.28026083	67.88633389	11	*Pinus gerardiana*	40	12.4		380.9012173	3.81	1.79	0.45
5	30.28026083	67.88633389	12	*Pinus gerardiana*	5	3.6		1.681994617	0.02	0.01	0.00
5	30.28026083	67.88633389	13	*Pinus gerardiana*	19	7.9		54.66713153	0.55	0.26	0.06
5	30.28026083	67.88633389	14	*Pinus gerardiana*	7	3.8		4.044666147	0.04	0.02	0.00
6	30.29114722	67.29114722	1	*Pistacia khinjuk*	36	4.8	0.7201	246.3907371	2.46	1.16	0.29
6	30.29114722	67.29114722	2	*Pistacia khinjuk*	38.25	5.1	0.7201	294.2493482	2.94	1.38	0.35
6	30.29114722	67.29114722	3	*Pistacia khinjuk*	45	6	0.7201	473.5620533	4.74	2.23	0.56
6	30.29114722	67.29114722	4	*Pistacia khinjuk*	57	7.6	0.7201	946.1766627	9.46	4.45	1.11
6	30.29114722	67.29114722	5	*Pistacia khinjuk*	36.75	4.9	0.7201	261.7243658	2.62	1.23	0.31
7	30.28176028	67.85157444	1	*Pinus gerardiana*	50	8.5		681.5921838	6.82	3.20	0.80

Plot No.	Latitude	Longitude	Tree ID	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	Wood Density (g/cm3)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
7	30.28176028	67.85157444	2	*Pinus gerardiana*	14	5.3		24.65350091	0.25	0.12	0.03
7	30.28176028	67.85157444	3	*Pinus gerardiana*	51	8		717.7137547	7.18	3.37	0.84
7	30.28176028	67.85157444	4	*Pinus gerardiana*	9	5.3		7.789305063	0.08	0.04	0.01
8	30.29727028	67.86506306	1	*Pinus gerardiana*	9	5.6		7.789305063	0.08	0.04	0.01
8	30.29727028	67.86506306	2	*Pinus gerardiana*	11	5.1		13.14498898	0.13	0.06	0.02
8	30.29727028	67.86506306	3	*Pinus gerardiana*	11	6.9		13.14498898	0.13	0.06	0.02
8	30.29727028	67.86506306	4	*Pinus gerardiana*	26	7..2		123.864405	1.24	0.58	0.15
8	30.29727028	67.86506306	5	*Pinus gerardiana*	14	4.2		24.65350091	0.25	0.12	0.03
8	30.29727028	67.86506306	6	*Pinus gerardiana*	32	6.2		212.8629711	2.13	1.00	0.25
8	30.29727028	67.86506306	7	*Pinus gerardiana*	22	4.7		80.12280518	0.80	0.38	0.09
8	30.29727028	67.86506306	8	*Pinus gerardiana*	10	8.5		10.25228148	0.10	0.05	0.01
8	30.29727028	67.86506306	9	*Pinus gerardiana*	13	6.6		20.32125853	0.20	0.10	0.02
8	30.29727028	67.86506306	10	*Pinus gerardiana*	34	9.3		249.3205597	2.49	1.17	0.29
8	30.29727028	67.86506306	11	*Pinus gerardiana*	63	12.7		1245.262391	12.45	5.85	1.46
8	30.29727028	67.86506306	12	*Pinus gerardiana*	6	2.6		2.705861334	0.03	0.01	0.00
8	30.29727028	67.86506306	13	*Pinus gerardiana*	46	9		548.3957986	5.48	2.58	0.64
9	30.28749694	67.87297778	1	*Pinus gerardiana*	75	14.1		1962.08482	19.62	9.22	2.31
9	30.28749694	67.87297778	2	*Pinus gerardiana*	76	14		2031.038359	20.31	9.55	2.39
9	30.28749694	67.87297778	3	*Pinus gerardiana*	35	12.8		268.8974975	2.69	1.26	0.32
9	30.28749694	67.87297778	4	*Pinus gerardiana*	22	8.7		80.12280518	0.80	0.38	0.09
9	30.28749694	67.87297778	5	*Pinus gerardiana*	47	11.5		580.029531	5.80	2.73	0.68
9	30.28749694	67.87297778	6	*Pinus gerardiana*	41	11.7		406.234669	4.06	1.91	0.48
9	30.28749694	67.87297778	7	*Pinus gerardiana*	52	8.1		754.9921574	7.55	3.55	0.89
9	30.28749694	67.87297778	8	*Pinus gerardiana*	23	6.3		89.97009917	0.90	0.42	0.11
10	30.27870361	67.87047583	1	*Pinus gerardiana*	30	6.1		179.891075	1.80	0.85	0.21
10	30.27870361	67.87047583	2	*Pinus gerardiana*	29	7.2		164.6704909	1.65	0.77	0.19
10	30.27870361	67.87047583	3	*Pinus gerardiana*	39	5.9		356.5658094	3.57	1.68	0.42

Plot No.	Latitude	Longitude	Tree ID	Tree Specie (Scientific Name)	DBH (cm)	Tree height (m)	Wood Density (g/cm3)	AGB (kg)	AGB (ton/ha)	AGC (ton/ha)	BGC (ton/ha)
10	30.27870361	67.87047583	4	*Pinus gerardiana*	40	8.1		380.9012173	3.81	1.79	0.45
10	30.27870361	67.87047583	5	*Pinus gerardiana*	17	2.5		40.90366035	0.41	0.19	0.05
10	30.27870361	67.87047583	6	*Pinus gerardiana*	22	7.2		80.12280518	0.80	0.38	0.09
10	30.27870361	67.87047583	7	*Pinus gerardiana*	35	10.8		268.8974975	2.69	1.26	0.32
10	30.27870361	67.87047583	8	*Pinus gerardiana*	30	7.4		179.891075	1.80	0.85	0.21
10	30.27870361	67.87047583	9	*Pinus gerardiana*	36	11.6		289.3946862	2.89	1.36	0.34
10	30.27870361	67.87047583	10	*Pinus gerardiana*	58	11.3		1003.717971	10.04	4.72	1.18
10	30.27870361	67.87047583	11	*Pinus gerardiana*	50	9.6		681.5921838	6.82	3.20	0.80
10	30.27870361	67.87047583	12	*Pinus gerardiana*	17	4.9		40.90366035	0.41	0.19	0.05
10	30.27870361	67.87047583	13	*Pinus gerardiana*	9	5.4		7.789305063	0.08	0.04	0.01
10	30.27870361	67.87047583	14	*Pinus gerardiana*	6	5.1		2.705861334	0.03	0.01	0.00
10	30.27870361	67.87047583	15	*Pinus gerardiana*	7	5.3		4.044666147	0.04	0.02	0.00
11	30.28522861	67.86340278	1	*Pinus gerardiana*	22	8.9		80.12280518	0.80	0.38	0.09
11	30.28522861	67.86340278	2	*Pinus gerardiana*	50	11.1		681.5921838	6.82	3.20	0.80
11	30.28522861	67.86340278	3	*Pinus gerardiana*	36	11		289.3946862	2.89	1.36	0.34
11	30.28522861	67.86340278	4	*Pinus gerardiana*	8.5	6.1		6.710675733	0.07	0.03	0.01
11	30.28522861	67.86340278	5	*Pinus gerardiana*	8.8	5.7		7.345950293	0.07	0.03	0.01
11	30.28522861	67.86340278	6	*Pinus gerardiana*	12.5	6.4		18.34563557	0.18	0.09	0.02
11	30.28522861	67.86340278	7	*Pinus gerardiana*	15	6.8		29.51302308	0.30	0.14	0.03
11	30.28522861	67.86340278	12	*Pinus gerardiana*	17	4.9		40.90366035	0.41	0.19	0.05
11	30.28522861	67.86340278	13	*Pinus gerardiana*	9	5.4		7.789305063	0.08	0.04	0.01
11	30.28522861	67.86340278	14	*Pinus gerardiana*	6	5.1		2.705861334	0.03	0.01	0.00
11	30.28522861	67.86340278	15	*Pinus gerardiana*	7	5.3		4.044666147	0.04	0.02	0.00
12	30.25946167	67.84304667	1	*Pinus gerardiana*	32	6.8		212.8629711	2.13	1.00	0.25
12	30.25946167	67.84304667	2	*Pinus gerardiana*	26	5.4		123.864405	1.24	0.58	0.15