

ANNEX 2 FEASIBILITY STUDY COMMUNITY-BASED AGRICULTURE SUPPORT PROGRAMME 'PLUS'

CHAPTER V: FORESTRY MANAGEMENT

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Executive Summary

1. While forest cover is low (about 3% or 423,800 ha) it is particularly valuable to a mountainous country such as Tajikistan with its dry subtropical and semi-arid continental climate. Here, reduction in the quality or extent of forest vegetation results in desertification, landslides, mudflows and floods; limiting agricultural productivity and threatening human settlements. Mitigation of these adverse effects, if even possible, can be very expensive. Therefore, the protection and prudent use of the existing forest resources through proper forest management, the regeneration of degraded forests and creating new forests can not only prevent such natural disasters but also reduce government expenditure on addressing their effects or on expensive engineering solutions to manage these risks, thus saving much needed state funds.
2. Statistics on forest cover have not been properly updated in nearly 3 decades. The annual rate of timber removal and forest degradation caused by illegal firewood collection and intensive grazing and is likely to be higher than the biomass increment and regeneration, with 70% of forests estimated as degraded. Reforestation activity is weak with poor matching of species to site conditions or climate change and budgets for maintenance are low. There is very limited protection for forests that could regenerate naturally and afforestation activity is minimal.
3. The potential to strengthen and expand forest cover is high, however, with approximately 1 million hectares estimated as having the potential to sustain new forests. Joint Forest Management (JFM) has been implemented successfully in many areas over a number of years and is now ready for upscaling to the national level. The Forest Code of 2011 and recent supporting regulations places JFM on a strong footing. Extending this approach to establish fuelwood crops and agroforestry such as alley-cropping that are well known in Tajikistan has enormous potential to raise livelihoods and enhance food security. There is an extensive network of State Forest Enterprises available to be mobilized once their capacity is enhanced, both in terms of skills and equipment.
4. The forestry sub-sector is very closely linked to pasture management, water management, biodiversity and sustainable land management generally. The management of all these natural resources now needs coordination under an integrated catchment-based planning approach with full participation of Leskhoz and the mobilization of communities under JFM as an important part of the Climate-sensitive Community Action Plans developed for each village. These plans will encompass the pastures in Leskhoz lands as well as the forests, and will factor in potential displacement of grazing from JFM sites, access to summer pastures and enhanced cooperation with PUUs/PUGs formed in each community.
5. Of the 21 CASP+ project districts, 10 contain 1 Leskhoz and two further districts contain 2 Leskhoz. In many cases, the existence of a Leskhoz aligns with the countries' ecozones and are found in areas that have supported forest cover historically. Thus, while the project as a whole may engage with 400 villages or more, under Component 2 of CASP+ JFM and forest investments will take place in approximately 50% of the selected areas. The investments here total \$16.8 million and include support for afforestation and forest rehabilitation, including site works, irrigation, fencing, seedlings, Leskhoz vehicles, equipment and required forest nursery establishment. Component 1 will include capacity building for Leskhoz staff in forestry as a professional, technical discipline according to a curriculum already developed with the assistance of GIZ. In designing the project interventions, community involvement in climate resilient sustainable land management has been prioritised and 85% of the budget for field investments are allocated to JFM with the balance taken up by Direct afforestation. It is planned that the directly afforested areas are also transferred to the community through JFM contracts before project closure so that they can maximise their usufructuary rights. Site selection for direct afforestation will emphasise their long-term joint management role and ensure sites are selected that are easy for community access. One of the project districts (Sh.Shohin) contains a protected area and JFM will also be offered here to strengthen the sustainable management of its buffer zone.
6. The tree types planned at design stage include fruit and nut trees, pistachio trees, riparian forests, poplar, saxaul, juniper (both planting and natural regeneration) and the current total gross area amounts to 7,330ha. Training will be provided to participants in tree planting and aftercare. Simple to use smart phone apps for field data capture will be used to monitor the progress of field investments and be integrated with annual planning and reporting requirements.

Chapter V: Forestry Management

I. Context

1. Forests are not extensive in Tajikistan with the latest estimate¹ placing the national forest cover at 423,800 ha or about 3% of the total territory and the lowest in the countries of the Caucasus and Central Asia². While Tajikistan's forest coverage has not significantly decreased in the last 3 decades its growing stock reduced by 20 per cent between 1990 and 2007³.
2. Coniferous forests, predominantly composed of four juniper species (*Juniperus zeravshanica*, *J. semiglobosa*, *J. turkestanica*, *J. sibirica*) with deciduous species such as Turkestan birch (*Betula turkestanica*), Tajik poplar (*Populus tadshikistanica*) and barberry (*Berberis vulgaris*) cover some 150,000 hectares (over 36 per cent of the total forest area) and accounted for over 60% of the total growing stock. Hard-leaved xerophytic light forests are mainly located in southern Tajikistan. They include pistachio and Bukhara almond natural forests and plantations covering 99,000 ha. Broad-leaved mesophytic forests include maple and walnut of the temperate climatic zone account for an area of 172,000 ha.⁴
3. Tugai forests are concentrated in the Tigrovaia Balka Nature Reserve in the Amu Darya watershed in Khatlon province and are a mixture of *Populus euphratica*, *Tamarix* and Russian olive (*Elaeagnus angustifolia*). Other riparian forests occur in narrow strips along rivers in the mountains and consist of poplar, birch, elm, and sea buckthorn. In the south, saxaul woodland is the dominant forest type (about 8,000 ha).
4. All current estimates are highly uncertain as a systematic survey of forest resources has not been conducted since 1991. National statistics are maintained by applying incremental changes to the baseline using afforestation records rather than any systematic sample or census. Consistency also appears challenging, with the data provided for the 2015 UN FRA report differing from the figures then held by UN Statistics Division and FAOSTAT (as of 2015 the country initiated a process to update them). Some authors put the real figure of forest cover at 2% (based on deforestation trends) while others place the percentage at 6%⁵.
5. In 2018, Tajikistan along with five other Caucasus and Central Asian countries signed the Astana Resolution to restore about 2.7 million hectares of degraded forest landscapes. Tajikistan specifically committed to restore 48,000 ha of degraded forest landscapes from 2018-2030. The country had already restored 16,000 ha of degraded landscapes since the inception of the Bonn Challenge in 2011, bringing its targeted commitment to a total 66,000 ha of restored area by 2030.⁶ The State Forestry Agency has developed the Forest Development Strategy (2016 – 2030), which has been adopted by all relevant ministries and state agencies, but there is no dedicated funding for implementation. The goal of the Forest Strategy is sustainable development of the sector by ensuring a balance of ecological, economic and social functions. Key areas of intervention to achieve this goal include: a) improving the management system and strengthening the structures of the forestry sector; b) improving the regulatory framework and strengthening law enforcement; c) creation of a sustainable financing system for the forestry sector; d) preservation and increase of the area and productivity of forests through commercial forestry, joint forest management and specially protected forests; e) development of the basics of forestry such as nursery management, forest inventory and monitoring, human resources development and science and innovation in forestry. The Action Plan for the implementation of the Forestry Sector Strategy lists detailed activities with specific targets, but due to lack of adequate investment and capacity, most of the activities have not been started and the targets remain unattained. The National Development Strategy 2030 addresses energy issues and aims to

¹ 2020 UN FRA Country report, Tajikistan.

² Forest Landscape Restoration in the Caucasus and Central Asia

³ ESA Analysis/IFAD

⁴ 2017, Third Environmental Performance Review, UNECE

⁵ https://www.dropbox.com/s/6i9c6ntgtwar0v1/6th%20National%20Report_2019.pdf?dl=0

²² UNECE (2018). Ministerial Roundtable on Forest Landscape Restoration in Caucasus and Central Asia. Summary Report

provide a reliable energy supply. Planting 1,000 ha, rehabilitating 2,000 ha, and supporting natural forest regeneration on 8,000 ha of forests annually is envisaged.

A. Forestry goods and services

6. Due to its location, topography, soils and climate, Tajikistan's natural environment is highly vulnerable to biotic and abiotic disturbance. Despite covering only a small percentage of land area, forests are recognized as extremely important in regulating moisture and climate, protecting soil, and providing non-timber resources and fuelwood. For example, under the heading of climate change the Poverty Reduction Strategy of 2010⁷ calls for "Rehabilitating mountainous, river banks and desert forests to strengthen foothills and stabilize the water flow process" with a goal to "establish sustainable development principles by halting forestry degradation by 0.3%, expand forested areas, improve the protected areas by 0.6% and decrease land degradation by 1.5%".
7. Disruption of mountain ecosystems (e.g. climate change, overgrazing or deforestation) is already causing significant erosion. Degradation in plantation forests is estimated to affect around 70% of the area.⁸ All Forest Fund lands have been assigned the function of 'Group 1 – soil and water protection' including slope stabilization, erosion control and water management. Over 70% of forests are reported as "primary", but it is clear that even the least intensively managed forests in Tajikistan have been influenced by human activities, such as grazing and fuelwood harvesting. No data is available on the degree to which these forests are degraded.
8. The civil war in Tajikistan in the 1990s also increased the felling of forests for fuel, as did the sudden collapse of energy supplies from the Russian Federation after the fall of the USSR, leaving only wood (and dung) as fuels for rural families. At present, it appears the main source of deforestation pressure is livestock grazing and illegal firewood collection.⁹ Irrigation is highly important to the agriculture sector and the positive relationship between tree cover and water yield is acknowledged¹⁰.
9. More than two-thirds of the population lives in rural areas and it is estimated that some 10-20 percent of the country's population depends on firewood, a smaller proportion than before (when it reached 80%¹¹) as hydropower is developed¹². Since 1950¹³, no forest is designated as having the objective of wood production and tree felling is not allowed unless due to certain circumstances, such as for improvement or sanitary felling. However, a rough estimate from 2008¹⁴ puts firewood consumption at almost 13 times greater than the official harvest estimates. Again, the lack of reliable data in this area hampers the formation of effective policy.
10. Non-Wood Forest Products (NWFPs) are said to play an important role in the standard of living and livelihood of rural communities and as a source of income for Leskhov. Products include game and fur animals, seeds, nuts, berries, mushrooms, oils, foliage, medicinal plants, peat, honey and seedlings. However, reliable records on the scale, value and spatial extent of these forest outputs are also lacking.
11. According to information from various sources, collection of over 80 species of medicinal plants generates income in the amount of 0.22 to 0.49 million USD per year. However, over-harvesting in the absence of effective control can lead to the extinction of valuable species (as has already

⁷ <https://www.imf.org/external/pubs/ft/scr/2010/cr10104.pdf> 2010 Poverty Reduction Strategy

⁸ The Economics Of Land Degradation For The Agriculture Sector In Tajikistan – A Scoping Study [https://www.undp.org/content/dam/tajikistan/docs/projects/PEI/Economics%20of%20Land%20Degradation%20Report%20ENG%20pre-final%20\(2\).pdf](https://www.undp.org/content/dam/tajikistan/docs/projects/PEI/Economics%20of%20Land%20Degradation%20Report%20ENG%20pre-final%20(2).pdf)

⁹ 2017 UNECE 3rd Environmental Performance Review for Tajikistan

¹⁰ Under the ACTED project forestry experts decided to extend the reach of Kyrgyz Sarkent National Park to create a special transboundary protected forest area, and came up with the joint slogan "Forest is father of water, water is mother of harvest!" to express their shared interest in preserving forests.

¹¹ FAO, 2006. People, Forests and Trees of West and Central Asia: Outlook for 2020. FAO Forestry Paper No. 152. FAO, Rome, Italy.

¹² 2020 UNECE report

¹³ 2010 Hessen Forst

¹⁴ 2008 UNECE Forest and forest products country profile

happened in at least two rare species of plants listed in the Red Book).¹⁵

12. The Red Data Book of Tajikistan (1988) includes 226 species of plants, 4 species of fish, 21 reptiles, 37 birds and 42 mammals. Depletion and degradation of forest and woodlands is a major threat. Several tree species are included in the Red Data Book, including two hawthorn species, two plum species, the wild pear *Pyrus cajan*, Afghan fig *Ficus afghanistanica*, and *Thuja orientalis*. The area of the Forest Fund strictly conserved for protection of biodiversity amounts to 26.7% of the whole. Recreation and tourism, including hunting, are of increasing importance and forests play a key role in their support.
13. While some official sources place the area of pastures in the legal ownership of the State Forest Agency (SFA) at 340,800 ha¹⁶ other estimates place the area as high as 1,187,600 ha¹⁷. The most common tree and shrub species in pastures are juniper, pistachio, almond, saxaul and maple. Forests in the pastures are mainly sparse with a canopy density of less than 30%. Pastures in the SFF are assigned to agricultural enterprises, state farms or individual farms for their long-term use (usually on a 10-year lease).
14. In addition to the pastures in SFE's there are also transhumance routes passing through the forest fund with no clear accountability for livestock or the problems this can cause. Resolution of these issues are beyond the influence and control of the SFEs management, e.g. in Farkhor and Khoavling. Those livestock issues can only be dealt with in cooperation with other ministries and willingness of cooperation of influential persons on the government level¹⁸.
15. Pastures and the degree to which livestock cause degradation of forest resources is a very significant issue which can only be addressed through participatory rangeland management and monitoring (see separate Working Paper on pastures sub-sector).

B. Forest governance and management

16. In 2004 the Government of Tajikistan decided to amalgamate the Ministry for the Protection of Nature and the Tajik Forestry Production Association to form the **State Committee for Environmental Protection and Forestry (CEP)**. The Committee and its local bodies, which incorporates in its structure the Forest Management and Hunting Agency, oversee and monitor matters relating to hydrometeorology, environmental protection and the sound use of natural resources.
17. **The Ministry of Agriculture** is the government body responsible for developing and implementing a centralized State agricultural policy, including forestry.
18. The **State Land Management Committee** is responsible for developing and implementing a centralized policy relating to land management, land use and land ownership, including forest land. It is also tasked with supervision to ensure effective use and protection of land resources in compliance with the law, drafting and conducting State programmes to regulate land-related matters, to implement land reforms and to ensure sound use and protection of land resources.
19. In 2013, the latest institutional changes were made that regulate the division of tasks between the Forestry Agency (FA) (policy function), the State Forestry Enterprises (SFEs, management function) and a newly established Forest and Hunting Inspection (control function). The Forest and Hunting Inspection (FHI) as one of the central elements of forestry governance is not fully operational yet and its practical role in the control of forest activities is not fully clear to all stakeholders. The Forest Agency is now under the Government of Tajikistan and not sub-ordinate to the CEP.
20. There are 42 SFE's or **Leskhoz**; 5 tree nurseries and 13 temporary protected areas (zakazniks, usually located within a Leskhoz). At 4.9 per 1000 hectares¹⁹, staffing is relatively high in

¹⁵ <http://www.apfnet.cn/en/uploads/file/20171204/1512377903119163.pdf>

¹⁶ TajStat 2019

¹⁷ 2008 FAO Forest sector profile

¹⁸ CAFT project lessons learned

¹⁹ 2008 UNECE Country profile

comparison to the EU average of 1.5820. The area of Forest Fund managed in each Leskhoz and their staffing levels vary between 4,500 ha and 108,000 ha, and between 10 and 82 people respectively. Many also still lack their land registration certificates with the process of securing these important documents hampered by lack of funding and erroneous assignment of the Forest Fund to agricultural organizations.

21. Since the dissolution of the USSR the forest management institutions appear largely unchanged except that budgets are greatly reduced. Minimal funds are available for salaries and practically non-existent for forest maintenance, protection and expansion. The share of funding for forestry sector of the total expenditures of the state budget between 2012-2014 in average amounted to just 0.09%. In 2015, the annual budget of the Forestry Agency was 15.52 million somoni (US\$ 2.52 million), 70% of which was intended for the payment of staff salaries. The remaining small amount of funds for investment activities was inadequate for the proper maintenance of the SFF and management of flora and fauna²¹. SFEs or Leskhozoes are central to managing the forests sustainably. However, the typical SFE is short on equipment, uniforms, tools, transport and technology. In terms of human capacity very few are trained foresters or young staff who are willing to contend with the low and unreliable wages.
22. Requests to meet quotas of fuelwood to be harvested and areas to be planted and/or rehabilitated continue to issue annually from the Forest Management and Hunting Agency in Dushanbe in addition to the fuelwood demands of local schools, the army and other public institutions and this raises difficulties. For example, the entire GBAO requires a total of 19,000 m³ of fuelwood each year, as demanded by the khukumat (local governments). Consequently, the Leskhoz in Khorog has two masters; the CEP in Dushanbe and the Governor of GBAO. Clearly the pressure on forest resources is tremendous and there are many overlaps with other agencies. By some accounts, the survival of leskhozoes depends on NWFPs to supplement their budgets. Of particular importance for some SFEs is the production of fruit trees (in state-owned nurseries), which are sold to private customers or planted on Leskhoz land. Forest nurseries of the State Forestry Agency annually cultivate more than 3.2 million seedlings and saplings of 25-30 species of tree-shrub species with sales of more than 1.5 million pieces of standard planting material²². In general, the demand for fruit trees is higher than that for forest trees and SFE incomes from grazing fees are often higher than from forest product sales and conflicts can arise between the opportunities for grazing income and the long-term benefit of the forest.
23. The scale of demand, particularly for fuelwood, and the capacity of the resource to meet it must be reconciled and more coherent mechanisms for decision-making and managing natural resources implemented. In the absence of any data on the nature and extent of forest resources and any related management plans or calculation of Annual Allowable Cut it is difficult to establish whether or not the total cut (from legal and illegal means) exceeds the productive capacity of the forest²³.
24. In response to the forestry sector need for a comprehensive investment program the "Forest Sector Development Strategy until 2030" was developed in accordance with the instructions of the Government of the Republic of Tajikistan No. 27317 (28-6) dated June 25, 2014 and was approved by all concerned ministries and institutions except the Ministry of Finance, meaning it is not formally adopted or funded. With only 30% of the estimated financial requirements met from the state budget, achievements has thus far been limited. In contrast, the potential activity level could be significant with the Atlas of Forest and Landscape Restoration Opportunities estimating approximately 1 million hectares where additional forests would grow under current climate conditions (and assuming no adverse human influence)²⁴.

²⁰ <https://www.unece.org/fileadmin/DAM/timber/publications/forests-in-the-ece-region.pdf>

²¹ FOREST DEVELOPMENT AND BEST PRACTICES OF FOREST MANAGEMENT IN TAJIKISTAN
<http://www.apfnet.cn/en/uploads/file/20171204/1512377903119163.pdf>

²² From 6th CBD report: <https://www.cbd.int/doc/world/tj/tj-nr-05-en.pdf>

²³ Forestry Sector Analysis of the Republic of Tajikistan GIZ, 2010 <http://naturalresources-centralasia.org/assets/files/Forestry%20sector%20analysis%20of%20the%20republic%20of%20Tajikistan%20eng.pdf>

²⁴ Peter Potapov, Lars Laestadius, and Susan Minnemeyer. 2011. Global map of potential forest cover. World Resources Institute: Washington, DC. Online at www.wri.org/forest-restoration-atlas

II. Sector Performance

25. While current estimates place the percent of forest cover as less than 3% past records testify that in the early 20th century forests covered approximately 25% of Tajikistan²⁵. At only 0.05 ha of forest per head of population currently, current levels are considerably lower than for other countries in the region. Following independence from the collapsed Soviet Union, supplies of energy from the Russian Federation dropped very sharply. As a result fuelwood became the primary source of energy for many, especially for rural areas. The civil unrest of 1992-1993 in Tajikistan and resulting economic collapse caused widespread economic disruption, further worsening poverty and access to alternative sources of energy.
26. Livestock numbers have risen, leading to overgrazing, which has inhibited forest regeneration. In addition, a shift from small livestock (sheep, goats) to larger domesticated animals (cattle, horses) kept closer to settlements, has increased grazing pressure on pastures and surrounding forests, further degrading forests. Finally, uncontrolled logging added to the ongoing exploitation of the forest. While the situation has improved for some countries in the region, fuelwood removal continues to drive forest degradation in Tajikistan. Harvesting timber for wood products and grazing remain the other major drivers of forest degradation.²⁶ The numbers employed in the forest sector is about 4,000 of which 50% are temporary staff.
27. Estimates of growing stock per hectare vary widely between 5 m³ha⁻¹ as one sample source²⁷ and (due to a lack of national forest inventory) a project-based estimate of total growing stock was cited in the 2020 UN FRA report at 5.11m m³. This figure, when divided over a total forest area of 421,000 hectares of forest would be 12.5m³ha⁻¹. The same growing stock divided over the total area of forest and 'other wooded land' would yield an estimate of 9 m³ha⁻¹. Whatever the real figure, this average growing stock volume is low (the carbon stock of non-degraded subtropical steppe forests are estimated²⁸ to be 28.2 tC ha⁻¹) and is another indicator of the degraded and vulnerable state of the forests of Tajikistan. There are no plantations for wood production, although in the 1970s and 1980s, a quarter of forests were classified as nutbearing forests. Non-Wood Forest Products (NWFPs) play an important role in the standard of living and livelihood of rural communities and as a source of income for Leskhoz. Products include game and fur animals, seeds, nuts, berries, mushrooms, oils, foliage, medicinal plants, peat, honey and seedlings. Currently, prices for forest products are set up by the Forestry Agency for the next two years, and do not correspond to the current market prices.
28. The largest source of revenues for Leskhoz is actually their pastures, with about 1 million ha of the total 1.85 million ha in the State Forest Fund assigned to agricultural enterprises for their long-term use as pastures. Moreover, these areas have the richest vegetation, which for decades have traditionally been used for transhumance. Here there is overgrazing and depletion of grass, trees and shrubs and little by way of conservation or restoration of these rich plant communities. Pasture rotation is not used, livestock numbers are not limited and grass or shrubs to enrich the flora are not planted.
29. Official records state that annual reforestation activity is at about 2,100 hectares annually and the seedling survival rate is between 60 and 70 percent and attempts at natural regeneration appear to have been abandoned²⁹. Juniper, pistachio, riparian forests in the mountains and saxaul forests all need intensive forest landscape restoration. Juniper forests require less active restoration, with protection from firewood gathering and heavy grazing pressure sufficing to allow recovery. Planting saxaul will help prevent erosion and desertification. There is considerable potential for forest restoration on abandoned mining sites and saxaul areas, where limited competition from other land use would create a good environment for forest landscape

²⁵ 2010 GTZ Forest Sector analysis

²⁶ THE ECONOMICS OF LAND DEGRADATION FOR THE AGRICULTURE SECTOR IN TAJIKISTAN – A SCOPING STUDY [https://www.undp.org/content/dam/tajikistan/docs/projects/PEI/Economics%20of%20Land%20Degradation%20Report%20ENG%20pre-final%20\(2\).pdf](https://www.undp.org/content/dam/tajikistan/docs/projects/PEI/Economics%20of%20Land%20Degradation%20Report%20ENG%20pre-final%20(2).pdf)

²⁷ State of Forests of the Caucasus and Central Asia <https://unece.org/DAM/timber/publications/sp-47-soccaf-en.pdf>

²⁸ Ex-ante GHG Appraisal of the Environmental Land Management and Rural Livelihoods Project in Tajikistan (2014-2019)

²⁹ 2017 Third Environmental Performance Review UNECE

restoration³⁰.

30. Typically, seed is sourced on an ad-hoc basis and seedlings are supplied by a mixture of private nurseries, the 5 main Forestry Agency nurseries and most Leskhoz have a small nursery of approx. 2 ha. In JFM projects 'backyard' nurseries of the size of a few hundred square metres have been established specifically to support the requirements of planned JFM investments in a specific locality. Some Leskhoz nurseries are said to operate at a high level (Vahdat, Quibodiyon) but in general the technical level and capacity is very mixed. Total annual production is said to exceed 3 million pieces but the emphasis is on production of fruit species rather than forest trees and limited attention is paid to identification and development of native or climate adapted species or guidance for amended site and species selection based on climate change forecasts. There is no standardization in seed handling or certification and no national authority on control and use of forest seed.
31. With the assistance of various projects, progress is being made to digitize the mapping and management processes of the Forest Agency through establishment of central geospatial database and conducting forest surveys in a number of districts. Systems for monitoring and management have also been designed ('TajFIS') although are not yet operational.

A. Joint Forest Management

32. The 1993 Forestry Code expressly permitted leasing to individuals, although the instrument was rarely used. Starting in 2006, the GIZ project on "Sustainable Rehabilitation and Development of Flood Plain Forests in Gorno-Badakhshan" commissioned by the German Federal Ministry for Economic Cooperation, began making extensive use of the instrument by testing a new and innovative approach towards forest management called "Joint Forest Management" (JFM). The view was that forest institutions lacked both the opportunities and tools for sustainable forest management. The absence of land rights for local forest users and, as a result, the consideration of forest ecosystems as an "open access" resource prompted their over-use and degradation. The expectation was that the participation of local forest users, the introduction of transparent governance mechanisms and adaptations to forest management would reverse the degradation trend and raise local livelihoods.
33. In order to provide the foundation for sustainable forest management, formal agreements are signed between the State Forestry Agency and private forest users. The "JFM Contract" is a legally binding document with a validity of 20 years (with renewal possible) and provides for the rights and obligations of both parties. Detailed management plans and annual plans for the sustainable management of the areas are jointly drawn up. In order to meet the requirements of the management plans and annual plans, forest users receive technical advice from the State Forestry and JFM Contracts are signed between individuals and the relevant Leskhoz. Forest User Groups are set up to represent the rights and obligations of forest users with the State Forestry and in some cases JFM contract holders are actually acting in the name of a number of households organized as a Forest User Group.
34. JFM is a "bottom up" approach, involving active participation by local actors in priority setting and planning. The involvement of local and regional government structures in the process has stimulated the proper modernization of the institutional and regulatory framework and has paved the way for wider distribution of the JFM approach. The introduction and use of appropriate, long-term tenure arrangements triggers investments that focus on community-based reforestation and forest management, rehabilitation of threatened River basins, agroforestry, conservation of biodiversity and entire ecosystems, and multipurpose forest and wildlife management.
35. The JFM approach was implemented in GBAO from 2006 to 2012, with the GIZ project described above and since 2013, this approach has been implemented in Gorno-Badakhshan by the Public Foundation CAMP Tabiat and the State Forestry Agency under the project "Sustainable management of natural resources in Gorno-Badakhshan". The Forest Code adopted in 2011 specifically provides for the participation of local people in JFM and with the assistance of this project, since 2018 the required subsidiary regulations and by-laws are now also in place. The

³⁰ Climate Change Adaptation FLR_CCA_challenges___opportunities_081018-ENG-edited.pdf

State Forest Enterprises are now obliged to support JFM and report on its implementation. The forest agency, forest enterprises, NGO's and forest users in the previous project areas have gained a comprehensive understanding of JFM and are now able to share this approach more widely within and beyond the target areas, paving the way for full national rollout. The approach is now widely supported, with the Agriculture Reform Programme of Tajikistan 2012-2020 stating that scaling-up successful practices in Joint Pasture and Forest Management focusing on rehabilitation, conservation and rotational use is crucial to success in the sector. A new project funded by KfW – Climate Adaptation through Sustainable Forestry – Phase II is under consideration, will also support JFM and if approved will run from 2021-26. A further new project with the working title of Tajikistan Resilient Landscape and Livelihoods Project (TRELLIS) and funded by World Bank is under preparation and if approved will work with JFM from 2022.

36. Typically, JFM contracts are established where at least 30% tree canopy cover already exists so that participants may begin benefitting from some harvest immediately. Where tree cover is lower than this, Leskhoz undertake 'direct afforestation' using local labour. These may be remote from villages so that they are less exposed to degradation pressures. Protected Areas are split into core and buffer zones, the latter allowing a certain amount of activity that can absorb some of the pressures on the conservation objectives of the core zone. The buffers contain communities and natural resources that nevertheless need support and JFM will be introduced to the buffer zone of Dashtijum Nature Reserve, the only Protected Area within the areas covered by the 14 project Leskhoz.

III. Past and Ongoing Development Projects / Programmes / Govt plans

37. There are numerous past and ongoing projects in forestry and natural resources management.

Table 1 Current and ongoing relevant projects

Sector/Issue	Key Donors/Projects	Key Partners	Key Locations
NRM/SLM and Climate Resilience	European Union (EU) – Phase II (2021-27) – Rural Development Program BMU (Government of Germany)/GIZ – Technical assistance Adaptation Fund – Integrated Landscape Management and Pastoralism (2020-25) WB/(Green Climate Fund - GCF) – CAMP4ASB (2016-221) Kofirnighan River Basin (2020-	CEP/HydroMet CEP Ministry of Finance (MOF), CEP	Kafirnighan RBO
Food Security Climate Resilience	GCF/World Food Program – Climate Resilience and Livelihoods	CEP	Raasht, GBAO Khatlon
Water Resources	Swiss Development Cooperation – IWRM EU/WB – Water Management and Irrigation Rehabilitation EU – IWRM Asian Development Bank (ADB) – Water Resource Management - Pyanj	WB, MEWR MEWR, ALRI CSOs MEWR	Raasht, Sughd, Zarafshon, Kafirnighan, Zarafshon Khatlon, GBAO
Agriculture	USAID – Various projects (ending 2020) WB – Agricultural Commercialization Project IFAD – Community Agriculture Support (2017-2024)	MOF, MOA MOA	Khatlon Khatlon, Sughd, RRS Khatlon, Sughd, RRS
Pasture Management	IFAD – Livestock and Pasture Development Phase II (2016-22)	MOA	Sughd, RRS
Forestry	KfW – Climate Adaptation through Sustainable Forestry – Phase II (2021-26) Adaptation Fund	To be determined	
Rural Development	WB – Rural Economy Development Project (2020-24)	MOF	Khatlon, GBAO

Sector/Issue	Key Donors/Projects	Key Partners	Key Locations
Land Administration	USAID – ending 2020	State Committee for Land Management and Geodesy	
Disaster Risk Management	WB, ADB, SDC (on-going)	CESCD	Various and national

IV. Lessons Learned

- Ownership is created among beneficiaries to take responsibility for the interventions and maintain their livelihoods in sustainable ways through Community driven planning and decision-making. Although these were effective in ensuring transparency and prioritizing local needs, significant facilitation support and capacity building was required. Future Community driven interventions should allocate sufficient time and resources in that regard.
- Mechanisms for engaging district-level decision makers (such as Jamoat Committees) are critical for buy-in and help elevate sustainable land management and climate resilience issues to the district level. They facilitate integration of interventions on environmental protection and SLM as part of the overall local development agenda.
- Local technical consultants have an important role as interlocutors for maintaining dialogue between the implementation group and project beneficiaries and building ownership at the local level.
- Future projects should consider improving productive assets and protecting and restoring the underlying natural resource base upon which people depend and these or similar measures, in tandem with a robust M&E system based on guiding principles of resilience operations, will support evidence-based evaluation and learning.
- JFM has been successfully introduced and adapted to the needs of communities with different forest types. Local communities and forest enterprises rate JFM as an effective and helpful approach.
- Measures to strengthen the capacities of forest authorities and forest users and to settle land use conflicts leads to the rehabilitation of degraded forest areas, greater availability of fuelwood and increased earnings from forest activities. The forest agency, forest enterprises and forest users have gained a comprehensive understanding of JFM and are now able to share this approach more widely within and beyond the target areas. With the development of local bylaws, the legal basis for JFM is now fully in place and documented so that it can be rolled out in additional areas.
- The JFM approach upscaled and tested in different climatic zones in Tajikistan has proven its advantage as a forest management tool. Comparing the cost per hectare to establish a plot, the costs for JFM are significantly lower than for SFE direct afforestation. The JFM plots are well protected and maintained by JFM users.
- JFM users can make better and more efficient use of the given resources on their plots and improve their livelihoods significantly. JFM users also address risks, e.g. erosion, by applying countermeasures on their own.
- There is a high transactional cost associated with JFM contracts between individuals and the Leskhoz. A trend toward contracts between individuals who represent Forest User Groups and Leskhoz could improve the efficiency of the process, be more community-driven and give more flexibility for collective labour efforts.
- The JFM approach is not suited for large-scale afforestation due to the workload required in a short period of time. The SFE direct afforestation can bridge this gap. A combination of SFE direct afforestation and later transfer of the plantations into JFM plots will ensure long-term maintenance. With this kind of JFM approach, the resource sharing mechanism needs to be re-addressed.
- Insistence on using native species – has posed difficulties with sourcing of seedlings and community acceptance but has a strong case when climate adaptation and local nursery capacity is considered. Additional climate resilient tree planting plans could be successful, e.g. using Poplar cultivars in certain scenarios. Small-scale local 'backyard' nurseries have worked well and are a useful source of local, indigenous planting materials.

V. Project description

Component 1: Enabling conditions

38. Support to district and village-level institutions will embed forestry as a land use, and Leskhoz as managers of large areas of forest and pasture, into an integrated catchment-based approach to natural resources management. District diagnostic work will identify the role of forestry in sustainable land management. A strong linkage will be established between existing national capacity for remote sensing and the government need for improved monitoring of the degradation status of natural resources. Capacity building for participatory planning and monitoring by communities will be combined with this remote sensing capacity. Climate adaptive forestry principles will also be the focus for capacity building of agro-ecological extension workers and Leskhoz staff with a forestry curriculum recently prepared under a GIZ project being made available as professional training to staff of the targeted 14 Leskhoz.

Component 2: Investments

39. Climate-sensitive Community Action Plans (CsCAPS) will be compiled with the assistance of a facilitator and relevant specialists at level village taking a catchment based approach and spanning pastures, forestry, infrastructure and community mechanisation. The plans will reflect the District Climate Resilient Diagnostic reports, integrate well with pre-existing plans and be approved by the relevant bodies at local, district and River Basin levels. Tree planting and natural regeneration techniques will be applied in Leskhoz lands and in public lands such as roadsides or shade or riverbank stabilisation. A package of equipment, including vehicles, trucks for irrigation, tractors, hand tools and personal protective equipment and clothing is an essential part of the investment and will be funded for each Leskhoz. JFM will also be introduced on a small scale to a Protected Area buffer zone in the Sh.Shohin district. The regulations concerning JFM are flexible in their formulation: the focus is on JFM participants and Leskhoz staff jointly preparing a management plan and for each JFM household to then sustainably tend the land plot allocated to them. By implementing annual action plans over successive years the JFM beneficiaries earn the right to retain their portion of the harvest and pass the remainder to the Leskhoz according to proportions agreed in advance. A wide range of timber and non-timber forest products may be covered, including multi-purpose fodder trees and grasses, woodlots and the use of live fences and terracing where needed and possible. Training will be provided to participating households on tree planting and aftercare and a simple field data capture App will be integrated into such annual plans and monitoring. Leskhoz nurseries will be re-established to cater to Leskhoz direct reforestation needs in conjunction with small 'back yard' nurseries established specifically to supply JFM sites, including both timber, fruit, medicinal, aromatic and fodder tree species. A dedicated NGO will be mobilised to support each village and Leskhoz in the implementation of JFM.
40. Typically about half of the forests to be established or restored will be of native tree species that are slow growing and very long lived in the growing conditions of Tajikistan, with dendrochronology evidence indicating juniper reaching up to 1320 years³¹ and pistachio also reaching up to 1000 years old³². The remaining species of saxaul, walnut, poplar, almond, cherry and some fruit shrubs will grow for at least 30 years and some much longer. For this reason, carbon stock changes will continue to occur as a result of the implemented activities far beyond the typical period of 15 years seen in GHG assessments.

VI. Proposed investment

41. At Design stage the team engaged closely with State Forest Agency and agreed on an indicative plan using the following interventions:

³¹ Opała-Owczarek et al, Divergence in responses of juniper tree rings to climate conditions along a high-mountain transect in the semi-arid Fann Mountains, Pamir-Alay, western Tajikistan, Ecological Indicators, Volume 150, 2023, <https://doi.org/10.1016/j.ecolind.2023.110280>.

³² Khanazarov, A.A., Chernova, G.M., Rakhmonov, A.M. et al. Genetic resources of *Pistacia vera* L. in Central Asia. Genet Resour Crop Evol 56, 429–443 (2009). <https://doi.org/10.1007/s10722-009-9419-1>

Table 2 Forest activities

Forestry Activity	Description
1. Riparian forest	This activity will include creation of mixed willow, poplar and sea buckthorn plantations. Species choice will vary with altitude and orientation of each valley, soils and micro-climate. In CASP+ it currently applies to JFM only.
2. Fruit and nut	Creation of plantations of Greek walnut, rose hips, cherry plum, bitter almonds, apricots, apples and other fruit species. Altitude 600m to 2000m
3. Pistachio forest	Creation of a Pistachio plantation, as well as a mixed forest with the addition of bitter almonds or crimson almonds. Altitude 300m to 800m.
4. Juniper planting	Planting of Juniper for soil stabilisation and fuelwood. Altitude of 900m to 3200m.
5. Assisted Natural Regeneration of Juniper	Promotion of natural regeneration, through partial loosening of the soil, sowing seeds, partial planting of seedlings. Applies to Direct works only. Altitude of 900m to 3200m.
6. 'Open and Guarded'	Where possible, the area enclosed by fencing will exceed the planned planting area, allowing expansion in later years and as a guard against further degradation of these areas. This 'Activity' is included for monitoring purposes to distinguish these areas from others.
7. Saxaul	In suitable districts Saxaul (Haloxylon species) will be planted to promote the 'greening' of sandy rangelands and sandy areas in general and to provide shelterbelts and good grazing for sheep and goats.
8. Poplar agroforestry	Specific poplar agroforestry plots, including the use of improved productivity cultivars.

Fencing

42. Livestock must be excluded from all planted or naturally regenerated areas, at least until the trees have become established. It is budgeted to cost nearly \$5 per linear metre and fencing four sides of one hectare (100m x 100m square) could cost \$1825 per hectare, or more than 75% of the cost. The cost per hectare of a square plot is halved if the plot is doubled in size so the scale of plots is important. Long rectangular plots are very inefficient, costing up to 6 times more per hectare than circular plots. Where possible, effective natural barriers or live fencing will be used and large plots of an efficient shape will be preferred (circular being optimum). During detailed site design, the area of each site will be maximised within the fencing budget available, even where the gross area exceeds the planned JFM intervention area (see
43. Figure 1 and Figure 2). This will protect additional areas from degradation and allow for later expansion of the area under tree cover. A category of 'Activity 6 Open and Guarded' has been created for this practice, so that this practice can be encouraged and these additional hectares may be accounted for. Fencing materials comprise approximately 70% of the cost of each linear metre; once the forest areas are established (after 5-7 years) these fences can be moved to the next afforestation or reforestation site requiring protection.

Irrigation

44. Drip or other forms of permanent irrigation are expensive to install and maintain. A concept of deep planting micro-sites and seasonal watering is proposed as the most cost efficient by the State Forest Agency. This is the main purpose for which a truck is proposed for the equipment packages for each Leskhoz. Irrigation will continue until the forest is established.
45. As part of the overall project targeting exercise 12 Districts have been identified for intervention that contain or intersect with 14 Leskhoz. Table 3 contains the planned hectare investments under each activity.

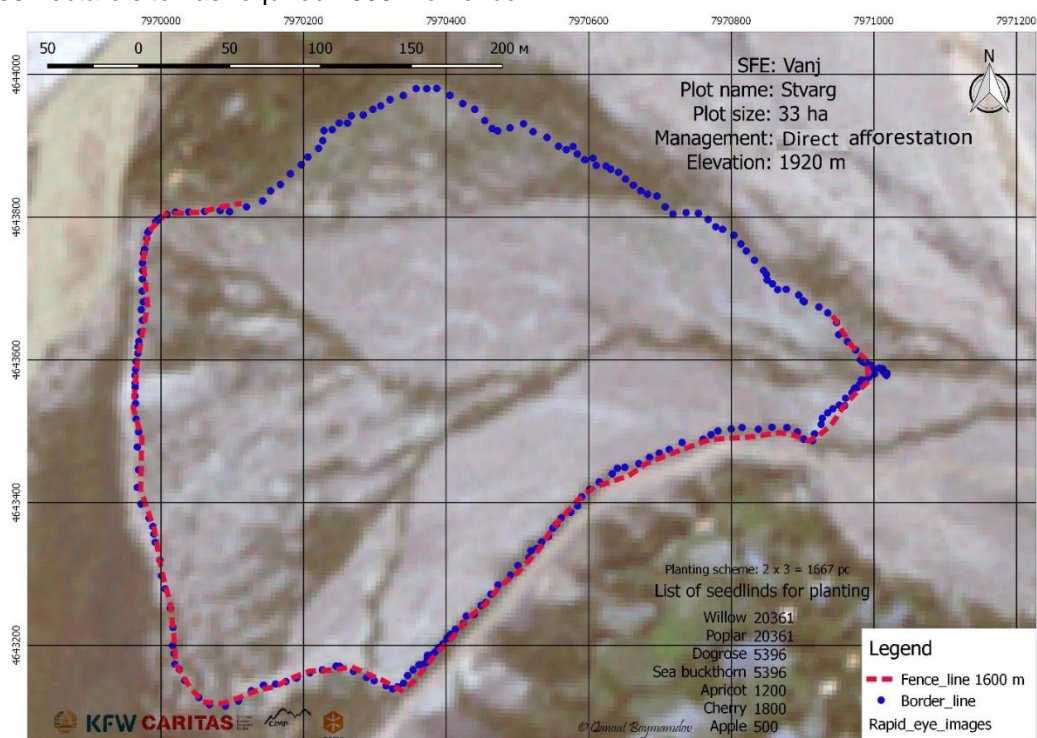
Table 3 Afforestation and reforestation area targets (5-year totals)

Values	JFM	DIRECT	Total
Sum of Activity 1: Riparian forest Plan 5 yrs	580	-	580
Sum of Activity 2: Fruit and nut Plan 5 yrs	2,525	275	2,800
Sum of Activity 3 : Pistachio forest Plan 5 yrs	2,395	205	2,600

Масштаб: 1: 1000

EPSG:32642 - WGS 84 / UTM zone 42N

Figure 2 Example of site plan map from KFW/CAFT project site of Direct afforestation in Vanj. Here a 33 hectare site has required 1600m of fence.



VII. Rationale

46. Forest cover is low and sparse and degradation is continuing, leading to increased vulnerability to soil erosion, slope instability, flooding and impaired soil water regulation and whole catchments are affected. Rural communities are highly reliant on their natural resources and lack of food security is a real threat. This risk is heightened by increases in returned migrants, falling remittances and reduced capacity for control caused by COVID-19. Usage of natural resources is unsustainable and pastures management needs improvement inside the State Forest Fund as well as outside. To date, coordination has been poor across all land users. While many donor projects usefully operate at a catchment-by-catchment basis no one coordinated approach has yet been adopted by the authorities. Anticipation of the effects of climate change and training in Ecosystem based Adaptations; a focus on food security; and enlisting the power of local knowledge in a participatory manner are aspects that have been largely absent in investment planning.
47. Enabling investments are needed to clarify inconsistencies in legislation to ensure there is a firm foundation for participatory planning and monitoring and that communities, staff and governance bodies will be fully receptive to the approach and associated field investments. Training in climate change effects, Ecosystem Based Adaptation methods and participatory planning and monitoring is required. Root cause issues such as lack of alternatives to wood energy and poor documentation of land tenure also need to be addressed. Robust, climate resilient investments are needed to create a tangible impact and crystallize the benefits of participatory planning and climate change adaptation.

IX. Barriers to success in the forest sector include

A) limited climate-sensitivity of the policy and regulatory framework for forest management

- limited systematic and ongoing monitoring of forest resources. A clear missed opportunity exists in the lack of linkage between state capacity in remote sensing with state agency responsible for land degradation monitoring needs
- limited understanding of climate change and its slow onset and how forest practice and species and site selection needs to adapt
- overlap and confused regulatory handling of forests in the Forest Code, Land Management regulations and in those covering Protected Areas
- incomplete awareness of the potential for Joint Forest Management and how it works
- inadequate coordination of plans for forest, pastures, biodiversity and water resources at catchment level
- imposed wood fuel supply demands
- unclear status of forest in agricultural lands and lack of supports for forest expansion
- limited technical and human resource investments at Leskhoz.

B) limited capacity for forest restoration in communities

- inadequate budget for Leskhoz operation and in support of reforestation and afforestation
- significant governance challenges with increasing livestock numbers and over-grazing
- inadequate Leskhoz staff and resources for close supervision and monitoring of forest lands
- inadequate mechanisation of Leskhoz to perform site preparation and irrigation services
- strong rural demand for fuelwood
- limited community appreciation for forest functions
- limited markets for NWFP and information on prices, standards
- limited processing, drying and marketing opportunities for local NWFP

X. Alignment and ownership

Table 4 Alignment to strategy

Strategy	Year enforced	Alignment
National Development Strategy 2016–2030 (NDS)	2016	<p>The primary focus of the NDS is on the long-term development of Tajikistan to improve living standards for the population. NDS objectives to achieving this include: i) poverty eradication; ii) sustainable economic growth; iii) promotion of sustainable consumption and production patterns; and iv) sustainable use of natural resources.</p> <p>The vulnerability of the Tajik population to climate change is acknowledged throughout the NDS, with the importance of agriculture and water management to alleviating this highlighted.</p>
National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (CBD Strategy)	2003	<p>Several interconnected components contribute to the primary objective of the CBD Strategy.</p> <p>A priority element of the 'geo-system-level approach' outlined in the CBD Strategy is the restoration and reforestation of degraded landscapes to reduce soil erosion, particularly in landslide and already eroded areas.</p>
National Strategy on Disaster Risk Management for 2010–2015 (NDRMS)	2010	<p>The NDRMS identifies the significance of climate change-related disasters in the country such as droughts and high-water events. It is also acknowledged in the strategy that mitigation for these types of events needs to be incorporated into the design phase of new development projects.</p>
The National Climate Change Adaptation Strategy (NCCAS)	2016	<p>Within the NCCAS there are guidelines provided for priority adaptation actions to be undertaken in Tajikistan. The proposed project is well-aligned with the NCCAS because they both recognise that climate change effects on the agricultural sector result in significant negative impacts for the population. The NCCAS also recognises the potential of Ecosystem Based Adaptation (EbA) as an effective approach.</p> <p>The NCCAS is currently in draft format and has not yet been accepted by the government.</p>
Living Standards Improvement Strategy for the Republic of Tajikistan for 2013–2015 (LSIS)	2013	<p>LSIS recognises the cross-cutting nature of climate change adaptation in relation to environmental sustainability, economic growth and reducing poverty. The importance of water, soil quality and improving the capacity to collate and disseminate climate change information are also identified as important fields for poverty reduction.</p>
National Program of Actions to Combat Desertification (NPACD)	2001	<p>Outcome 2 of the project aligns with the NPACD focus on 'rational land tenure' and 'measure on rational nature using'. These focal points refer to the sustainable use of natural resources, with clear guidelines on reforestation and mitigating the effects of water erosion.</p>
Strategic Program for Climate Resilience (SPCR)	2011	<p>The SPCR was developed in response to the specific vulnerability of Tajikistan to climate change and the associated economic, environmental and social impacts. It is the strategic overview of the Pilot Programme for Climate Resilience (PPCR), which consists of six core components. One of these core components is 'Agriculture and sustainable land management', which focusses on incorporating climate resilience into all sectors of land management.</p>
National Action Plan for Climate Change Mitigation (NAPCC)	2003	<p>The NAPCC is the only strategic framework in the country that specifically addresses the implications of climate change.</p>

XI. Contribution to the project outcomes / impact level results

48. Outcome level results are

- Strengthened institutional and regulatory systems: through clarification and reform of regulatory instruments.
- Climate resilient green investments: afforestation and reforestation investments
- Reduce level of reliance on wood for energy: establishment of fuelwood forests and reform of approach to fuelwood supply for rural communities

- Enhanced livelihoods and food security: improved food security and alternative livelihoods presented by JFM investments.
- Enhanced financial sustainability of Leskhoz: improved revenues through JFM revenue and harvest flows.

XII. Forest related outputs (statements, indicators, targets)

Output	Output	Indicator & Target	
Strengthened adaptive capacity and reduced exposure to climate risks	Output 1.1: By Year 7, Capacities of relevant national institutions for climate-resilient natural resources management are strengthened.	N. of graduates of the "Forester" curriculum in the project locations (target 70 individuals)	
		N. of Agencies collaborating for an active exchange of data and information related to remote and participatory NRM (target 6 institutions).	
Pastures rehabilitated, Increased Forest coverage, Improved livestock productivity, green growth principles adopted.	Output 2.2: By year 7, 400 Climate-sensitive Community Action Plans (CsCAP) implemented in 21 districts benefitting at least 100,000 rural HHs	Leskhoz or Protected Area land subject of JFM contracts (Ha):	5980
		Of which	
		JFM Riparian forest established (Ha):	580
		JFM Fruit & Nut orchards established (Ha):	2525
		JFM Pistachio forest rehabilitated (Ha):	2395
		JFM Juniper forests rehabilitated (Ha):	325
		JFM Saxaul (Ha):	125
		JFM Poplar agroforestry (Ha):	30
		Number of Hectares of land reforested directly (in Leskhoz or other lands):	1350
		Enhanced supply of locally grown forest and orchard species: 14 Leskhoz nurseries upgraded and 150 backyard nurseries established	

XII. Cost Estimates and timeframe

49. During a 7 year project it is expect to take one year to mobilize and to leave 1 year before the end of the project where no new afforestation works will commence, thus the targets and outputs are based on a 5 year effective period.

Item	Unit Cost USD	Timing (years)	Number of years	Quantity	Total USD
Annual JFM field activity	2,349	2-6	5	5980	14,047,548
Annual Leskhoz field activity	1,791	2-6	5	1350	2,417,624
Leskhoz nurseries	14,868	2	1	14	208,14
JFM Backyard nurseries	845	2	1	150	126,681
Leskhoz mechanisation packages	140,000	1	1	14	1,400,000
					18,200,000

XIII. Risks and Mitigation measures

50. Identified risks and mitigations are outlined below.

Table 5 Risk and mitigations

Risk	Impact	Probability	Mitigation
Lack of Leskhoz capacity to manage large scale field activities	High	Medium	Provide training, IT, vehicles and equipment to Leskhoz Build on existing agro-ecological extension services
Local labour force is insufficient to execute large scale forest activities	Medium	Medium	Invest in mechanization Use fencing and natural regeneration as a mechanism to increase impact efficiently Pace the work to match local labour supply
Low survival rate of afforestation	Medium	Medium	Use participatory planning to benefit from local knowledge in works planning and species selection Use locally grown, autochthonous and robust species and sub-species Utilize the training materials and manuals already developed on the JFM approach, forestry in riparian forests, tree species identification, pistachio forest establishment, etc. Establish backyard nurseries and Leskhoz level nurseries as required, using experienced nursery trainers (e.g. from Vahdat nursery) to train those involved. Locate the nurseries close to the source of demand, minimizing transport. Closely monitor sites and share learnings as the project progresses. Train field level beneficiaries in tree planting and aftercare. Ensure trees are adequately irrigated during establishment.
Afforestation, fencing and other works may exclude pasture users from their habitual areas of use	Medium	High	Consult extensively to ensure the awareness is high and rationale of natural resource conservation is fully understood Negotiate the continued use of adjacent or alternative lands Coordinate with pastures and water management to address comprehensively Maximize JFM involvement to mobilize pasture users in favour of afforestation as part of JFM contracts
Remote sensing monitoring is disjointed from local field work and rejected	Low	High	Ensure the link from the outset via a participatory framework with remote sensing results embedded
JFM participants require immediate outputs	Medium	High	Use Leskhoz and contracted labour to establish the forests that require time to mature

Risk	Impact	Probability	Mitigation
			Adjust the concessionality of longer-to-mature investments (e.g. woodlots) is justified in the eyes of the JFM participant.
Activities adversely affect biodiversity	Medium	Medium	Safeguards will be included to favour native species and environmental protection
Afforested or reforested areas are adversely affected by grazing	High	Medium	Participatory approach coupled with field and remote monitoring will reduce this risk, as will the inclusion of low density forests in JFM contracts
Insufficient understanding of upstream and downstream interactions of forestry and other land uses hampers coherent planning	Medium	Medium	Full understanding of District Climate Resilience Diagnostic into the participatory planning process
Insufficient institutional climate adaptation knowledge	Medium	Low	Involvement of local communities will strengthen planning approach
Transboundary disputes will disrupt River basin planning efforts	Low	Medium	Targeting has avoided transboundary areas
Disputed land tenure could impact planned activity by Leskhoz or other owners (both inside and outside the State Forest Fund).	Medium	High	JFM Contract preparation sub-activity will cover this issue.
Irrigation is needed for successful forest establishment	Medium	Medium	Agile and low cost irrigation concept is proposed that will be implemented until trees are established.

XIV. Exit strategy and sustainability (focus on Paradigm shift potential and Sustainable development potential investment criteria)

51. The project will support mainstream River Basin planning and integrate it fully with subsidiary planning systems such as those for infrastructure, forests, pastures and water use. The principles and practical functioning of Joint Forest Management will be fully explained to SFE staff and promoted amongst communities. Continued targeting based on objective evidence such as forest potential and vulnerability will guide forestry activity into the future. A robust system of participatory monitoring combining field level observations and remote sensing will strengthen the transparency and sustainability of sustainable land management.

Annex 1: Investment Targeting

Stage 1: assemble Leskhoz data

52. As part of the targeting exercise, information was collected on Leskhoz areas by district, as there is no digital map dataset available. The total area amounted to 1.3m hectares, somewhat short of the expected 1.8m hectares so this dataset may be incomplete. Some Leskhoz are in fact nurseries, not containing any forestland as such; these are included in the number below.
53. Table 6 Estimated Leskhoz areas (total, under pastures and other - by difference) together with the number of whole or part Leskhoz within each district.

Region	District	Leskhoz total area (Ha) (A)	Area designated as Pasture within Leskhoz (B)	Non-pasture area within Leskhoz (A-B) (C)	Number of Leskhoz within the district ³³
Khatlon	Khovaling	107,785	31,847	75,938	1
Khatlon	Ayni	177,472	48,120	129,352	1
RRS	Panjakent	108066	33225	74,841	1
Sughd	Sh.Shohin	63,626	23,806	39,820	2
Sughd	Laksh	97458	13858	83,600	1
RRS	Vanj	58883	8887	49,996	1
GBOA	Mastchoh	54,462	22,000	32,462	1
Sughd	Devashtich	55970	32888	23,082	1
Khatlon	Shakhriston	47456	18372	29,084	1
Khatlon	Muminobod	17423	4490	12,933	1
Sughd	Asht	64470	40887	23,583	2
Khatlon	Rasht	36989	10670	26,319	1
RRS	Baljuvon	34,953	19,591	15,362	2
RRS	Qubodiyon	28,469	9,856	18,613	1
Khatlon	Kulyab	3	-	3	1
Khatlon	Tojikobod	28331	9913	18,418	1
Sughd	Darvoz	9279	1344	7,935	1
RRS	Nurek	5205	229	4,976	1
Sughd	Istaravshan	15112	10189	4,923	1
Sughd	Spitamen	37	0	37	1
Khatlon	Sangvor	50161	34318	15,843	1
RRS	Hamadoni	4,410	2,577	1,833	1
GBOA	Vahdat	25979	10019	15,960	2
Sughd	Vose	1,252	-	1,252	1
GBOA	Shakhrinav	1018	227	791	1
Khatlon	Rudaki	8999	5985	3,014	1
Sughd	Danghara	7,238	1,158	6,080	1
Khatlon	Gissor	1994	1872	122	1
Khatlon	Khuroson	2355	415	1,940	1
Sughd	BGafurov	1367	0	1,367	1
Sughd	Bokhtar	1316	0	1,316	1
Khatlon	Faizobod	13639	6954	6,685	1
RRS	Rogun	21531	14992	6,539	1
Khatlon	Varzob	6832	5250	1,582	1
Khatlon	NKhusrav	18,548	17,572	976	1
RRS	Farkhor	15,425	14,042	1,383	1
RRS	Shakhrituz	407	28	379	1
RRS	Pyandzh	1460	880	580	1
Khatlon	Konibodom	1241	0	1,241	1

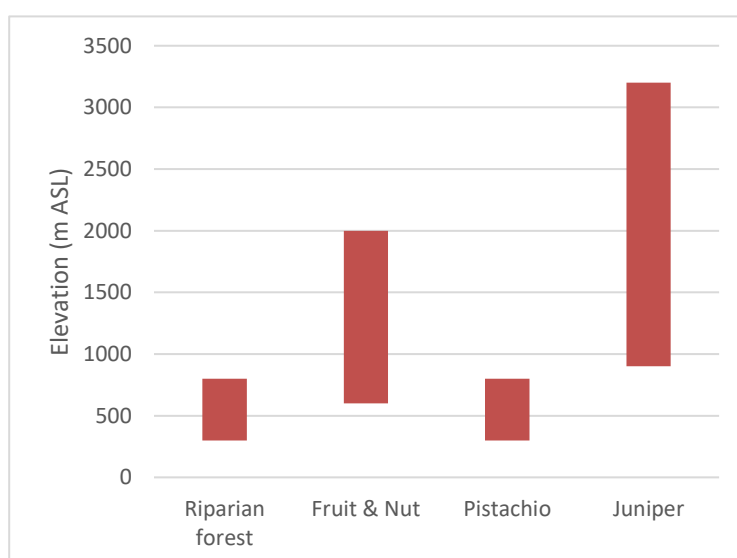
³³ Whole Leskhoz or parts of Leskhoz split over more than one district

Region	District	Leskhoz total area (Ha) (A)	Area designated as Pasture within Leskhoz (B)	Non-pasture area within Leskhoz (A-B) (C)	Number of Leskhoz within the district ³³
GBOA	Dusti	15192	12984	2,208	1
Khatlon	Rushon	4173	30	4,143	1
RRS	Tursunzoda	1273	92	1,181	1
RRS	Roshtqala	1687	106	1,581	1
Sughd	Shughnon	2931	216	2,715	1
Khatlon	Ishkoshim	1999	36	1,963	1
Sughd	Murghob	87770	15384	72,386	1
Khatlon	A.Dzhami	0	0	0	0
Khatlon	Yavan	0	0	0	0
Khatlon	Vakhsh	0	0	0	0
Khatlon	Sarband	0	0	0	1
Khatlon	Jrasulov	0	0	0	0
Khatlon	Temurmalik	0	0	0	0
Khatlon	Isfara	0	0	0	0
Sughd	J. Balkhi	0	0	0	0
RRS	Jaihun	0	0	0	0
Sughd	Nurobod	0	0	0	0
GBOA	Zafarobod	0	0	0	0
Total		1,311,646	485,309	826,337	51

Stage 2: assess the forest restoration potential

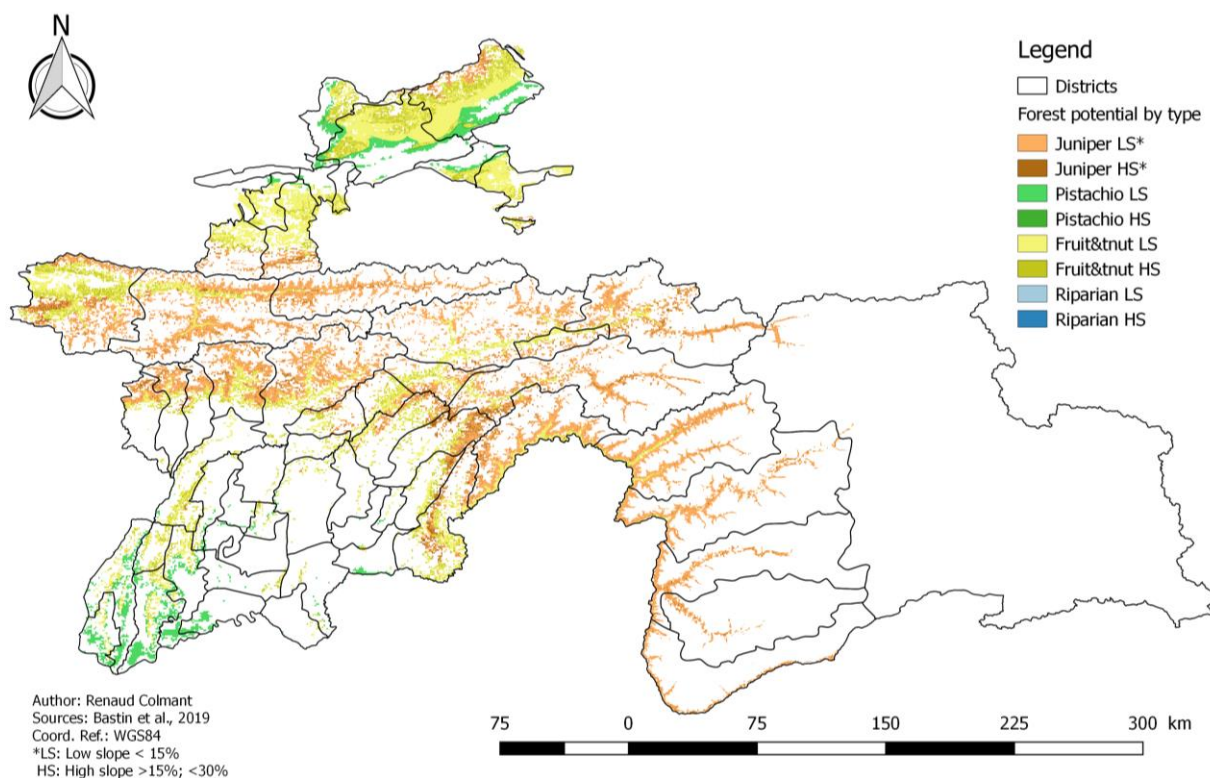
54. The work of Bastin et al was used to identify areas that may be suitable for forest cover restoration. Simple classes were used to classify the areas with forest potential into broad intervention types, further sub-classified by slope:

- Riparian: 200m buffer of river centres between 300m and 800m with forest potential**
 - Moderate slopes (<15%)
 - Steep slopes (>15%)
- Fruit & Nut between 600m to 2000m with forest potential**
 - Moderate slopes
 - Steep slopes
- Pistachio between 300m to 800m with forest potential**
 - Moderate slopes
 - Steep slopes
- Juniper between 900m to 3200m with forest potential**



- a. Moderate slopes
- b. Steep slopes

55. The zones overlap in elevation so the classification was applied in the numbered sequence shown: i.e. if one pixel had forest potential at 700m it was classed first as a riparian pixel (if in a river buffer), if not in a buffer it was classified as fruit and nut (rather than the last class at that altitude, the Pistachio zone). This is a rough ordering that is intended to reflect the overall ecosystem services value of these activity types for the communities involved and can be revisited when planning individual projects.



Stage 3: summarise by district and confine to within Leskhoz areas

56. The potential area of intervention was identified in each district and in many cases the total area of all activities exceeded the area of the non-pasture lands in each Leskhoz. For forestry sub-sector planning purposes there is little point extending the targeting beyond these boundaries and so the total area of all potential activities was capped at the area of the non-pasture lands within Leskhoz while the proportion of the different activities was maintained.

Region	District	Total potential	Fruit & Nut	Juniper	Pistachio	Riparian	Total ³⁴
Khatlon	Khovaling	68,736	30,625	38,112	-	-	68,736
Khatlon	Ayni	75,181	31,721	43,460	-	-	75,181
RRS	Panjakent	130,852	50,190	24,651	-	-	74,841*
Sughd	Sh.Shohin	111,552	24,797	14,899	76	49	39,820*
Sughd	Laksh	61,388	22,024	39,363	-	-	61,388
RRS	Vanj	48,438	11,804	36,634	-	-	48,438
GBOA	Mastchoh	72,515	11,900	15,855	4,595	112	32,462*
Sughd	Devashtich	61,122	18,233	4,526	270	52	23,082*
Khatlon	Shakhriston	43,548	23,438	5,646	-	-	29,084*
Khatlon	Muminobod	41,951	9,530	3,403	-	-	12,933*
Sughd	Asht	98,556	18,689	3,336	1,520	37	23,583*
Khatlon	Rasht	105,643	16,564	9,755	-	-	26,319*
RRS	Baljuvon	67,940	10,063	5,299	-	-	15,362*
RRS	Qubodiyon	38,324	12,309	-	6,165	139	18,613*
Khatlon	Kulyab	1,443	2	-	1	0	0,003*
Khatlon	Tojikobod	37,342	12,637	5,781	-	-	18,418*
Sughd	Darvoz	89,600	2,886	5,049	-	-	7,935*
RRS	Nurek	10,448	4,751	213	-	13	4,976*
Sughd	Istaravshan	16,505	4,727	-	169	27	4,923*
Sughd	Spitamen	4,752	29	-	8	0	0,037*
Khatlon	Sangvor	79,954	5,090	10,753	-	-	15,843*
RRS	Hamadoni	4,269	448	-	1,370	15	1,833*
GBOA	Vahdat	99,506	7,607	8,353	-	-	15,960*
Sughd	Vose	1,287	887	-	354	11	1,252*
GBOA	Shakhrinav	21,929	426	365	-	-	0,791*
Khatlon	Rudaki	39,375	2,862	59	66	27	3,014*
Sughd	Danghara	11,850	5,199	263	545	73	6,080*
Khatlon	Gissor	19,617	78	44	-	0	0,122*
Khatlon	Khuroson	10,751	1,468	2	458	12	1,940*
Sughd	BGafurov	83,486	1,113	11	237	6	1,367*
Sughd	Bokhtar	1,745	-	-	1,260	56	1,316*
Khatlon	Faizobod	28,926	4,578	2,107	-	-	6,685*
RRS	Rogun	43,915	5,196	1,343	-	-	6,539*
Khatlon	Varzob	69,680	835	747	-	-	1,582*
Khatlon	NKhusrav	10,766	405	-	565	6	0,976*
RRS	Farkhor	4,443	972	-	400	11	1,383*
RRS	Shakhrituz	19,261	191	-	185	3	0,379*
RRS	Pyandzh	1,580	505	-	69	5	0,580*
Khatlon	Konibodom	4,469	946	-	290	6	1,241*

³⁴ An asterisk indicates where the area for forest restoration has been limited to the area of non-pasture lands the Leskhov within that district (as per column C in Table 4).

Region	District	Total potential	Fruit & Nut	Juniper	Pistachio	Riparian	Total ³⁴
GBOA	Dusti	24,021	1,308	-	880	19	2,208*
Khatlon	Rushon	19,746	518	3,625	0	0	4,143*
RRS	Tursunzoda	31,885	685	496	-	0	1,181*
RRS	Roshtqala	2,393	-	1,581	-	-	1,581*
Sughd	Shughnon	10,696	-	2,715	-	-	2,715*
Khatlon	Ishkoshim	4,393	-	1,963	-	-	1,963*
Sughd	Murghob	1,832	-	1,832	-	-	1,832
Khatlon	A.Dzhami	1,282	-	-	-	-	-
Khatlon	Yavan	2,509	-	-	-	-	-
Khatlon	Vakhsh	664	-	-	-	-	-
Khatlon	Sarband	6,871	-	-	-	-	-
Khatlon	Jrasulov	3,778	-	-	-	-	-
Khatlon	Temurmalik	6,963	-	-	-	-	-
Khatlon	Isfara	10,194	-	-	-	-	-
Sughd	J. Balkhi	5,939	-	-	-	-	-
RRS	Jaihun	3,503	-	-	-	-	-
Sughd	Nurobod	51,615	-	-	-	-	-
GBOA	Zafarobod	172	-	-	-	-	-
Total (Hectares)		1,931,099	358,237	292,239	19,485	679	670,639
Percent by activity type			53%	44%	3%	0.1%	100.0%

Stage 4: combine with Forest Agency assessment of potential

57. The CASP+ Design team selected 21 districts in collaboration with CEP. Only 12 of these Districts contain Leskhoz (highlighted below).

CASP+ Districts	Riparian forest	Fruit and nut	Pistachio forest	Juniper forest	Natural regeneration of Juniper	Saxaul	Poplar agro forestry	Total
RRS	-	500	375	130	300	50	10	1,365
Hisor	-	230	50	30	-	-	5	315
Rudaki	-	20	325	20	150	-	-	515
Shahrinav	-	250	-	80	150	50	5	535
Khatlon	580	2,300	2,225	245	450	75	90	5,965
A.Dzhami	-	-	-	-	-	-	-	-
Baljuvon	100	610	-	110	150	25	20	1,015
Bokhtar/Kushoniyon	150	-	500	-	-	-	-	650
Danghara	-	-	450	-	-	-	-	450
Farkhor	60	55	525	-	-	-	20	660
Hamadoni	-	110	25	-	-	-	-	135
J.Balkhi	-	-	-	-	-	-	-	-
Khovaling	100	450	-	65	150	25	20	810
Khuroson	50	25	425	-	-	-	-	500
Kulyab	-	-	-	-	-	-	-	-

CASP+ Districts	Riparian forest	Fruit and nut	Pistachio forest	Juniper forest	Natural regeneration of Juniper	Saxaul	Poplar agro forestry	Total
Pyandzh	20	-	250	-	-	-	-	270
Sh.Shohin ³⁵	100	1,050	50	70	150	25	30	1,475
Temurmalik	-	-	-	-	-	-	-	-
Vakhsh	-	-	-	-	-	-	-	-
Vose	-	-	-	-	-	-	-	-
Yovon	-	-	-	-	-	-	-	-
Sughd	-	-	-	-	-	-	-	-
Mastchoh	-	-	-	-	-	-	-	-
Zafarobod	-	-	-	-	-	-	-	-
Grand Total	580	2,800	2,600	375	750	125	100	7,330

³⁵ The total for Sh.Shohin includes 180 ha in Protected Area buffer zone