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University of Central Asia

Conservation and Research of Wild Fruit Species in the Western Tian Shan

Kyrgyz Republic

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8. Project background

The western slopes of Fergana ridge and southern slopes of Chatkal range in the south of Kyrgyzstan are covered with unique fruit and nut forests, which are dominated by one tree species – the Persian walnut (*Juglans regia*). The fruit and nut forests represent semi-wild forests, which consists largely of common walnut *Juglans regia* trees with patches of original apple *Malus sieversii* (VU), *M. niedzwetzkyana* (EN) and *Pyrus korshinskyi* (CR), which are globally threatened and recognized as "vulnerable", "endangered" and "critically endangered" by IUCN respectively. These 3 species are also included into Red Data Book of Kyrgyzstan, which means it is prohibited to destroy these trees. Some other tree species also grow in this forest, but they do not develop forested patches and are distributed sporadically within the walnut and apple forests. These species include *Acer turkestanicum*, *Pyrus turcomanica*, *Crataegus spp.*, *Betula spp.*, *Populus spp.*, *Fraxinus spp.*, *Prunus sogdiana*, *Lonicera spp.*, *Berberis spp.*, *Cotoneaster spp.*, *Rosa spp.* and other species.

The apple trees and their patches are sporadically distributed in the walnut forest, some trees have a natural origin, whereas others are artificially planted mainly by forestry units. The artificial parts represent either plantation of garden apple varieties or garden varieties grafted on wild rootstock, their distribution does not seem to follow any patterns. The most numerous wild species are *Malus sieversii* and *Malus kirghisorum* with red apple *Malus niedzwetzkyana* being far less numerous, approximately less than 10% of the apple trees. Different literature sources have different opinions on whether *Malus niedzwetzkyana* is a subspecies of *Malus sieversii,* or whether *Malus kirghisorum* is a distinctive species. Additional research is required to estimate the population of each *Malus* species in the forest. Both *Malus* species are included in the Red Data Book of the Kyrgyz Republic. *Malus niedzwetzkyana* is rated as 'Vulnerable' in national Red Data Book and 'Endangered' by the IUCN Global Red List, *Malus sieversii* is 'Least Concern' and 'Vulnerable' respectively on the two lists. *Malus sieversii* is considered an ancestor of *Malus orientalis* and *Malus domestica*, a domestic variety of apple trees which makes it a valuable genetical resource for new varieties.

The remarkable feature of *Malus niedzwetzkyana* is red color of its flesh and skin, which is a result of the high content of anthocyanins, which is flavonoid pigment imparting red, blue, or purple pigmentation to fruits, flowers and foliage. These compounds are powerful antioxidants and are widely accepted to be useful to human health. Thus, the wild fruit forests represent a valuable stock of genes for the development of new fruit varieties with beneficial qualities.

Problems

Kyrgyzstan is a poor country with more than 60% of its population residing in rural areas. Forests play an important part in the rural economy. It is effectively the main source of income for many families in the villages. Walnut is the main crop, which is being harvested on annual basis by the local population, however wild apples also have their part in the income structure of the rural families. Forest products

contribute from 22% to 61% to the income of local people, collection of walnuts being on the 1st place and collection of wild apples is on the 2nd place of all forest products. However, 96% of households collect walnuts and only 19% of families collect apples, and these are mainly poor families.

Collection of walnuts and animal husbandry are among few major income sources for local people with walnut collection providing the largest and animal husbandry with the second-largest share to household income. This has resulted in overgrazing and selective planting and cutting, contributing to the suppression of natural regeneration and loss of genetic diversity. Walnut trees are considered the most profitable and more valuable than apple trees, thus walnut trees are preferred over the apple trees, which leads to selective cutting and higher pressure on apple genetic resources. The apple tree wood has higher energy value than that of walnut, and local people know about it. The livestock, browsing freely in the forest, destroys young trees, as well as damages stems and branches of adult trees. Local people extract apple seeds from the forest by collecting the apples and selling them for juicing or drying. These activities strongly limit sexual and vegetative propagation of wild apple species. This results in ageing trees and major ecosystem change, losing genetic diversity and turning the forest into a monocultural orchard, which is vulnerable to pests and diseases.

Also, pests like Gypsy moth (*Lymantria dispar*) and diseases like Fire blight (*Erwinia amylovora*) pose a serious threat to the population of wild apples in Kyrgyzstan and South Kazakhstan. These pests and diseases are spread by industrial fruit orchards and by *Rosaceae* and other species, which are abundant in the forest. Forestry units lack expertise and resources to control these diseases, which constrains natural propagation and leads to the loss of wild trees. The nature reserves also lack capacity and expertise to protect the forest against illegal logging and grazing and to conduct research on tree populations, especially after the abolition of scientific departments in all the nature reserves.

If no measures are taken the outnumbered wild apples can be severely damaged and the population dramatically decreased. The local population will continue cutting the fruit trees for firewood and there will be no regeneration as new seedlings will continue to be eaten by livestock and seeds massively extracted from the forest. The protected areas and forestry will continue inefficient protection practices, which will exacerbate the threats. The wild population of fruit trees will get old and extinct in near future.

Cutting trees and grazing are prohibited inside nature protected areas, which include Sary-Chelek and Padysha-Ata in our case. However, local communities in Arkit and Kashka-Suu still do it because there is a lack of alternative income sources. Grazing, cutting trees and collection of nontimber forest products are allowed in forestry units like Kara-Alma, but in practice, the collection and grazing limits are rarely observed. Local communities do realize they have a negative impact on the environment to a certain extent, but they do not have many choices regarding income generation. So, alternative income sources, awareness campaigned and increase of added value products can help to decrease human pressure on natural resources.

A number of national and regional projects propose different management schemes for the forests, to find a balance between the socio-economic and conservation goals. Forest units (leskhoz) are the main official bodies managing the forest; however, they lack resources and skills. Scientific agencies also lack the capacity to conduct research to inform management strategies. At the same time, holistic socio-economic surveys on silvopastoralism and use of non-timber products and their impact on natural resources as well as climate change impacts modelling are rare in the region. This leads to uninformed natural resource management decisions with different levels of success. It is important to apply a

multidimensional scheme considering various interests to improve the management and conservation of these forests and globally important genetical resources. The efforts should include research, monitoring and reproduction of the threatened tree species, as well as capacity building of forestry units, raising awareness and sustainable livelihoods for local people, development of management plans for natural resources and climate change adaptation.

Geography and Administration

For this project we have chosen 3 sites, these include Sary-Chelek Biosphere Reserve, Padysha-Ata State Nature Reserve and Kara-Alma forestry unit, these protected areas geographically coincide with KGZ06 "Sary-Chalek", KGZ05 "Aflatun-Padyshata" and KGZ18 "Bazar-Korgon" key biodiversity areas, recognized by CEPF respectively. We will be working inside the protected areas. There is a village named Arkit inside of Sary-Chelek Bioshpere Reserve, residents of this village utilize the forests in the Reserve for income generation, so it is important to engage this community in conservation activities to alleviate the human impact on the forest resources. The village Kashka-Suu is very close to Padysha-Ata nature reserve and people from this village use forests inside and around the nature reserve, so this community will also be involved in the project. We will also involve the community in Kara-Alma village, which is inside the Kara-Alma forestry unit having impact on the forest resources there.

These areas were selected because they represent main forest ecosystems in the region, large habitat for the selected species and encompass their greatest population. At the same time, these areas are some of the most densely populated areas in the country and the areas with the greatest human pressure on the target species. This makes these areas very important sites for species research, conservation, and population restoration. These entities cover most of the forested areas in the south of the Kyrgyz Republic. Sary-Chelek, Padysha-Ata and Kara-Alma were chosen because they cover the largest area of apple forests with the highest protection status. This ensures conservation sustainability and continuity of the efforts, taken within the proposed project. At the same time, we have a positive experience of joint project implementation with the organizations managing the sites, which will facilitate the implementation of the proposed project. Mountain Societies Research Institute (MSRI) of the University of Central Asia (UCA) and Mountain Societies Development Support Programme (MSDSP), involved in this project have a long history of collaboration with the mentioned organizations in the project areas and strong representation in the region. The collaboration experience includes successful implementation of development, research, and capacity building projects. For more information, please see the "Organizational strengths" section below. MSRI has reached a collaboration agreement with the management of Sary-Chelek Biosphere Reserve and its scientific staff represented by Toktonaly Zhunusov, as well as Padysha-Ata State Nature Reserve scientists represented by Mavlyanov Shumkarbek. We also have an oral agreement with the State Agency Environmental Protection and Forestry for implementation of the project.

Approach

The University of Central Asia and its partner, the Mountain Societies Development Support Programme (MSDSP) will address these challenges by:

- Conducting research on the distribution of the target species.
- Conducting a socio-economic survey of forest users.
- Promoting the creation of Community Interest Groups (CIGs) for tree planting and joint sale of apple products via the Nomad Store and Sun Planet Organic LLC.

UCA's work with park authorities and community members may result in the voluntary reduction in cutting or removal of protected species of apples and pears in favor of more desired walnut trees.

UCA's work may also result in changes in policies allowing access to reserves and/or greater enforcement of existing laws on the removal of globally threatened species. During the life of the project, UCA will assess current trends on forest use, both in terms of species conservation and in terms of importance to local livelihoods. The project may suggest changes on the implementation of existing rules for activities allowed within the protected area (which may not be consistently implemented) or may propose new regulations. (See the next section for further discussion of this.) It may be anticipated that UCA will discourage the non-sustainable cutting of threatened apple and pear tree species within formal protected areas.

9. Participatory implementation

UCA and MSDSP have ongoing and past relationships with park authorities and community members in the three target locations. As part of the proposal process, UCA received the following specific endorsements:

- Sary-Chelek Biosphere Reserve (Toktanaly Zhunosov, 28 April 2020)
- Padysha-Ata State Nature Reserves (Shumkarbek Mavlyanov, 5 October 2020)
- Oral agreement with Kara Alma forestry unit (Suyun Malosov, 20 June 2020)

The project will work with two CIGs in each of three villages: (1) Arkit village in Sary-Chelek biosphere reserve, (2) Kara-Alma village in Suzak district and (3) Kashka-Suu village near Aflatun and Patysha-Ata nature reserve. These people, and park authorities, will be part of extensive consultations on forest use. UCA will engage community members in gender-appropriate forums to solicit perspectives and ensure agreement.

As noted above, the project may make recommendations to park authorities to ensure protection of the target species. Such recommendations would apply to protected areas which already have requisite legal authority to limit activities within their boundaries. Apart from working with the CIGs, UCA will engage extensively with community members, including via its socioeconomic survey, to ensure agreement with such recommendations. As discussed in Item 11, below, there will be measures to offset any limitations on access to species or land, even as these species and land already are protected.

10. Criteria for eligibility of affected persons

Eligible people will include 1,368 households from (1) Arkit village in Sary-Chelek biosphere reserve, (2) Kara-Alma village in Suzak district and (3) Kashka-Suu village near Aflatun and Patysha-Ata nature reserve, with a particular focus on people directly using forest resources for fruit and nut harvest for direct consumption and sale.

11. Measures to assist the affected persons

UCA will create six CIGs, each with 30 farming households, with 50 per cent of members of the CIG being women. Selection will be based on (i) households defined as vulnerable by the District Department of

Social Development and Protection, (ii) households residing in project's target areas and (iii) households extensively involved in wild apple collection.

Before starting the practical activities (below), Sagyndyk Emilbek Uulu from MSDSP will recruit a short-term consultant-trainer to provide technical training to CIG members and forest units on horticulture best practices, more particularly on i) planting protection measures (pests & diseases) ii) enhancing pruning, and iii) seedling replantation techniques in months 2-3.

MSDSP agronomist and horticulture expert-trainer will deliver the training for CIGs on apple processing techniques for reducing seeds waste and will also capacitate CIGs to correctly apply technologies for (i) reducing seeds destruction during processing and (ii) improving the quality of apples for further processing in month 8. This training will be provided following the delivery of the processing equipment. The trainings on horticulture will have extended positive effect on the entire forest ecosystem, as it will increase the knowledge of the local population and the protected areas management staff and improve forest use practices. We will conduct a post-training assessment using questionnaires to measure the awareness increase.

To increase sexual propagation and genetical diversity of apple trees in the target regions tree nurseries will be established. For that MSDSP agronomist will facilitate the collection of the apple seeds from the local communities by CIGs, as well as from the apples dried by the CIG themselves and juicing factories, between months 8 and 10. Those seeds will be then used by CIGs to grow seedlings in three nurseries that CIGs will establish earlier with the technical support from MSDSP agronomist in months 6-7. CIGs will manage and operate those nurseries to increase their sustainability.

To increase genetic diversity and exchange of genetic material between different areas, CIGs, in consultation with MSDSP agronomist, will complement the replantation of seedlings from the nurseries by collecting in months 15-16 the seedlings growing under adult trees and plant them over into other areas to form patches of apple trees. The CIGs, in collaboration with the forestry units and consultation with Sagyndyk and MSDSP agronomist, will replant 300 saplings from the nurseries in specific forest areas that are appropriate for the species in month 21. The plantation will occur outside of protected areas, where any kind of activity is prohibited. More specifically, forestry units and CIGs, in consultation with MSDSP agronomist, will select the exact places for planting these samplings based on the results of the ecological research undertaken in this project to ensure their survival and increased population connectivity in month 20.

To protect the young seedlings from grazing, CIGs will fence them with three poles and secure them with strings in months 21-22. Moreover, to protect young seedling from human activities, in month 14, MSDSP agronomist will develop notes and signs explaining the need for conservation of these trees and their state and internationally protected status and CIG will attach them to the trees and saplings that will be replanted in month 21. These afforestation efforts will also contribute to soil fixation and decrease of erosion processes.

To help CIGs to add value to wild apple harvested and to improve the sustainable processing capacity of the six CIGs, Sagyndyk and MSDSP agronomist (MSDSP) will supply a set of cutters and dryers to each of them in month 7. By using the cutters and dryers, CIG members will be able to produce dried apples, which will increase their income and allow them to store and transport the product better. Furthermore,

as mentioned above, the apple seeds will stay in the villages and will be seeded in the forest in the most favorable areas, to decrease the impact on natural regeneration.

As a high-value organic product, countries such as Japan, Europe and the Russian Federation consider wild apple products as a high-end product. Between months 7 and 10, Sagyndyk and MSDSP agronomist will establish business linkages between at least one company or individual entrepreneurs who are interested in exporting not only wild apple products but also other types of nontimber forest products and the six supported CIGs. To do so, Sagyndyk and MSDSP agronomist in months 7-10 will:

- Identify and map out potential end buyers
- Facilitate face-to-face meetings between buyers and CIGs
- Co-finance quality improvement activities together with potential buyers (e.g., trainings, consultations, product development, branding, and marketing)
- Consult CIG members on business administration and negotiation setting, basic bookkeeping, and analysis of sales, etc.
- Facilitate and sustain the market linkages between CIGs and buyers of wild apples (e.g. contracts between CIGs and buyers)

One of such companies is LLC Nomad Store established under JICA's "One Village – One Product" program. This buyer is already interested in collecting GMO-free and organic products from farmers from various villages throughout the country and exporting them to potential external markets.

MSDSP agronomist will promote among the six established CIGs alternative environmentally friendly livelihoods such as beekeeping, bakery, sewing guilds, etc., that can benefit both men and women. To support MSDSP agronomist in the promotion of those alternative livelihood activities, MSDSP will sub-contract a short-term and an external horticulture expert-trainer who will conduct training on alternative eco-friendly livelihoods among CIG members in month 3.

The project anticipates that those actions will contribute to increase wild apple producers' income and increase the value of wild apple trees among the local population.

12. Conflict resolution and complaint mechanism

UCA will ensure that local stakeholders are aware of the work and understand how to voice complaints if any. We will:

- Post information in local languages in each village, at our own offices in Bishkek and at the reserve offices.
- Explain our activities at CIG meetings.
- UCA will create fliers about the project's objectives and planned activities and these will also include contact information for UCA staff. Fliers will be distributed in each village and via CIGs to further increase local awareness of the project activities.

During all meetings and in general interactions with the public, UCA personnel will inform local people and other stakeholders that they have the right to raise a grievance at any time with UCA, MSDSP, nature reserve personnel, or CEPF about any issue relating to the project. Before starting the project implementation, local communities will be informed of the objectives of the grant. They will be given telephone numbers and e-mails of contact persons at UCA, MSDSP, the reserve, and CEPF. This information will also be put on all education materials that will be produced during this project implementation including posters, brochures, and booklets. Contact information of the Regional Implementation Team and CEPF will be made publicly available in local languages. If UCA receives a grievance, it will communicate the grievance, together with a proposed response, to CEPF and the RIT within 15 days.

We will inform stakeholders that grievances should proceed in the following order below. If the stakeholder is unsatisfied with the response at any step, they may proceed further.

- Project Manager, Research Fellow, UCA, Maksim Kulikov, maksim.kulikov@ucentralasia.org
- Toktanaly Zhunosov, Deputy Director for science, Sary-Chelek Biosphere Reserve, +996 772 621815;
- Shumkarbek Mavlyanov, Deputy Director for science, Padysha-Ata State Nature Reserve, +996 770 168242;
- Suyun Malosov, Director, Kara Alma Forestry Unit, +996 771 010190
- Mikhail Yakovlev, RIT country coordinator, +996 708 148 015, mihey-painter@mail.ru
- Lizza Protas, RIT Team Leader, WWF-Russia, lprotas@wwf.ru
- CEPF Executive Director: cepfexecutive@conservation.org

13. Implementation Arrangements

The project will be coordinated from UCA and MSDSP offices in Bishkek, specifically at UCA's Mountain Societies Research Institute (MSRI). The research team will travel to the three field locations twice a year for seven days at a time. The CIG team will be based in Bishkek and Osh. They will visit each CIG five times per year. The overall team will include:

- Maksim Kulikov, Team Leader/Researcher
- Zhyldyz Shigaeva, Social Scientist
- Azamat Azarov, Economist
- Sagyndyk Emilbek Uulu, Agricultural Economist
- To be determined, Agronomist