



Liberal Arts and Sciences

Environmental Management and Sustainable Development

Community Resilience and Commodification of Nature: Possibilities of Sustainable Use of *Teresken* in Eastern Pamir, Tajikistan

By

Kaziev Daler Sultanalievich

Supervisor: Emil Dzhuraev

A thesis submitted to the Liberal Arts and Sciences program
in partial fulfillment of the requirements for the degree of

Bachelor of Arts

at the

American University of Central Asia

Bishkek, 2017

Table of Content

Acknowledgements.....	1
Abstract.....	2
Chapter 1	
Introduction	
1.1. An Ongoing Shrub Collection in Murghab, Tajikistan.....	3
1.2. Research Question and Objectives	9
1.3. Theoretical Framework.....	13
Chapter 2	
Background	
2.1. Pastures of Eastern Pamirs.....	19
2.2. Murghab District of Tajikistan.....	21
2.3. Scientific Studies of Teresken.....	25
2.4. Methodology.....	30
Chapter 3	
Results	
3.1. Energy in Local Context: Development of Identity.....	32
3.2. Terskenchi a Profession: Normal Activity.....	33
3.3. Functions of different Energy Supply Practices.....	36
3.4. Emerging Russian named Energy Supply Practices.....	38
3.5. Economic Pressure and Interdependencies.....	40
3.6. Complexity and Commercialization of Supply Practices.....	40
Conclusion.....	43
Further Questions.....	45
References.....	46

Acknowledgements

Thanks to all the staff of the departments, Environmental Management and Sustainable Development and Anthropology, in American University of Central Asia. Special thanks to Tobias Kraudzun (Free University of Berlin), Dr. Cyrus Samimi (University of Bayreuth), Dr. Martin Saxer (Ludwig-Maximilians-Universität München), Tobias Marschall, Amadeus DeKastle and my supervisor Emil Dzhuraev (AUCA).

Abstract

This paper re-examines the energy crisis in Eastern Pamir, Tajikistan, where people currently depend to a large extent on the collection of shrubs to cook and heat their houses. It examines the informal institutions of shrub extractors and their functions. At what extent their collecting practices really are unsustainable, especially since a relatively positive recent assessments of land degradation in the region. This paper addresses this issue by focusing on Murghabi terskenchiler in order to see how, as informal organization, they minimize their impact and maintain sustainable harvesting based on their local knowledge and previous failures. Methodology includes two phases of fieldwork. A variety of ethnographic methods were used in the field, including structured interviews, participant observation, and photographic documentation. Snowball sampling and applied multiple samplings (regional, random, dimensional, and stratified) were employed. Second phase of research included statistical data and survey data to visualize the variables. R Studio statistical software program and QGIS was used. The results of two years of ethnographical, experimental fieldwork and statistical data analysis suggest possibilities of sustainable teresken management on the pastures of Murghab district. The key groups, so called terskenchiler, have been paying an essential role in managing shrub resources based on their failures and experience and knowledge along with the arrival of nomads to Pamir Mountains. Informal social organization of tereskenchiler, cycle harvesting, and strategy of harvesting, energy supply practices, and learned experience and knowledge could all lead to efficient teresken management. However, commercial interests of professional harvesting groups may lead to clash in practices or organizational dysfunction and the intensifying pastureland access and use between farmers and shrub collectors, which create some challenges to practice sustainable harvesting.

Key words: energy, ethnographical, social organization, informal institutions, local knowledge, sustainable extraction, commercial interests

Chapter 1

Introduction

1.1. An Ongoing Shrub Collection in Murghab, Tajikistan

The Eastern Pamir¹ region in Tajikistan is very dry and mountainous area, which lacks forests. Mostly occupied by ‘Kyrgyz and Ismaili’ people, local habitants depend currently heavily on natural energy resources, especially using shrubs. When the Soviet Union broke apart, state provisioning ceased abruptly. Lack of state support such as basic needs, food, clothes, coal, and salaries, jobs, electricity resulted Civil War and poverty. During the Soviet era, energy demands were supported by the State through imported coal, diesel generators and mini hydro power station. After the collapse, all these sources ceased along with other state subsidies. On individual and collective basis, locals started collecting plants in the region, teresken (*Krascheninnikovia ceratoides*) and shybak (*Artemisia*), in order to heat their houses and cook. I begin with currently ongoing fight for energy in one of the post-Soviet district called Murghab in current Tajikistan (Figure 1).

With the population of 15274 people², bordering with China from east, Kyrgyzstan from north and Afghanistan from south, the district is located in the eastern part of Tajikistan. With a specific climate, altitude ranging from 3,500 to 7,500 meters above the sea level, the areas has very short summer season and long winters. Other specific climate features are its barren and dry and mountainous area with specific climate (Kraudzun, 2012). Inhospitable ecopractices are usually seen as being that there is nothing to burn to heat house, and cook food except widely grown dwarf shrubs (*Krascheninnikovia ceratoides*) and shybak (*Artemisia*), on pastures. If you enter any local house in this areas, the fire is always on, whole year around.

¹ Administratively referred to as Murghab District in Tajikistan

² Region Statistical Agency of Murghab, May 2016

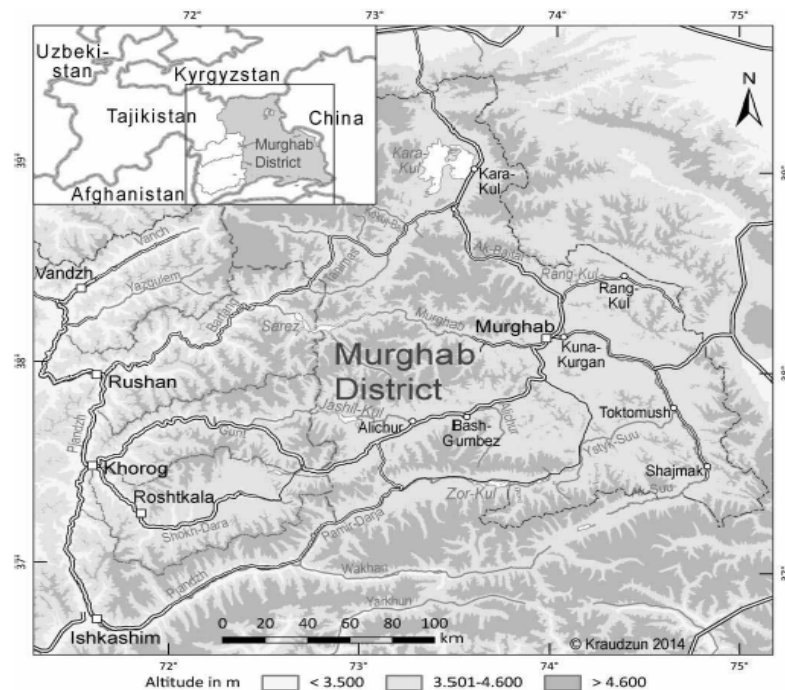


Figure 1 Case study area, Murgab District, GBAO province of Tajikistan, source: map modified by Tobies Kraudzun. 2014: 553.)

For the past 145 years, people have been degrading much of the shrubby pastures in order to maintain life. Collecting shrubs intensified after the breakup of the Soviet Union but it has a much longer history. Tracing human activity, there were no towns in the area until the beginning of the Imperial times around 1870s. Local inhabitants were nomadic Kyrgyz tribes, *Naiman*, *Kypchak*, *Teit*, and *Kesek*, living in the yurts. There is a dispute among scholars about the arrival of Kyrgyz in Pamirs. Some argue that they have lived since the 16th century, some argue since the 18th century (Maanaev E, Ploskikh V 1983). The Kyrgyz adapted their life to their biophysical environment such as pastures that were suitable for livestock breeding. Vast valleys used as pastures allowed yak, goat and sheep keeping. Nomads have maintained their life trading with people living in Western Pamirs, who were sedentary agrarian people and Kashgari merchants prior to the Russian invasion (Kraudzun, 2012).

In the 1870s, the Russian Empire occupied the region with the purpose of territorial extension. Known as the Great Game, a competition among the great powers of the British, Russian and Chinese Empires, resulted in the division of territories. This geopolitical struggle

over Pamir Mountains had become a major event in the history of Russian Imperialism and communities of the region (Maanaev and Ploskikh 1983; Kreutzmann, 2009). Thus, the creation of new borders separated Kyrgyz nomads. Some found themselves in China, some in Afghanistan and others in the Russian Empire. Right after, because of strategic importance of the region, Russian army constructed military bases. Almost all the military bases remain there up to now.

Russian officers observed how nomads sustained their life in yurts. They noticed that Kyrgyz collected dry manure (*tesek*) and shrubs (*teresken*) to heat yurts and cook food. Furthermore, the population of the region increased with soldiers and infrastructure already by 1911s. It was the period of building infrastructure and sedentarization of nomads in the region (Krausduz, 2014). The first headquarter and the military base was called “Pamirski Post”, near the place of current town Murghab. For Kyrgyz tribes with their yurts and livestock there was no energy (*otyn*) problem before sedentarization. In other words, resources available in the environment were sufficient for domestic use. This can still be observed in summer pastures (*jailoo*) today. They could move to any places they wanted, collect manure and shrubs maintain live. Usually, nomads supplied their *otyn* on the base of local practices like “Kynymdyk” and “Ashar”. In other words, seasonal migration from pasture to pastures allowed abundance of *otyn*. Because of mobility and nomadic migration there was less demand for energy prior to the imperial times and socialism.

Since the energy supply was a challenge for the Russian empire, they started cooperating with locals on the provisioning of energy. Thus, collectively, nomads supplied shrubs to military bases. In addition to local energy supply practices, Russians introduced a few more practices. Russians helped them to organize the extraction practices based on energy supply practices like “Zagotovka”, “Nochevka” or “Brigadier”. It was the period during the transition from Russian empire to Soviet. These terms come from Russian language and they often mean collective and different way of performing certain task. It is common way in Russia to meet energy demand in wild forests. By 1950s, nomadic people settled nearby the military bases.

Collection continued until 1950s when the last Kyrgyz nomads were sedentarized and coal was introduced (Kraudzun, 2012). Around 1960s, shrub collection was banned by the Soviet administration due to pasture degradation. The local and Russian named energy supply practices all disappeared. The town started growing, mud brick houses and electric grids were built everywhere. Compared to other nomads in Afghanistan and China, the Kyrgyz of Soviet part have enjoyed the public services of the Soviet Union and the Socialism. In other words, the all Soviet Pamirs were highly subsidized by state provisioning and exceptional status (Mostowlansky, 2011). Lifestyle had changed, Ak-su hydropower station and giant diesel generators fulfilled the energy demand of Murghab.

This enjoyment did not last long because after the break of Soviet Union, Tajikistan got its independence in 1991 and coal and oil supplies stopped, which triggered shrub extraction again. The old hydropower station stopped functioning because diesel supply for its generator stopped (Figure 2). The hydropower station alone could not provide enough energy³. Thus, people of Murghab district started collecting shrubs for cooking and heating houses. Government could not stop collectors because people simply did not have a choice (Kraudzun, 2014 et, al). One year after gaining independence, Tajikistan descended into the civil war and poverty. These three moments, stopped soviet supplies, civil war and poverty, were the worse times that Murghabi people, as they remember, have gone through. “If you find food, there was no (*otyn*) energy. If you find *otyn* -shrubs, there was no food ⁴ ” This issue was conceptualized as “Teresken syndrome”: the combination of sociopolitical, economic and environmental crisis (Breckle and Wucherer, 2006). This environmental degradation and story of dwarf shrubs made this town and community well known in travel books, development reports and academic articles⁵.

³ Energy Resources in Central Asian Mountains in the era of global change: Research and Practice Conference 29/05/2015 Dushanbe, Tajikistan.

⁴ Interview from May 2015: Maman and Jarkynbai, elderly professionals among shrub collectors

⁵ Video by United Nations University (<https://ourworld.unu.edu/en/highland-people-struggle-to-fuel-their-lives>)

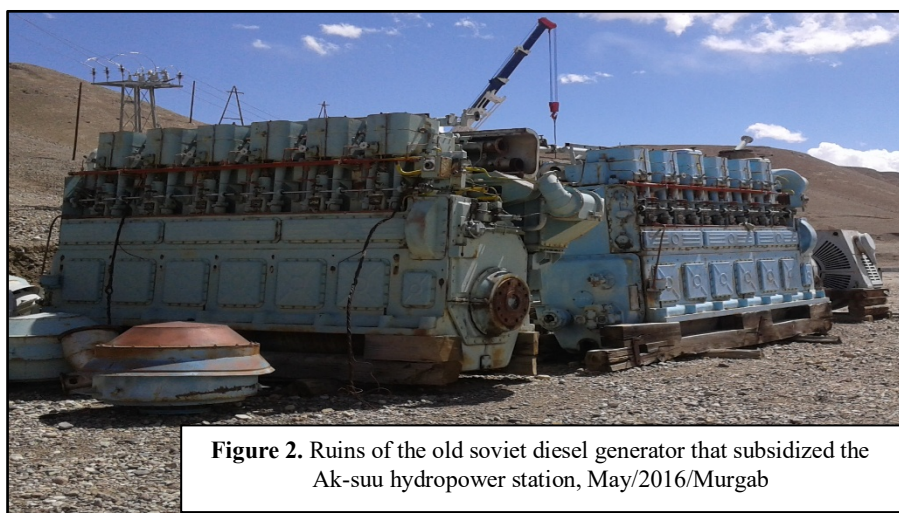


Figure 2. Ruins of the old soviet diesel generator that subsidized the Ak-suu hydropower station, May/2016/Murgab

After the war was over, poverty level declined and the situation in Tajikistan stabilized. Beginning from 2004, stability returns to the region, trade connection started building up with China and Kyrgyzstan. From Alai region of Kyrgyzstan, people started providing coal in local markets of the town. However, it was expensive for most poor families and many families could not afford it. Tajik-Chinese border Kulma-pass, which was closed for generations, was re-opened in 2004. Now the Kyrgyz communities were able to travel to their relatives in China and build trade relations. In the local market of Murghab, solar panels were introduced and they replaced the old Soviet kerosene lamps. The solar panels were not powerful enough either to heat house or cook food. People were very happy to have lighting, but continued collecting shrubs and degrading pastures. Around this period, availability of coal and animal manure reduced pressure on shrub extraction. In other words, people were having coal, animal manure and shrubs. These three sources of energy mix stabilized the land degradation (Kraudzun, 2014 et, al.). Among the researchers, the concept of “teresken syndrome” was considered no longer relevant to describe the current situation in Murghab. However, shrubs still serve as an alternative energy sources and its long term use is subject to energy availability and security. No attention was given to the study of key actors, informal institution of shrub suppliers.

Since then and despite stable degradation, which I will clarify later in my detailed literature review, people still depend on shrubs, as an alternative energy sources, in main town and outside villages. Realizing the emending harvesting and degradation, today scholars turned

their attention to sustainable management of mountain commons. With the 21st century's technology, scholars from various universities from Germany have suggested statistical models and remote sensing to map shrub vegetation (Vanselow and Samimi, 2014). However, due to extremely low vegetation cover, total satellite based predictor or remote sensing have shown unsatisfactory results (H. Zandler, et, al 2015). Reasons of unsatisfactory results are explained in detailed context analysis. Nonetheless, due to the low vegetation cover, it was difficult to predict the vegetation cover. The remote sensors lacked great performance.

While testing the remote sensing predictors is under the development, some scholars have studies energy poverty and energy security in villages. They have shown that availability of shrubs as an alternative plays crucial role in energy security. Recent work in Alichor village brings prove, “we found that currently only 15 % of Alichur's inhabitants are energy poor, 25 % are endangered by energy poverty and 60 % are energy secure. However, with decreasing access to dwarf shrubs in the future, the share of energy poor households and those endangered by energy poverty may increase to more than 70 %, leaving less than 30 % of Alichur's households energy secure” (Hohberg, 2015). Thus, scholars are suggesting that shrubs play a role in securing energy for the long run. These significant results make us to think of our capacity to solve this issues. It make us think about the importance of shrub management in that region for each village and the main town.

While Alichor village is experiencing difficulty of access to shrubby pasturelands, each year distance of collection zones getting far destabilizing their energy security, the residence of Murghab town, with half of total population, have already experienced and overcome this issue. What we observe, after all, is a transformation of collective harvesting practices based on reciprocity to dedicated groups called tereskenchiler. It is complex informally functioning (not reorganized by state) organization. They came in to existence mainly since the collapse of the Soviet Union but, as an identity, it has a long history. Since the extraction of shrubs continues in Murghab district, in recent years massive collecting has shifted from collective to groups who today, as an organization, supply local energy demand. Somehow, these group collectors were

able to manage their commons informally. They have developed unique way of organizing themselves and supplying local shrub consumption using various practices, above mentioned practices or methods. To be precise, those local practice s and Russian named energy supply practices have re-emerged again in transition period. Dedicated plant collectors seem to have responsibility over their activity. Along with the energy-mix alternative, responsibilities, duties and supply practices also changed for the past 25 years.

1.2. Research Question and Objectives

Over the past few years, being a tereskenchiler (plant collector) has become an identity, a profession and job for local people, especially males. Therefore, difficult accessibility affects them first as primary energy suppliers and energy security. Today the only people who have the most capacity to sustain a long-term use are the so called plant collectors, tereskenchiler. Almost the entire previous literature renders shrub plant collecting as unsustainable activity. The concept of ‘teresken syndrome’, is not applicable to describe the current land degradation and energy crisis due to availability of energy sources like animal manure and coal in the region (Kraudzun 2014 et, al.). This thesis proposes that it was not only about the availability of coal and manure, but also the way people have been managing their commons. In other words, it is about the capability of self-organization and how that can be a crucial element of sustainable energy. Behind the concept of ‘teresken syndrome’, those re-emerged energy supply practices have developed. No attention was given to the study of revivals and their functions. Re-emerged nomadic and Russian energy supply practices still function today.

Against the background of the relatively positive recent assessments of land degradation, the question is to what extent the tereskenchilers harvesting practices are not sustainable. This paper addresses this issue by focusing on a Murghabi tereskenchiler in order to see how, as informal organization, they could minimize their impact and maintain sustainable harvesting based on their local knowledge and previous failures. The sub questions raised include:

- a) Who are the tereskenchiler today and how is collecting organized and socially valued?
- b) What is the role of informal social organization, emerging energy supply practices, in sustainable teresken harvesting?
- c) How could their cultural adaptation, local knowledge and experience, contribute to conservation and sustainable collecting?
- d) Is there any recommendation that could be derived from combining local knowledge, local point of view and practice with state-of-the-art knowledge on environmental issues?

Current heavy dependency on mountain commons is continuing. Throughout the independence period, so called tereskenchiler, the dedicated professionals or energy suppliers, have been actively supplying local energy demand, securing the livelihood, changing the pasture degradation, and managing the available local resources like shrubs. Their informal social organization, process of traditional energy supply, cyclical harvesting, strategy of harvesting, and knowledge and experience offer many solutions in sustainable governing of mountains commons and securing local energy demand.

The complexity of interdependencies drives this issue to be continued. The ecological condition of the region is fragile. It has short summer and long winter seasons. The ecopractice is semi-mountain-desert with long lasting cold temperature. High altitude location of Murghab district to deal with agriculture in terms of crop production, even lack of grass production for livestock. Humans need shrubs as means of traditional energy and livestock breeding. There is no forest and shrubs are the only resource that people and animals depend on. They serve as fodder for both wild and domestic animals like yak, sheep and goat. In addition, they provide ecopractice services and prevents from wind and soil erosion. Other challenges include lack of electricity, and expensive coal. The government supposed to rebuild the old hydropower station Ak-su but due to lack of finance and corruption the region still lacks electricity. The imported

coal from Alay valley is often too expensive due to high custom duties and poor people cannot afford it. Increased population of the district from Pre-soviet period has resulted increase demand for energy. In addition, today shrubs are highly commercialized and there is open access to commons. Thus, not only simple people consume and buy the traditional energy but also all the local government administrations like schools, banks, and others depend on them. After all, due to high unemployment in the region, dedicated plant collectors turned this activity, into a small remunerating job.

The purpose of the study is to turn the research focus on study of energy problem in Murghab district into these key energy suppliers and study their relations with commons through local cultural point of view. It gives us not only a better understanding of interaction practice s of plant collectors (tereskenchiler) but also provides answers on the capacity of locals in governing the mountains commons. The second purpose of the study is to show, under the transition to market economy of the Tajik republic, the main problem of energy issue in Murghab district and its effects.

This research benefits local people, stakeholders, development organizations, scholars and public in general. It helps the local people to feel and value the significance of plant collectors as a primary energy suppliers between consumers and commons. Since the shrubs are limited and subject for long term use, it helps local consumers to understand the importance of decreased shrub consumption and increased use more alternative energy like gas, coal, manure, solar etc. As for professional plant collectors, they will understand their capacity in regulating commons and meeting energy demand of all people living in that area. Both, local shrub suppliers and consumers, have to understand that plant use has always been a local nomadic traditional way of meeting energy demand and it is impossible to avoid this activity. Stakeholders and development organization like ACTED (Agency for Technical Cooperation and Development) in Murghab can use the ideas in this research and implement development projects with plant collectors. It helps them in officially recognizing plant collectors as an

organization under the decentralized democratic decision making practice , which is widely practice in natural resource management. As for scholars, the research opens new perspectives and practical solutions in the study of energy issues in Murghab district. Even more importantly, this is a great case to explore informal practice s of social cooperation, promises and risks of such cooperation for sustainability. With the study of social organizations and interaction practice s, scholars can evaluate the shrub demand of local people. The case is a great example for all people to value their energy and understand the importance of energy efficiency.

The results of two years of ethnographical, experimental fieldwork and statistical data analysis suggest possibilities of sustainable teresken management on the pastures of Murghab district. The Key groups, so called tereskenchiler, have been paying an essential role in managing commons based on their failures and experience and knowledge along with the arrival of nomads to Pamir Mountains. Informal social organization of tereskenchiler, cycle harvesting, and strategy of harvesting, energy supply practice s, and learned experience and knowledge could all lead to efficient teresken management. However, commercial interests of professional harvesting groups may lead to clash in practice s or organizational dysfunction and the intensifying pastureland access and use between farmers and shrub collectors, which create some challenges to practice sustainable harvesting.

1.3. Theoretical Framework

Sustainable development is itself a challenge in such a place like Murghab or in the context of Eastern Pamir Mountains. The wild life, plant like teresken (*Krascheninnikovia ceratoides*) and shybak (*Artemisia*) is a subject for natural resource management, especially wild life, flora and fauna management and sustainable use. Loss of biodiversity marks the need for conservation and protection. Today there are many conservation agencies working across the world expending worldwide and becoming significant, especially biodiversity rich, culturally diverse and economically poor countries (Zimmerer, 2006). However, quite often, creation of protected areas and conservation activities have negative impact to local communities. For instances, African natural parks have effected on local communities and their social and economic life (Brockington, 2009). Like in African natural parks, the green development projects in Murghab tend to avoid the problem of shrubs but it is another research question. They tend to focus on snow leopard (*Panthera Uncia*) or big horn sheep (*Ovis ammon*) conservation or eco-tourism⁶. In addition, ecotourism and conservation, which portrays the face of development; yet, the benefit of such developments do less contribution to the local people, especially whose life directly depends on the natural resources (Brockington and Scholfield 2010). The tourism activities are involved only because it is used a tool to bring alternative income to empower local communities as part of conservation activities. However, to finishing the conservation and tourism line, environmental conservation activities can be understood as McAfee puts it, save to sell it. This phenomenon called ‘commodification of nature’ and ‘green developmentalism’ (McAfee, 1999). These concepts are relevant to understand the notion of wild life conservation activities in developing countries like Tajikistan. If those, whose life directly depend on local resources and they are detached from green project, scholars argue, such type of conservation is not acceptable in true environmental governance (McCarthy, 2005). Thus, the local people, like the example of plant collectors of Eastern Pamirs, do not benefit from the conservation projects

⁶ Some Ongoing Biodiversity Conservation Activities in the Pamirs: <http://www.wildlife-tajikistan.org/>

can be understood as an example of unfairness between biodiversity conservation activities and locals in developing countries (Zimmerer, 2009).

However, sketching from the theory of ‘resilience’ (Holling, 1973), we can understand the shrub collecting activity in Post-soviet experience of Murghab. To get a background, first discovered by ecologist C.S. Holling, the theory emerged from the study of different populations of species, starting from bacteria to mammals. In particular, he studied habitat change, prey and predators, fluctuating populations among species and their response to habitat change. Several examples of ‘resilience’ can be found in Holling’s work, resilience and stability in ecological practice. In the 1930s, too much nutrient disposal from agriculture and domestic sector causes increased algae population in the Lake Michigan and the Great Lakes. Nutrition change in Lake Michigan resulted in the disappearance of some species and appearances of others. *Bosmina coregoni* was replaced by, *Diaptomus oregonensis*, *B. Longirostris*. In the Great lakes, the fish population had dramatically dropped. Even though people tried to minimize human pressure, there were no indicator of population return. On top of the fishing pressure, too much nutrients resulted in the appearance of new predators that keep causing obstacle in the increase of fish population. Such examples gave a birth to the idea of resilience. The author argues that, despite the disturbance, natural practice s have high capacity to persist change without dramatic alternation.

The theory of ‘resilience’ has been advancing since 1970s and has entered in many academic disciplines. Scholars have shown that it is not only about natural practice s ability but also human communities have high capacity to absorb shock and cope with it. Scholars have advanced the theory of ‘resilience’ from the study of freshwater practice s to rangelands, from ecopractice studies to disturbance management. The theory found echo in social sciences such as anthropology, human geography and sociology. According to the article ‘Resilience: The emergence of a perspective for social–ecological practice s analyses’, the ecologist C.S. Holling describes the development of the theory in detail. He claims that, in current times, the ‘resilience’ is not only theoretical approach used to understand the social ecological practice s

but also applied concept to manage change natural resources, ecopractice change, and human activities in sustainable development and environmental governance (Folke, 2006).

Resilience is the ability of socio-ecological practice s to absorb shock or disturbance and still keep and maintain their functions (Folke, et, al. 2002). There are three main elements of this theory. First element is the amount of shock, change, or pressure can practice s absorb and still maintaining its function. The second element is the degree to which a practice is capable of self-organization. The third element is the degree to which a practice can develop capacity on the basis of learning and adapting (Folke, et al. 2002). In other words, it is ability, under the pressure or changing circumstances, to adapt, re-organize, and respond to the change. The opposite side of resilience is vulnerability. A social and ecological practice becomes vulnerable when it loses and cannot absorb change or pressure any more. Sometimes, change create an opportunities within resilient practice s.

Plant collectors' case perfectly fits the main element of 'resilience' theory and contributes to the study of social practices rather than ecological practices. It meets the main principles of the theory. It considers specific and critical problem of certain ecological place. The interaction between shrub collectors (*tereskenchiler*) of particular nomad-indigenous background with teresken (*Krascheninnikovia ceratoides*), shybak (*Artemisia*) growing in particular semi-desert mountainous ecopractice. Plant collectors have faced a shock and sudden disturbance after the end of Soviet era. Collecting shrubs for fuel started because of the sudden disturbance. Such changes and emerging energy problems significantly effected people in post-soviet transformation in Murghab (Kraudzun, T. 2014; Kraudzun, 2014 et al). Scholars like Breckle and Wucherer have developed a concept, 'teresken syndrome', in order to illustrate period of heavy environmental land degradation and energy crisis in the Pamir mountains. It was a sudden political and economic change in the region. Nonetheless, so-called *tereskenchiler*, as a social practice, were able to not only absorb the shocks but also cope with changes and keep their function by locally responding to those changes.

Under the disturbances of post-Soviet transformation in Murghab, plant collectors began responding to the changes on the base of re-merged pre-Soviet and mix of soviet practices as a coping strategy. Appearance of different pre-soviet and Russian named traditional energy practices represented as terminology like ‘*Kynymdyk*’, ‘*Ashar*’, ‘*Zagotovka*’, ‘*Nochevka*’ and “*Brigadier*” serve as an indicator of resilience ability of social practice s. These re-emerging daily practices are not a new in the field of post-soviet transformation studies. Today all the former Soviet countries are transiting from planned economy, totalitarian communism society to democratic, market economy oriented independent countries. The transition period has been widely discussed among scholars who study these post-soviet transformations. Scholars argue that post-soviet countries moving back to communism (Gans-Morse, 2004); some argue that it is moving back to feudal structured society pre-communism period (Burawoy and Verdery, 1999); some argue that it is having a mix of pre-Soviet, Soviet, and new norms of practices (Jones Luong 2004; Collier, S.J. and Way, L. 2004). All these post-soviet transformations and changes help us or at least set a ground to understand the re-merged pre-Soviet and mix of soviet practices as a resilient response in Eastern Pamirs among shrub collectors.

The third element of ‘resilience’ includes opportunities and challenges. What can we learn from these resilient abilities and responses? For the locals these re-emerged practices offer solutions to meet their energy. Over the 25 years of intensive and 145 years of extensive plant extraction history, the ‘resilience’ ability of those dedicated plant collectors created a possibility to manage shrubs. Human ecological knowledge, territorial knowledge, process of collecting, informally regulating locations, and local and Russian named supply practice s helping them practically manage the commons like *teresken*. How ‘resilient’ response is helping shrubs collector are explained bellow.

Some cultural revival contains pre-soviet nomadic energy supply practice s such as ‘*Kynymdyk*’ and ‘*Ashar*’. The relationship of humans with its nature, especially in Murghab region was sustainable in many ways before the Imperial and Socialism times. Humans have special ecological knowledge of their surroundings (Dasman, 1991) which helps them to sustain

their life in particular ecopractice. In general, humans have best adapted themselves in their ecological niche that also helps to sustain biodiversity (Alcorn, 1996; Durning, 1992; Gadgil, 1985; McNeely, 1997). Like other humans, despite few resources, humans in the Pamirs have learned to survive in that ecological zone relying on their ecological knowledge. Colonial expeditions provides many example how expeditors hunted wild animals together with indigenous nomads (D.C.Adolphus Murray, 1893). Thus, cultural revivals that took place in Murghab in relation to ecological problems contain pre-soviet ecological knowledge that is sustainable. Similar with dwarf shrub collectors, some pre-soviet ideas suggest long-term shrub use.

However, for the locals, one problem is political economy of natural resources today. In other words, *teresken* is being highly commercialized and has financial value. Under the current Tajikistan's transition to market economy, some re-emerged Russian ideas such as *Zagotovka*', '*Nochevka*' widely practiced in supplying the energy demand by commercial means. As I have interned and read history of pasture use in Central Asia, the Soviet Union literally exploited and degreed the pastures of Central Asia (Bussler, 2013). The Soviet farming institutions aimed for massive production, which led to pasture degradation⁷. The Eastern Pamirs was highly shaped by the collective and state farms. Russian named energy supply practices like '*Zagotovka*', '*Nochevka*' seek for maximum profits and resource extraction.

Coming back to the current experience of shrub collectors, demand for Russian named energy supply of shrubs creates competition among the actors (*tereskenchiler*) who seek their financial interest rather than long-term use of shrub. Thus, the re-emerging resources supply practices among shrub collectors contains unsustainable activities, especially Russian named supply practice s like *Zagotovka*', '*Nochevka*'. In addition, they decrease the shrub collectors' capacity in sustaining shrubs or its governance.

In sum, theoretical framework stated that the processes of 'commodification of nature' and 'green developmentalism' and commercialization of *teresken*, is an obstacle and challenge to

⁷ Internship at NGO, CAMP Alatoo, Bishkek, Kyrgyzstan. Sustainable Pasture Management - December, January 2015.

sustainable governing of commons in local level. However, understating the ‘resilience’ practices, especially functions of all the different energy supply and demand practices helps to distinguish positive and negative management practices of teresken. For example, which local or Russian named shrub supply practices is sustainable or not sustainable. In addition, ecological knowledge of dedicated plant collectors increases their chance of governing commons. Dedicated plant collectors have huge capacity in regulating extraction and consumption of traditional energy today. In addition to the mentioned challenges of sustainable development in the Eastern Pamirs, the solutions for the energy problem of Eastern Pamir can be only found in applied social science that gives more voice to locals to achieve environmental justice. Moreover, Political ecology can be one that gives more voice to the role of local knowledge in conservation and local community (Brown and Purcell 2005). Thus, we have to see human communities, as Walker puts it, not as a threat but as contributors to sustainability (Walker, 2005).

Chapter 2

Background

2.1. Pastures of Eastern Pamirs

Like the Himalayas, Hindi Kush and Tien Shan, the Eastern Pamir is high plateau in Central Asia. The Eastern Pamir has a long cold and windy winter and short summer seasons. The climate is cold and dry throughout the whole year; the annual average temperature is -1°C to -3° C and precipitation below 100 mm per year. The altitude ranges from 3500 to up to more than 7000 m.a.s.l. (Kraudzun, 2012).

Soviet scholars have contributed much in the study of vegetation of Pamir Mountains, especially the dwarf shrubs. The book *Терскен На Памире*, published in 1972, provides detail information on the distribution of dwarf shrubs in Pamir Mountains in various climatic zones; biological importance of the shrubs; evaluation of biological productivity; quality of dwarf shrubs by means of fodder; human impact thought harvesting and livestock breeding; and recommendation for practical improvement of dwarf shrub pastures for soviet farmers.

Terseken grow not only in Eastern Pamir but also across Eurasia, starting from Spain though Central Asia, Mongolia all away to China. Terseken serve as a fodder for camel, sheep, goat, rabbit, argali sheep (*ovis ammon*), and yaks and habitat for many bird like horned lark. Dwarf shrub pastures makes up 60% the Eastern Pamir's territory. Dwarf shrubs are naturally best-selected and widely grown plants arranging from 3500 up to 4600 (meters high above the sea level) in Eastern Pamir (H. Y Yusufbekov and A.I. Kasach 1972).

The climatic zones determine plants distribution. Although the region is arid and desert with less precipitation, ground water sources deliver most of the moisture providing life for the growth dwarf shrubs. It was recorded 1 million hectares of shrubs in different valleys of Eastern Pamir (К.В. Станюкович 1949; in *Терскен На Памире* 1972). Valleys were taking into consideration even by the Soviet Scholars in terms of distribution. Mainly grown dwarf shrubs in the area *Artemisia rhodantha*, *Stipa glareosa*, *Sympegma regalia*, *Stipa orientalis*, *Zygophyllum*

roselvii, *Artemisia pamirica*, *Christolea crassifolia*, *Cristolea pamirica*, *Acantholimon diapiensoides*, *Oxytropis pancinsii*, *orularia korolikovii*, *Erysimum sisymriodes* and so many other. In total there are more than 100 types of vegetation cover has been recorded (Yusufbekov H. Y and Kasach A.I. 1972).

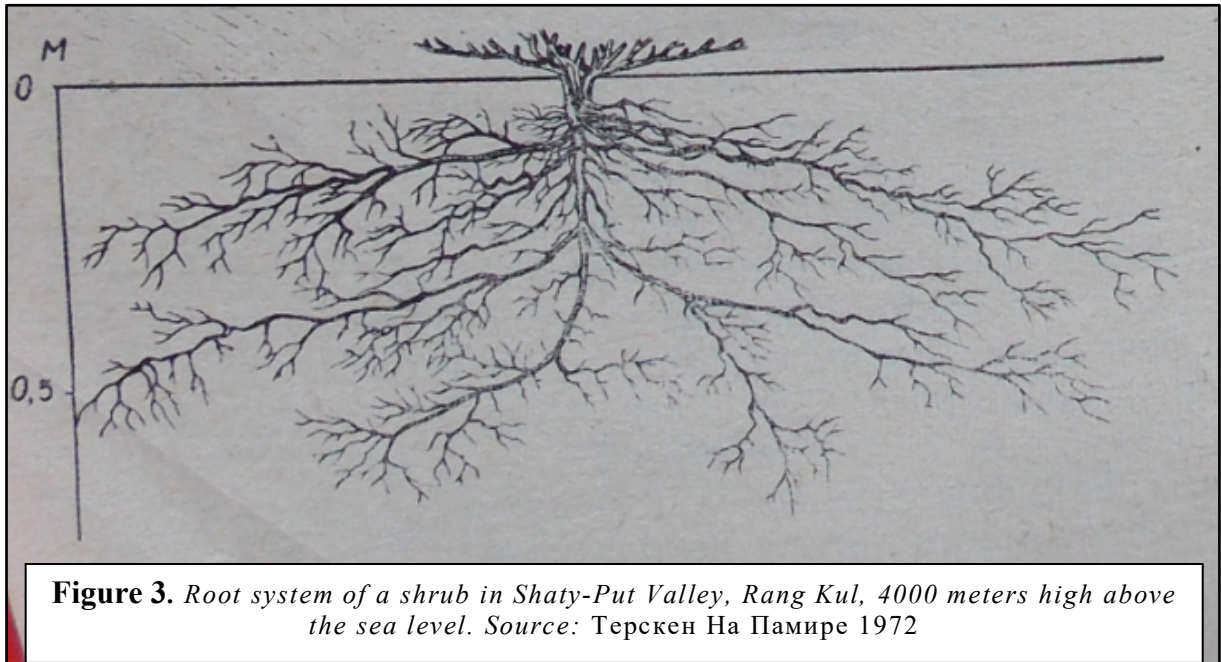


Figure 3. Root system of a shrub in Shaty-Put Valley, Rang Kul, 4000 meters high above the sea level. Source: Терскен На Памире 1972

Biologically, the dwarf shrubs in Eastern Pamir are very resistant to cold temperature. During the vegetation period, it can resist temperature from -2 up to -19 Shrub. They die off when the winter temperature exceeds its limits. Otherwise, natural death is in fall. Lifespan of dwarf shrubs can accede more than 100 years. Age is determined and classified in three: young dwarf shrubs 6-20 years, medium 20-70 years, and old 70-100. In order to fully grow it takes 7-12 years for dwarf shrubs. Altitude effects the growth year, the higher the elevation the higher the growth rate. Some other part of the world like Kazakhstan, roots can rich 5-8 meters. In case of Eastern Pamir, roots of young dwarf shrubs riches 80 to 130 sm depending on soil (Figure 3).

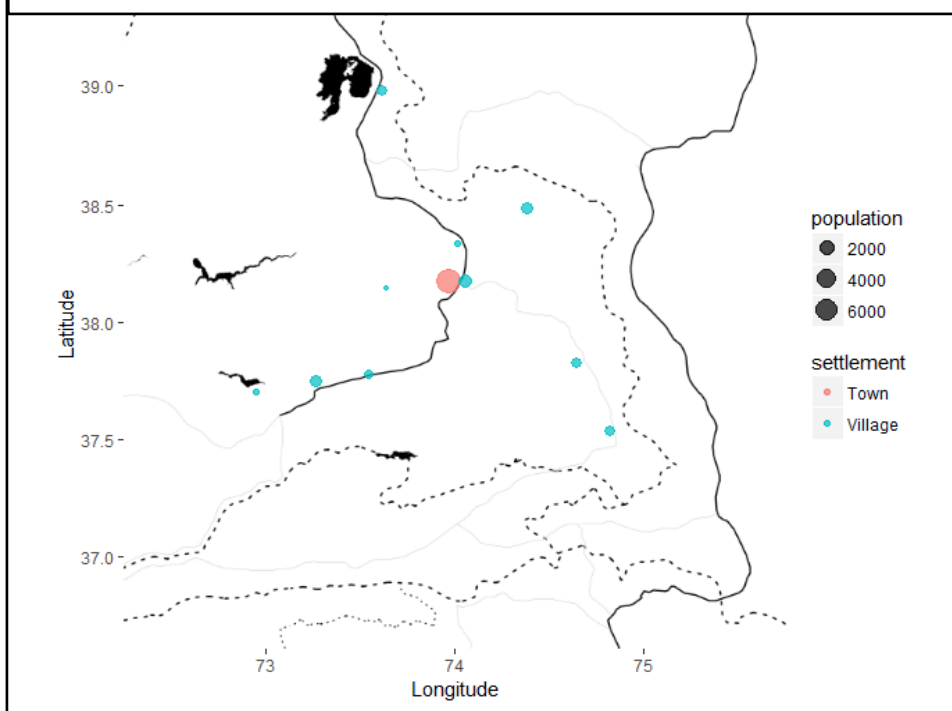
The Soviet scholars have noticed degradation since 1930s for several reasons. Pastoralism has been the major human activity in Eastern Pamir. It provided nomads with food, clothes and fuel. Besides cattle breeding, draft shrubs served as traditional biomass fuel and fodder for large mammals. All of the mentioned activates impacted on shrubby pastures.

Collecting and storing shrubs lead to degradation in Kara kul and Rankul, mentioned in 1930s. Although the main purpose of the book is to improve pasture condition in Eastern Pamir, the authors suggest that, for the past 100 years, pasture had already and heavily been impacted by natural and human factors (Yusufbekov H and Y, Kasach A.I. 1972).

Shrubby pastures are accessible and used whole year-round. In Eastern Pamir, dwarf shrubs main function has always been as fodder for grassing animals such as yaks, goats, sheep, and others. Productive of pastures always fluctuating depending on livestock breeding and various climatic zones. The authors suggest that even many bushy pastures are subject to degradation because livestock breeding, especially around the administrative centers and along the Pamir Highway derived from the Russian (Pamirskiy Trakt). Although in some territories where there is less snow, pastures are used completely year-round, it was observed that in remote areas of the Pshart valley almost 50% shrubs were unused. In winter pastures, shrubs play very crucial role because when snow falls, shrubs are the only visible fodder for yak keepers (Yusufbekov H and Y, Kasach A.I. 1972). This situation remains the same today.

2.2. Murghab District of Tajikistan

Today, Murghab district is one of the largest districts of the Gorno Badakhshan Autonomous Province of Tajikistan. Currently, 75 % of the population is Kirghiz and 25% is Pamiri (Shugni, Wakhi and Bartagni). The total population is around 15274 residents, half living in the main town and half living in six Jamaats (outside villages). Almost half, 7597 people live in the main town. Officially there are 6 Jamaats (administrative areas) but when consider shrub consumption, there are 10 villages where active consumption is under the process (Figure 4). Thus, in sustainability it is important to consider them all separately because each differ from each other. Each village has different number of shrub consumption, locations are different and territories of extraction (Figure 5).

Figure 4. Major Teresken Consumption Areas in Murgab District: modified by**Figure 5.** Total Population of Murghab District by Town and Village
(Murghab region statistical agency, May 2016)

	Name	Longitude	Latitude	Population	Settlement
	Murghab	73.97116	38.17692	7597	Town
	Kono-Korgon	74.06018	38.17705	1396	Village
	Toktomush	74.64779	37.83014	771	Village
	Shaimak	74.82256	37.53689	747	Village
	Chechekti	74.0127	38.34001	284	Village
	Rag-kul	74.3819	38.48722	1090	Village
	Kara-Kul	73.61476	38.98044	767	Village
	Bashgumbez	73.54131	37.78306	608	Village
	Madian	73.63592	38.14576	190	Village
	Alichor	73.26044	37.75118	1357	Village
	Bulunkul	72.94469	37.70426	240	Village

As we see in the map above, major consumption is taking place in the center of the district. It means that the town has more impact on pastures than outside villages. Outside villages are located far from the town. There is only one Kono-Kurgan village that creates competition to the main town. They both need to share the pasture both for fuel and grassing their animals. Due to high demand of shrubs, high consumption of shrubs, and large number of specialized suppliers, first challenge for the management of shrubs should begin from the town. Out of total population, 6533 people are unemployed including women. Since women does not collect teresken anymore and it is physically difficult, 3260 man have capacity to be a collectors (Figure 6). However, not all the 3260 man belong the identity of plant collector and it is a question of identity. There are about 7 neighborhoods in the town, each comprises 15-40 people who belong to the professional plant collectors, including transport providers.

Figure 6. Demographic Information: Murghab region statistical agency, <i>May 2016</i>					
Population	Male	Female	Age	Total	
Murghab	7618	7656		15274	
Children	1166	1191	0-6	2378	
High School Student	1707	1745	07-17	3485	
People with working ability	4611	4714	17-45	9411	
Employed	1409	1442	25-45	2878	
Unemployed	3260	3273	N/A	6533	
Pensioners	1172	1197	45<	2390	
Temporary absent	948	575	N/A	1523	

Two phenomena are commonly foregrounded in scholarly work about the region: the lack of resources and Russian colonization. Due to the climatic conditions that are not suitable for agriculture, pastoralism has been always main the human activity in the Eastern Pamir. Pastures are extensively used by Kyrgyz herders in this region. Although there are many disputes

about when people started living in the Eastern Pamir. Some scholars argue that nobody was permanently living in the area before the 19th century, except for Pamiri Kyrgyz nomads breeding yaks, sheep and goats. Besides pastoralism, they have been supporting their livelihoods through exchange with traders from Kashgar, the Western Pamir and Osh (Kraudzun, 2012).

The Soviet Union passively affected people's lives, especially in the Eastern Pamir. Collectivization, the promotion of education, media development, pasture regulations, improvement of transportation, and industrial development thoroughly transformed ways of life. To improve the accessibility, the Pamir Highway referred from Russian (Pamirskiy Trakt) was constructed in 1931s, starting from Osh, Kyrgyzstan, to Khorog City passing through Murghab. To increase literacy among nomads, a first school started working with forty-two children (internats) from 1928 to 1931. In terms of media, the first newspaper "Chygush Pamir", known today as "Sary Kol" started being publishing. In 1965 the first hydropower station, named "Ak-Syy", along with diesel generators was established in Murghab. Moreover, transportation and services were further improved. In 1975, the Murghab Hotel was constructed, and in 1979 flights between Dushanbe and Murghab (Taipov, 2002).

The breakup of the Soviet Union affected the region very negatively. The Soviet Union stopped providing coal, oil, and food. This resulted in increasing poverty and an energy crisis, especially in Murghab District. Healthcare, schools, and other public organizations suffered a lot because of this lack of energy. On top of this double crises, Tajikistan descended into a Civil War (1992-1997). After all these difficulties, president Emomali Rahmon sought help from international organizations like Red Cross, USA Aid in the USA, Canada, Holland, EU and many other. Between 1992 and 2002 international organizations and especially the Aga Khan Foundation started providing aid. The Aga Khan Center in Dushanbe was established in 1994 and in 1997, the Aga Khan started social, economic and cultural projects such as MSDSP – the Mountain Societies Development Support Program (Taipov, 2002).

2.3. Scientific Studies of Teresken

Teresken of Murghab district has been attracted western scholars since the emergence of this problem. Western scholars have contributed much in researching vegetation, climate social and even special aspect of this case. Although pastures play essential in Tajikistan's economy providing direct income for more than 80% of people leaving in rural area, especially in Murghab district, people depend on pastures paradoxically, fire wood and fodder. Both aspects equally important and study focused on pastures and livestock has confirmed the interdependent use of pastures between harvesters and livestock breeders (Kim André Vanselow, et, al 2012).

Today, local habitants currently experience heavy dependency on natural resources. When the Soviet Union broke apart, political and socio-economical frameworks, as for many other places, changed and state provisioning ceased abruptly. During the Soviet era, energy demand was supported by the State through imported coal, diesel generators and mini hydropower station. Alternative energy sources has always been subsidizing shrub usage (Figure 7). After the collapse, this supply of energy came to a halt. On an individual as well as a collective basis, locals started collecting plants, teresken (*Krascheninnikoviaceratoides*) and shybak (*Artemisia*) in the region in order to heat their houses and to cook. The problem was labelled as “teresken syndrome” by some scholars (Breckle and Wucherer 2006).



Figure 7. *Historical energy usage Murgab District.* Source: Tobias Kraudzun. Central Asian Survey. (2014)

To mitigate the failure of old the Soviet hydropower station and continuing massive harvesting and ecological degradation, international organizations started projects such as

thermal insulation of houses and micro-credit schemes. This has done little to improve the situation. Furthermore, in 2004 solar panels and energy saving LEDs were introduced when the Kumla pass opened between China and Tajikistan. Like many poor regions of the world, people of Eastern Pamir widely started using 12voltage solar charging a storage batteries, which replaced smoky kerosene lamps (Figure 8.) However, solar batteries cannot simply replace shrub harvesting because it cannot heat house or cool food but it is just enough for lighting. Later, people learned to use a mix of energy sources, including animal manure and imported coal from the Alai in Kyrgyzstan. This has minimized the pressure on shrub use much more than anything else. Later work shows that the current land degradation is less severe more stable than before (Kraudzun, et, al. 2014).



Figure 8. Introduction of Solar batteries to Murgab District since 2004. Source: Tobies Kraudzun 2014.

Since then, despite stable degradation, people still depend on shrubs in main town and outside villages. Realizing the unending dependency on firewood, later scholars turned their attention to sustainable management of mountain commons. Scholars have tested statistical models or remote sensing to map shrub vegetation. Remote sensing technology is usually used to determine various types of forest vegetation covers but in case of applying it to detect shrubs cover in Murghab district was quite an ambitious and exiting goal. Testing it, the scholars had concluded that, “the study underlines the difficulty of predicting vegetation parameters under

arid conditions with sparse vegetation cover, even with a spatial resolution of $6.5 \text{ m} \times 6.5 \text{ m}$ and the red edge band (RapidEye). Future studies should therefore consider technical innovations, such as hyperspectral data, to achieve better performance” (Kim André Vanselow and Cyrus Samimi 2014).

Inspired by this remote sensing technology, further re-try testing was conducted in order to calculate the total biomass vegetation cover using two suitable model of satellite based predictors (Landsat OLI and Rapid Eye). Although some of the lenses helped to visualize vegetation cover, it still lacked best performance. According to authors, “study showed that remote sensing based mapping of dwarf shrub TB is possible even under conditions with extremely low vegetation cover, although the predictions are subject to substantial uncertainties” (H. Zandler, et, al 2015). Photos bellows shows one of the best performing models of variation cover in Eastern Pamir (Figure 9).

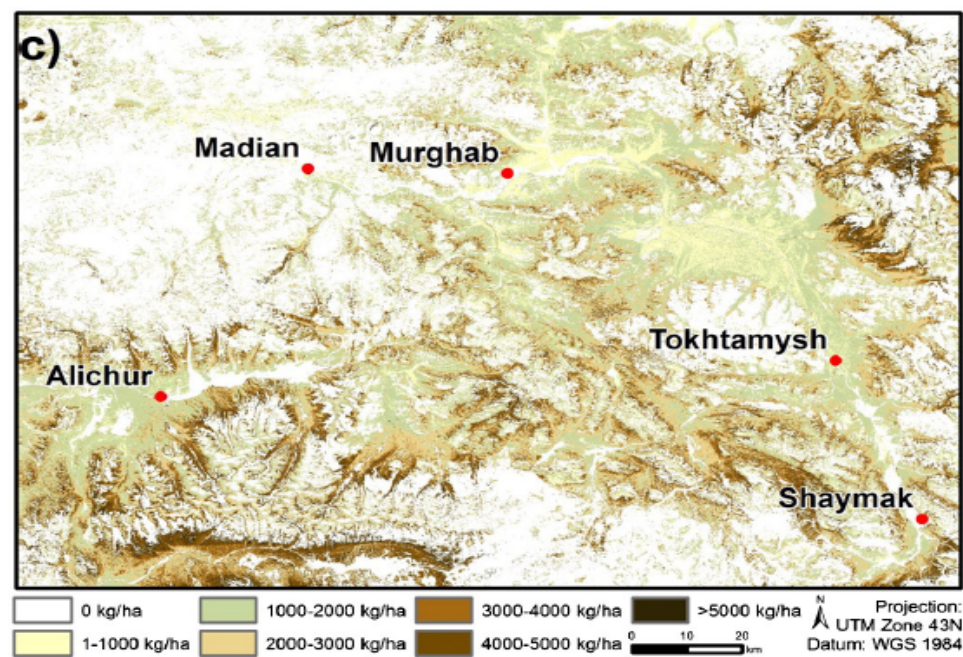


Figure 9. High resolution satellite based remote sensing image. Source: Remote Sensing of Environment “Zandler, Harald, Alexander Brenning, and Cyrus Samimi. (2015): 148.

Thus, seeking solution thought remote sensing still in process whereas other scholars focused on interdisciplinary analyzing approaches, local energy poverty index, to study energy practice s, especially mix energy. The study was conducted in Alichor village, where local energy mostly meet by animal

mature and shrubs. This study suggested that in the village 60% of total population were energy secure, 25 % threatened by energypoverty and only 15% people were energy poor. This study points out that decreasing access to dwarf shrubs in the future threatens those energy poor and energy threatened people. As consequence, if access to shrubs becomes difficult it decreases energy security up to 30%. This recent study forecast hypothesis that availability of shrubs and increasingly difficult accessibility may destabilize the energy security (Georg Hohberg, 2015). The study can help us to understand energy security only outside village of Murghab; however, outside village are far behind from the harvesters of main town in term of experience. If today, as they harvest, harvesting distances is getting further and further for outside village, in Murghab's case, closes territories are being re-harvested for the third time during the past 25 years. It means harvesters somehow were able to give time for regrowth of shrubs. This is where we must turn our attention to the roles of these harvesters and their interaction with plant use. Examining interactions with more experienced harvesters of the main town will contribute to sustainable use of shrubs not only Murghab inhabitation but also outside villages.

2.4. Methodology

After the review of existing literature and the study of historical sources, I have combined the chosen theoretical concepts to a research design. Examining previous articles on the subject areas, energy issues in local context, helped me to build or formulate questions that are targeted to natural resources management and sustainability within the local context. Examining historical sources of study areas helped to understand cultural, historical and social-political situation of the case study. Examining the literature on world experience or worldwide concepts and theories helped to understand the case study.

First research was carried out between July and August 2015. Considering ethical questions, I informed the tereskenchiler about the goal of the study. More than 80 people were interviewed, including key players. Most of the interview questions referred to times and places of teresken harvesting, experiences, behaviors, opinions, values, feelings, and local knowledge. The research design included oral history interviews with elders in order to understand resource use in Pre-Soviet and Soviet times. I have examined local values, feelings and experiences of shrub collectors based questions and compared them with the literature findings.

A variety of ethnographic methods were used in the field, including structured interviews, participant observation, and photographic documentation. Since the community of the terkenchiler is relatively small, snowball sampling and applied multiple samplings (regional, random, dimensional, and stratified) were employed. Although such anthropological approach does not provide science based solution to environmental issues, it certainly contributes to understanding of human nature relationships.

Realizing the possibilities of sustainable shrub harvesting during the first field work on the base of anthropological approach, there was a need to develop map which would allow harvesters visually to orientate themselves. Since many local harvesters rely on traditional way of orienting themselves in those vast territories, collected geographical names and informal territorial knowledge was recorded. From the regional development filial ACTED (Agency for

Technical Development and Cooperation), I requested a map which was developed for pasture user in order to show how similar map should be developed to shrub collectors. This map helps to support the point that local people could use shrubby pastures sustainably.

Now that there was a need for statistical data to determine shrub use among different harvesting practice s, second data gathering was arranged from July to August 2016. I was not able to gather whole year seasonal shrub extraction and consumption but gathered data only for the summer period 2016. Harvesting groups had voluntarily filled a monthly diary, June, July, August-2016, the amount of dwarf shrubs for summer period. This was the third fieldwork during the second fieldwork. After the collection of data, by using R Studio statistical software program, survey data has been converted to bar chart to visualize the variables. Thought this method, we can calculate all year round shrub extraction and demand. This helped us to see which practice s are the most active and which passive. In addition, by using R Studio statistical software program, I have created a map showing the shrub consumption spots by population. The population and demographic information was gathered from the regional statistic agency of Tajik republic in May, 2016.

In addition, the ethnography was very important component of this work because the study of shrub collector's knowledge is place based, empirical, cumulative, and adaptive. Place based mean that we chose certain area and study only that context. Empirical method means the idea of observation or empirical evidence. The cumulative method suggests that the knowledge of target group has been cultivated and accumulated over a certain period of time. Thus, the knowledge of collectors or any other indigenous knowledge is subject for adaptation. The knowledge is adaptive and relevant to certain condition. The flowing methods are used in the study of human plant relations in post-colonial and post-soviet space.

Chapter 3

Results

3.1. Energy in local context: development of identity

Teresken is a general term used for widely growing shrubs in Murghab and mostly associated with (otyn), traditional biomass energy and fodder resources. It is valued as one of the (Gayp) common pool resources. Main function of shrubs has always been tuturuk – fire starters. Since they burn quickly, tezek- dried yak dung, chym- piece of grassland, and korosho- not artificially pressed manure were main energy source prior Soviet era. People had no idea about coal⁸ before the 1960s. Even the kyk-artificially pressed manure, emerged later in 1970, was unknown to locals. Burning them was considered as primitive because of samaz- gas until they finally learned. Thus, shrubs always remains as alternative energy option.

A person who harvests teresken is called tereskenchi, an identity named after teresken. However, terskenchi is a recently developed term. The original term was termechik – picker. The term ter means to collect but not extract. Before the sedentarization of nomads, especially children and women served as a termechik. They collected kakmach – any dead teresken unrooted by flooding. It was all about kynyndyk- meeting daily demand by feet or donkey. Seasonal migration from valley to valley always provided with kakmach and alternatively tezek – dried yak dung. Therefore people were energy secure. Collecting kakmach is still possible today but only in remote valleys. Ripping shrubs began with the introduction of uchpul – long wooden sticks used to dig out the roots. Willow trees widely grow in western Pamir. Today, metal sticks called lom replaced the woody stick and are still the tool of choice among contemporary harvesters.

⁸ Interview from Kalandar and Mitalip aksakals, Bash Kyshtak, Murghab June 2015

3.2. Terskenchi as a profession: normal activity

To become a terskenchi is not an easy task. One must know how to harvest, what to harvest, where to harvest and with what practice and finally believe in certainty. Once you are in the field, extraction begins. Before harvesting, the distance between extractors must be far away. This prevents overharvesting. After displanting, the plants need to be shaken. This is important to release the seeds, which allows the shrub to regrow. Other factors of such as target and locations will be considered later. Once 150 to 250 plants are collected, the process of making bundles (tendoo) begins. The shrubs are stacked with their roots facing alternate directions. This helps balance the bundle. Once the bundle reaches the right size, it is tied up with wire for safe and balanced transportation. It takes between four and seven hours to harvest two to five bundles (Figure 10)



Figure 10. Old and young terskenchi from Murghab, Tajikistan

Being able to assess the quality of the woody biomass is crucial for collecting. Quality is more important than size. To determine quality one must know the different types of shrubs: kowrak, kara shybak, karga tyrmak, kok shybak, sary syigek, teresken, koi shybak, jylky shybak, kyzyl tiken, sary jygach and kurtka. Kowrak, kara shybak, kok shybak, koi shybak, jylky and shybak are subspecies of *Artemisia* (Figure 11). Sary jygach, sary syigek, and karga tyrmak are

the species or subspecies of *Eurotia*. *Teresken* mostly commonly refers to *Ceratoides*. *Kyzyl tiken* and *too shyabak* are species or subspecies of *Acantholimon*. *Tereskenchiler* categorize shrubs according to their burning power. The best shrubs are *korak* and *kara shybak*, which burn like coal. They have thick roots. *Karga tyrmak* and *teresken* burn almost equally well but *karga tyrmak* is darkish. All other types are of lower quality. After all there is the large vocabulary and specialized knowledge that is required to manage efficient harvest.



Figure 11. Collection of dwarf shrubs in Biological Station in Chechekty. June 2015.

In addition to type, location plays a huge role in finding the right shrubs. One must know the distribution of the different shrubs and their locations in order to become a professional collector. There are concrete steps to get recognized as *tereskenchi*, based on the knowledge of the shrubs and of the environment. Without detailed knowledge of this geography one will never find the valleys with plentiful high-quality shrubs. Over all, there are more than 25 main valleys for collection, each with ten or more small side valleys. Within these small valleys, the sun-facing side (*kyngoi*) is distinguished from the watershed (*sai*) and the shady opposite side (*teskei*).

As it was mentioned, biodiversity, flora and fauna all located in various valleys. Valleys contain resources like *terksen* and grassland. Thus, territorial knowledge becomes very important to herding, harvesting *teresken*, and hunting for wild animals. This year, the filial of ACTED (Agency for Technical Development and Cooperation) in Murghab has developed a map for

pasture users on the base of using local orientations (Figure 12). Using QGIS the map was modified based on shrub collectors' location knowledge. However, energy sufficiency is seen as a more pressing issue than cattle breeding in Murghab⁹. There is completion between shrub collectors and pasture users. For this reason this research prioritizes energy to cattle breeding. However, ACTED's pasture initiative does not include terkesken collectors. If such map will be developed, there is a much possibility to sustain shrubs with the involvement of collectors. Problem is that, today, harvesters are functioning informally and as an informal institution.

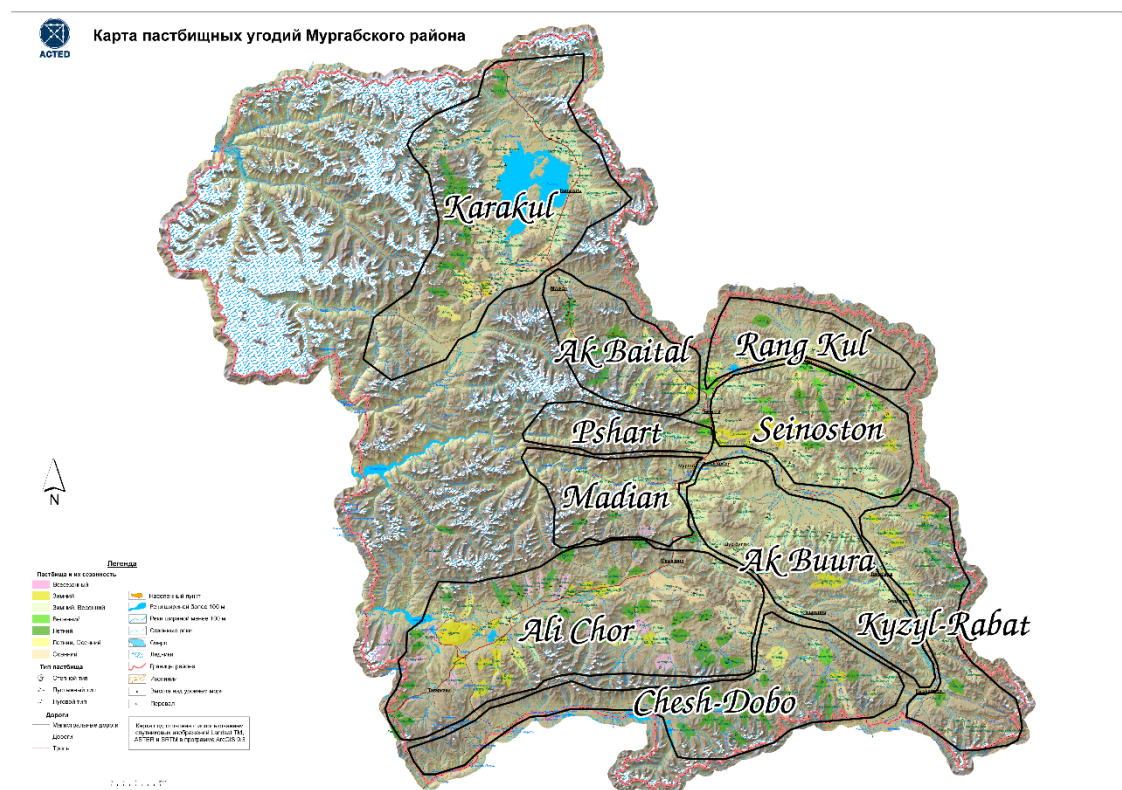
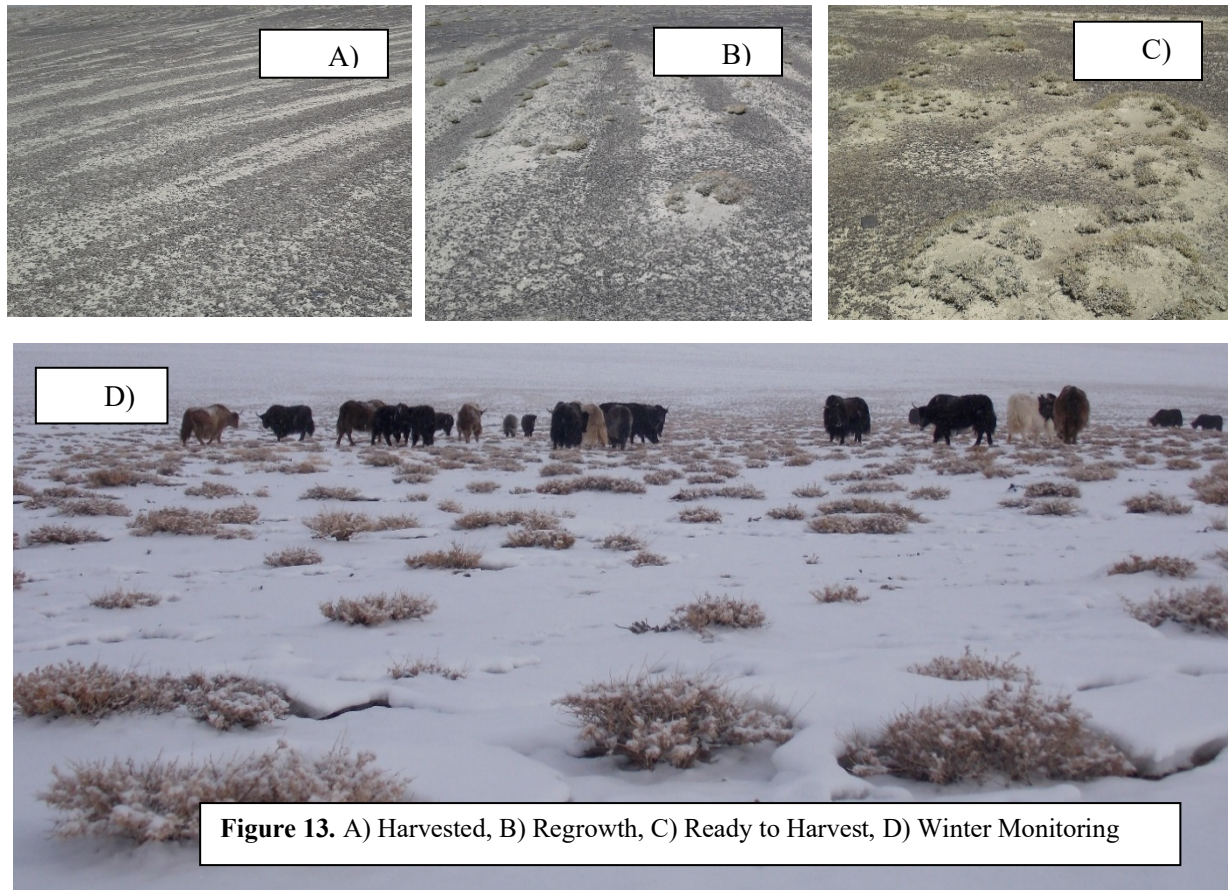


Figure 12. Pasture user's map developed by the ACTED; modified by author, Murhgab 2016

Location determines the distribution of different shrubs. For example, demand for korak, kara shybakm, teresken and karga tyrmak is huge. Koorak can be found in Bodo and Seinoston. Kara shybak and kok shybaks are prevalent in the Alichur region, particularly in the valleys of Ak Jar, Tylpar, Kara Jylga, and so on. Such knowledge is crucial for harvester. In addition, mobility of people living in Murghab allows them to evaluate the carrying capacity or determine

⁹ Interview of Teresken Collectors, Summer 2015

the areas with abundance in winter period. When snow falls, December and January, this is a perfect time to determine in which valley there are abundance (Figure 13). Information about resources travels and people are informed in which valley there abundance.



3.3. Functions of different energy supply practices

In addition to detailed local geographic knowledge, collectors must learn how the different informally organized practices of collection work. Today, tereskenchiler are located in different parts of Murghab, with Kopuro Bashy, Jar-bashy, Bash-kyshtak, Keshte Kyshtak, Nagornyi and Mogylevka being the main neighborhoods. In the begging when shrub collection began, almost all males were belonging to the identity of tereskenchiler. As the times passed this activity become profession only for small number of people. Due to unemployment and lack of ability to perform other casual jobs and older age (over 35), some males stayed in this career and specialize it. This is what makes them terskenchi than others. All tereskenchiler started their career during the crisis that followed the breakup of the Soviet Union. Remarkably, different

practice s of social organization have emerged among harvesting groups few years after the collapse. These practice s are called kynymdyk, ashar, zagotovka, nochevka, and brigadier. These informal practice s of social organization play a crucial role in harvesting practices.

Kynymdyk – “daily bases” – and ashar (1st meaning) – mutual deal – are local and sustainable practice s. In the kynymdyk practice individuals or groups go to a particular area for a single day. Many harvesters practice kynymdyk, especially in winter. In one day, a terskenchican bring 4-5 ten or bundle, contains random size of 150-to 200 shrubs 20-25 kg, by feet by donkey and by motorcycle and mini trucks today. The informal institution of shrub collectors is not getting better but in constant. These practices can be observed in summer pastures today. If a person does not have gasoline or money, he can go for the ashar practice for free, which implies sharing half of one’s harvest with the transport provider.

What makes Kyrgyz named two practice s sustainable is the rotation between valleys that it implies. Not mentioning all groups and valleys, the main valley Seinoston (see on Map 3) is in its third time of being harvesting since the beginning by not only Bash Kyshtak but also other groups in Murghab. It is naturally that accessibility becomes difficult as they harvest only one territory¹⁰, therefore, mobility shifted from valleys to valleys. Currently, in summer, tereskenchiler venture out for such single day expeditions thrice per week or thirteen to fifteen days per month by mini truck. By the time group makes a cycle, harvest in several valleys, it gives enough time for the first valley regrowth. They argue that “suu ele bolso teresken osot birok kichine- as long as there is enough snow and rain it will regrow but not fully.”

There is a second meaning of ashar – mutual help – which denotes a slightly different practice that could be unsustainable in the Murghab region. Anyone who has access to gasoline can organize ashar without participating. Here, tereskenchiler are paid with transportation services for collecting shrubs. Instead of harvesting oneself, the ashar organizer just tells the driver to bring him shrubs. In Murghab, this has become an easy way to turn gasoline into

¹⁰ This refers and contributes the discussion on energy poverty analysis in Alichor village of Murghab and further (Hohberg 2015)

shrubs. This version of the ashar practice may not be sustainable. Ashar in this second meaning of the term puts responsibility on the harvesters. In the case of villages like Kara Kul, Rang Kul, Alichor, Bashgumbez, and Kono Korgon, this is not problem. Less pollution, more accessibility, less demand, and abundant shrubs allow more energy security.

3.4. Emerging Russian named energy supply practices

The third practices is nohevka – camping for server days. It emerged during imperial times and is again practiced today. The nohevka practice is usually followed when tereskenchiler venture into remote valleys like Ak-buura, Chesh Dobo, or Pamyl. Sometime, tereskenchiler practice nohevka without a truck but with light vehicles and equipped just with tents and wires for bunding. They harvest 30-60 tens per person over the course of several days which are then picked up by a big truck. Some tereskenchiler harvest primarily for themselves while others do it commercially, supplying local markets. When tereskenchiler embark on nohevka, they try not to interfere with kynymdyk, because those regrown shrubs are too small for them and it is not efficient. This is the reason why far-away places with bigger shrubs are usually preferred. However, there are people who started already harvesting close areas, which seems little controversial for kynymdyk.

If this trend continues, the practice of nohevka is probably sustainable because it targets areas not usually harvested under logic of other practices. For example, two groups from Jar Bashy neighborhood practices a nohevka practice; it includes a skakals (elders) and young people. Sultan Aksakal together with men of his age (kary kartandar) established its own group of collectors; they are all over 50. As he himself puts it, “We cannot compete with the youth because we are now getting older. We cannot collect like these young people. My team comprises only old Aksakals. We get shrubs only for domestic use, cooking and heating. Thus, we have created our own group. We often visit Shakarak, Bodo and Min gajyr. We take our time and harvest as much we can, depending on our physical ability”.

Apart from *nochevka*, there are two other organization practices bearing Russian names: *zakatovka* and *brigadier*. They have emerged around 1925s and had a commercial background back then. Local representatives of Soviet administrated organized collective harvesting. According to Kraudzun (2014), *teresken* played an essential role in supplying the Soviet administration until the 1940s. In two areas, *Ak –jar* and *Ak-tash*, *brigadier*-responsible bodies organized group harvestings for certain purposes. In *Ak-jar*, near *Alichor* village, people had a *brigadiers* that would organize *zagotovka*-collecting and saving, for local the *internets*. It was the time of WWII, when man had gone to war and to secure local internet's energy, *brigadiers* organized group harvesting for women. *Brigadier* practice was very active in *Kuno Korgon*, before the war. They used shrubs to create cement through burning local rocks. It was organized in groups. *Brigadier* practice re-emerged after the end of Soviet Union but did not function longer. However, *Brigadier* practice emerged and disagreed in 2007 because of mobile phones. No body needed *brigadiers* any more. Drivers have replaced them today. It was an example of how technology impacts our life, even resources. Currently, *nochevka* is the only prominent practice under the practice. It is sustainable only if it does not interfere with *Kynymdyk* practice and harvests far valleys.

Tersknechiler organization is very informative about each neighborhood's *tereskenchiler* and place where they visit. Groups from each neighborhoods try not interfere with each other. There is little interaction because harvesting practices correlate with different neighborhoods, truck drivers, and locations. Only in a few instances, there are two vehicles visiting one main valley, but even then they usually harvest different hills, *kyngoi* and *tersekei*. *Bash-kyshtak*, *Keshte Kyshtak*, *Mogylevka*, *Nagornyi* have their own drivers and harvesting locations. *Keshte Kyshtak* often collects in *Seinoston*, *Ak buura*, *Kyigon Otok*. *Mogylevka* and *Nagornyi* visit *Sary jylga*, *Sasyk* and *Ak baital* territories.

3.5. Economic pressure and interdependencies

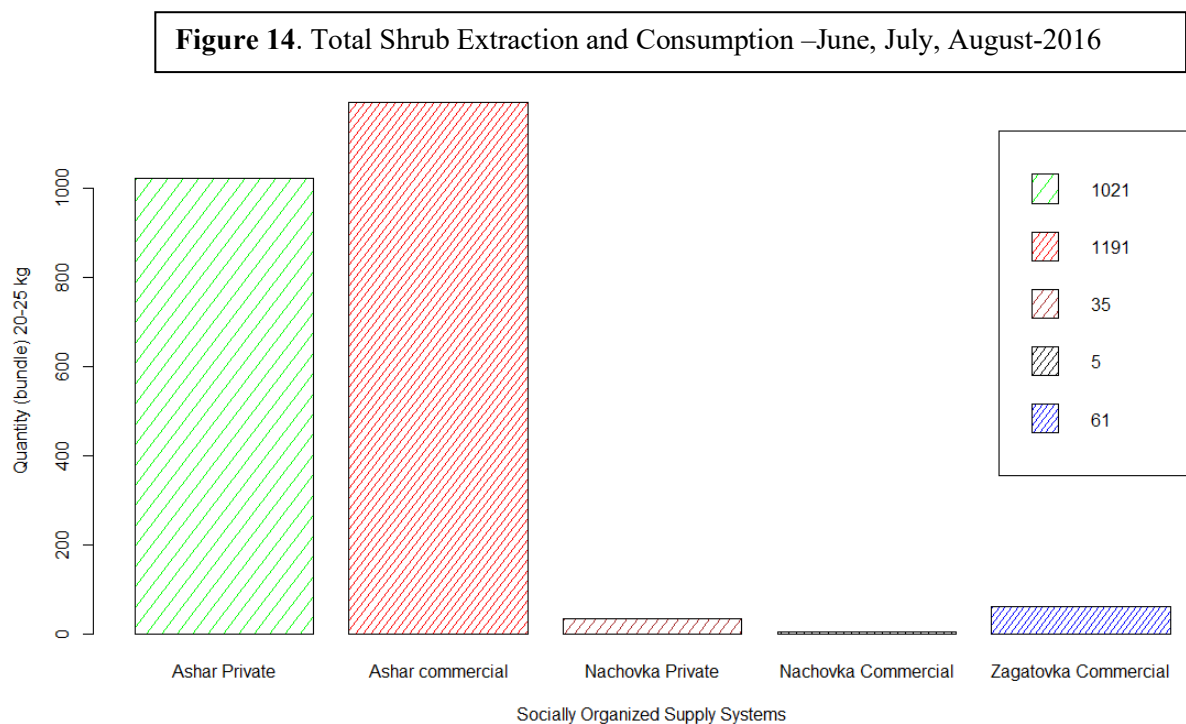
The economic pressure of harvesting teresken as a business in today's situation recently intensified the impact of collection on the teresken vegetation. Tereskenchiler and cattle breeders quite often are in conflict with each other because of teresken. These conflicts may not be noticed in the villages, but they are acute in the active harvesting locations of Murghabi tereskenchiler. For example, Ak buura, Ak baital, Rang kul, Seinoston are places quite often mentioned in relation to conflicts between tereskenchiler and cattle breeders. The reason is that in winter, cattle breeders come down to their winter pastures (kyshtoo). Their winter pasture are located in places where there is less snow and closer to Murghab. Tereskenchiler, also prefer such drier places, which are often close to winter pastures. This is where, sometimes, clashes take place. When the cattle breeders are on their summer pastures (jailoo), some tereskenchiler practicing the nochevka practice rush into winter pastures. Kynymdyk is not a problem for pasture users but nochevka. Tereskenchiler consider the conflicts as ach-kozdyk, rich pasture users (bai) are too avaricious or avid. Tereskenchiler argue that pastoralists have nothing to worry as they have full-time access to energy provided by animal manure.

3.6. Complexity and Commercialization of supply practices

Although tereskenchiler feel certain about their energy future, today, 'local knowledge' (which helped reactivate teresken harvesting) is losing ground against the commercial interests shrub consumers. We see the systematic changes and benefits of each practice in complex form. People with gasoline and money have capacity to turn gasoline into shrubs and they are the driving force of nochevka practices. Second most benefit is in the hand of nochevka and (ashar second meaning). Because they bring a lot in once, it limits the market of kynymdyk who gets little or no benefit. Since Kynymdyk benefit way less than nochevka, meeting public demand with nochevka simply challenges the kynymdyk. They cannot sell their few bundles. Nochevka for personal use is okay but not for the market. Moreover, it is important that nochevka must not involve with Kynymdyk and remain harvesting in remote valleys. Finally, public realization of regrowth, cycle harvesting, and knowledge of harvesting, proper practiceatic functions is

important in contribution sustainable shrub harvesting. It is clear that demand for teresken is changing practices of proper function.

This summer I have analyzed the existing practices by using R statistical program. From June to August- 2016 collectors have taken notes. They noted how much they harvested and with what practice. The main practices were, Ashar Private Demand, Ashar Commercial, Nochevka Private Demand, Nochevka Commercial and Zagotovka Commercial. Result of this data analysis suggest that it is possible to calculate the whole energy demand. The Practices helps us to calculate and even to show the difference in extraction and consumption. However, my research had a limitation because it was only organized for three month. These three month data collection suggest that tereskenchiler supply the public demand more than their own needs. Public demand is higher than private. Since summer period is working season harvesting rate is smaller than other season. This is why only the Ashar practices were active in summer (Figure 154). There is a need to organize such data analysis for the all year round in order to have clear data.



Conclusion

Since the extraction of shrubs continues in Murghab district, in recent years massive harvesting has shifted from collective (all the males of Murghab) to certain dedicated groups of shrub collectors who today, as an informal organization, supply local energy demand. Main objective of this paper was to focus on these key energy suppliers and study their relations with commons, targeting for sustainable shrub managing of the local commons. After all the paper concludes that commons could be used in sustainable way only through well-managed practices of social organizations based on harvesters' previous experience and knowledge. However, rationales of development intervention, economic pressure and changes in informal practices creates obstacles to achieve sustainable harvesting. The theory of resilience was used as a main theoretical frame. The resilience ability of plant collectors can be best solution for energy sustainability of the region.

Examining the context, it showed how the degradation of shrubby pastures has emerged. After showing the problem, it raised the main question how to reduce shrub harvesting. Then it studied previous studies on energy crisis and background information about post-soviet space, geographical background, historical background, previous researches on shrub issue, and methodology.

The rest of the article focuses on results such as historical usage of different local energy alternative sources and role of shrubs. Extract evolved simply from picking dead biomass, which later transformed into massive ripping of shrubs. Thus, later it became an identity and profession. We have explained what it takes to be shrub harvester and emphasized the knowledge that harvesters developed. Knowing different types of shrubs play essential role in identifying right shrubs. Further, we explained how informal location, as best orientation, contributes to maintain balanced harvesting from valley to valleys, so called cycle harvesting. In terms of social organization, we mentioned kynymdyk, ashar, zagotovka, nochevka, and brigadier. Among them, we explained how the brigadier practice have emerged and disappeared due to the

introduction of mobile phones. We maintained that kynymdyk and ashar (first meaning) practices as sustainable because of less benefit and daily demand, and cycle harvesting. In addition, regrowth of shrubs and strategy is also explained.

Since different neighborhoods practice different practices, we have suggested how ashar practice (second meaning) and nachevka could be unsustainable and how its interference with kynymdyk's territory might disturb cycle harvesting and intensify competition between pasture users. Thus, we suggested that nachevka's share in market creates challenge for kynymyk. Therefore, Commercial interest of harvesting groups driven by nachevka puts pressure on sustainable systemic use of shrub harvesting.

Further Questions

- Do locals extract more or less than carrying capacity or reserved shrubs within their radius?
- Whole-year round extraction data must be collected in order to see the difference in different supply practices by seasons.
- The share of territories and conflicts between pasture users and shrub collectors must be studied.

As for recommendations, the development organizations in the region and stakeholders could work with shrub collectors and aim for better resources management in the region

References

- Alcorn, J. B. (1996). Is biodiversity conserved by indigenous peoples. *Ethnobiology in human welfare*, 233-238.
- Breckle, S. W., & Wucherer, W. (2006). 16 Vegetation of the Pamir (Tajikistan): Land Use and Desertification Problems. *Land Use Change and Mountain Biodiversity*, 225.
- Bussler, S. (2013). Community based pasture management in Kyrgyzstan. A pilot project in Naryn region. Bishkek. GIZ/CAMP Alatau.
- Brockington D (2009) Community Conservation, unreality and conservation: myth of power in protected area management. *Conservation and Society* 2(2), 411-432
- Brockington D, Scholfield K (2010) The Conservationist Mode of Production and Conservation NGO in sub-Saharan Africa. *Antipode*, 45 (3), 411-432
- Brown, J. C., & Purcell, M. (2005). There's nothing inherent about scale: Political ecology, the local trap, and the politics of development in the Brazilian Amazon. *Geoforum*, 36(5), 607-624.
- Collier, S. J., & Way, L. (2004). Beyond the deficit model: social welfare in post-Soviet Georgia. *Post-Soviet Affairs*, 20(3), 258-284.
- Dasmann, R. F. (1991). The importance of cultural and biological diversity. *Biodiversity: culture, conservation, and Ecodevelopment*, 7-15.
- Dunmore, Charles Adolphus Murray. (1893). The Pamirs: being a narrative of a year's expedition on horseback and on foot through Kashmir, Western Tibet, Chinese Tartary, and Russian Central Asia. London.
- Duming, A. T. (1992). Guardians of the Earth: Indigenous Peoples and the Health of the Earth. *Worldwatch Paper*, (112).
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. *AMBIO: A journal of the human environment*, 31(5), 437-440.
- Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological practices analyses. *Global environmental change*, 16(3), 253-267.
- Gadgil, M. (1985). Cultural evolution of ecological prudence. *Landscape Planning*, 12(3), 285-299.
- Gans-Morse, J. (2004). Searching for transitologists: contemporary theories of post-communist transitions and the myth of a dominant paradigm. *Post-Soviet Affairs*, 20(4), 320-349.
- Holling, C. S. (1973). Resilience and stability of ecological practices. *Annual review of ecology and practice*, 1-23.
- Hohberg, G. E. O. R. G., Kreczi, F. A. N. N. Y., & Zandler, H. (2015). HIGH MOUNTAIN SOCIETIES AND LIMITED LOCAL RESOURCES—LIVELIHOODS AND ENERGY UTILIZATION IN THE EASTERN PAMIRS, TAJIKISTAN. *Erdkunde*, 69(3), 233-246.
- Jones Luong, P. (ed.) (2004a) The Transformation of Central Asia: States and Societies from Soviet Rule to Independence, Ithaca: Cornell University Press.
- Kreutzmann, H. (2009). Transformations of high mountain pastoral strategies in the Pamirian Knot. *Nomadic Peoples*, 13(2), 102-123.

- Kraudzun, T., Vanselow, K. A., & Samimi, C. (2014). Realities and myths of the Teresken Syndrome—An evaluation of the exploitation of dwarf shrub resources in the Eastern Pamirs of Tajikistan. *Journal of environmental management*, 132, 49-59.
- Kraudzun, T. (2012). Livelihoods of the ‘new livestock breeders’ in the eastern Pamirs of Tajikistan. In *Pastoral Practices in High Asia* (pp. 89-107). Springer Netherlands..
- Kraudzun, T. (2014b). Bottom-up and top-down dynamics of the energy transformation in the Eastern Pamirs of Tajikistan's Gorno Badakhshan region. *Central Asian Survey*, 33(4), 550-565.
- McNeely, J. A. (1997). Interaction between biological diversity and cultural diversity: Biodiversity conservation and indigenous peoples: Competing approaches. *IWGIA document*, (85), 173-196.
- McAfee, K. (1999). Selling nature to save it? Biodiversity and green developmentalism. *Environment and planning D: society and space*, 17(2), 133-154.
- McCarthy, J. (2005). Devolution in the woods: community forestry as hybrid neoliberalism. *Environment and Planning A*, 37(6), 995-1014.
- Maanaev ED, Ploskikh VM (1983) Na ‘kryshe mira’ (Istoricheskie ocherki o pamiro-alayskikh kirgizakh). Mektep, Frunze
- Mostowlansky, T. (2011). Paving the Way: Isma‘ili Genealogy and Mobility along Tajikistan’s Pamir Highway. *Journal of Persianate Studies*, 4(2), 171-188.
- Prudham, S. (2009). *Commodification* (pp. 123-142). Wiley-Blackwell.
- Taipov B (2002) Sary Kol tarykhyndyn kyskacha ocherkteri. Murghab
- Vanselow, K. A., Kraudzun, T., & Samimi, C. (2012). Grazing practices and pasture tenure in the Eastern Pamirs: The nexus of pasture use, pasture potential, and property rights. *Mountain Research and Development*, 32(3), 324-336.
- Vanselow, K. A., & Samimi, C. (2014). Predictive mapping of dwarf shrub vegetation in an arid high mountain ecopractice using remote sensing and random forests. *Remote Sensing*, 6(7), 6709-6726.
- Verdery, K., & Burawoy, M. (Eds.). (1999). *Uncertain transition: Ethnographies of change in the postsocialist world*. Rowman & Littlefield.
- Walker, P. A. (2005). Political ecology: where is the ecology. *Progress in Human Geography*, 29(1), 73-82.
- Yusufbekov H. Y, Kasach A.I. (1972) Teresken na Pamire. Akademija Nauk Tadshikskoj SSR, Dushanbe
- Zimmerer K S (2009) Biodiversity. A companion to environmental geography. Oxford: Wiley-Blackwell. 50-65
- Zimmerer KS (2006) Cultural ecology: at the interface with political ecology - the new geographies of environmental conservation and globalization. *Progress in Human Geography* 30 (1):63-78
- Zandler, H., Brenning, A., & Samimi, C. (2015). Quantifying dwarf shrub biomass in an arid environment: Comparing empirical methods in a high dimensional setting. *Remote Sensing of Environment*, 158, 140-155.

