Management Options in the Buffer Zones of Protected Areas in the South Caucasus – Socio-economic and institutional Background and economic Preferences

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"Everything in this World and every Human Being in it is Everybody's Business"

William Saroyan

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Summary

The South Caucasus is a mosaic created of different cultures, political situations and an incredible variety of nature. Due to a very high number of plant and animal species, the Caucasus region is one of the biodiversity hotspots and allotted a markedly high priority for additional conservation measures. Implementing, extending and asserting nature reserves postulate significant costs in form of usage restrictions from local population living close to these areas, while the economic profiteers of biodiversity mostly are in countries of higher national income. As the South Caucasus is in a status, where the rural population is dramatically impoverished after the collapse of the Soviet System, any stringent restrictions on land use required by the establishment of protected areas is likely to meet substantial resistance. Subsistence farming became important for the rural population, therefore already existing protected areas opponents concerning the natural resource land and new established once have to handle situations of competitions of nature protection and human land use. In the present dissertation three empirical studies were made, which consider the issue of willingness-to-pay and willingness-to-accept for additional or less access to pastureland from different points of view.

The first study showed a large household survey conducted in Lake Arpi (Armenia), Samtkhe-Javakheti and Lagodekhi (both Georgia) in 2012. Average household data about employment work, farming, socio-economic information, living conditions and relationships towards the national parks were shown. The study introduced a choice experiment concerning a willingness-to-pay/willingness-to accept (WTP/WTA) for access to summer pasture, additional income sources and other natural resources. Additional income sources are bee-keeping/honey production training, cheese-production training and tour-guiding training. It is found that households of all regions are poor and have bad farming, infrastructure and utility grid supply. Land is the most competitive resource of protected areas and humans living in the buffer zones of these reserves. Summer pasture in all regions has high economic value, especially for subsistence income. In Lake Arpi WTP for 25% more access to summer pasture is 205 €, in Samtskhe-Javakheti 495 € and in Lagodekhi 99€ a year. WTP for additional income sources vary over the regions: In Lake between 35 – 61 € in Samtskhe-Javakheti between 92 – 106 € and in Lagodekhi it is 42 € a year. Tour-guiding training

is just significant in Lake Arpi. In Lake Arpi a WTA to accept a ban to collect wild plants exists with 302 € a year. People are dependent from natural resources for home consumption. In Samtskhe-Javakheti respondents would be willing to pay 1178€ a year to leave their StatusQuo. The CE is widely not influenced by gender. Age increases the WTP in Lake Arpi for a bee-keeping training and decreases the WTP for summer pasture and increases the WTP in Lagodekhi for cheese-production training about 2%. Higher education decreases the WTP for summer pasture in Lake Arpi and Samtskhe-Javakheti and increases it in Lagodekhi. Higher income increases WTP for additional income sources and reduces the WTA for a ban. Households know about see national parks close by as threat for their economic future.

The second study had focus on the regions Lake Arpi and Samtskhe-Javakheti. The national parks are twinning zones and were established together. It was analysed how attitudes of locals towards the specific national park influences the WTP/WTA of the choice experiment of the first study and where the attitudes come from. Female respondents seem to have more positive attitudes towards national parks, as well as older respondents. Higher education results in Lake Arpi in a better and in Samtskhe-Javakheti in a worse attitude. Mostly history of establishment is important for the attitude. Lake Arpi was created integrative and therefore results in a positive attitude; Samtskhe-Javakheti was established excluding locals from planning and results in a negative attitude. The WTP for additional trainings related to the national parks and biodiversity are increasing with having a more positive attitude. In contrast, WTA for access to summer pastures decreases. Integrating locals in national park management results in better attitudes and therefore lower compensation payments.

The last study examines the choice experiment referring other factors that have not been considered in previous studies: After the breakdown of the Soviet System little private land was assigned to the rural population of Armenia and Georgia. Inadequate land markets are existing in the countries and locals are dependent from communal pastureland. The influence of owning more private land and being less dependent from a communal good, which is competitive in the term of usage and protecting was analysed. Owning more private land decreases the WTP for additional summer pasture in all three project regions, while owning larger herds increases it. Most respondents wish to enlarge herds, but due to a lack of land and money, it is not possible.

The results showed, owning more private land decreases the WTA for a ban of collecting wild plants. Communal land is not only important as pasture, also for other natural resources for subsistence. Having larger herds reduces the WTA as these households have higher incomes and can afford goods. It also reduces the WTP for additional income sources; these are more likely interesting for people less dependent from livestock keeping but increases the WTP for livestock related trainings.

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List of Abbreviations

ASC	Alternative Specific Constant
BMBF	Bundesministerim für Bildung und Forschung
BMZ	Bundesministerium für int. Zusammenarbeit
CE	Choice Experiment
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CIS	Commonwealth of Independent States
DLZ	Deutsches Zentrum für Luft- und Raumfahrt
ENP	European Neighborhood Policy
ICDP	Integrated Conservation and Development Programs
IUCN	International Union for Conservation of Nature
KfW	Kreditanstalt für Wiederaufbau
MtNP	Mountain National Park
MtPA	Mountain Protected Area
mWTP	marginal Willingness-to-Pay
N	Number
NGO	Non Governmental Organisation
NP	National Park
NR	Nature Reserve
PA	Protected Area
ppp	purchasing power parity
R^2	Determination Unit
Sig.	Significance
USSR	Union of Soviet Socialist Republics
WTA	Willingness-to-Accept

WTP	Willingness-to-Pay
WWF	World Wide Fund
€	Euro

I Introduction and Project Background

When Norman Myers integrated the term „biodiversity hotspot" in 1988 (Myers 1988) surely it was not foreseeable that the criteria of hotspot will become one of the main international conservation approaches. In the year 2000 Myers et al. published about the concept of the hotspot conservation and figured out 25 places of the world as hotspots (Myers et al. 2000). The NGO Conservation International (CI) and the Critical Ecosystem Partnership Fund (CEPF) identifies nowadays 34 biodiversity hotspots but still the analysis is done with the criteria constructed by Myers et al. in 2000:

(i) A hotspot must contain at least 0.5% or 1 500 species of vascular plants as endemics

(ii) Just 30% of the primary vegetation stayed remained.

Myers stated that vascular plants are used as determinant as they are important for virtually of forms of animals life in addition to that already well-studied. The biodiversity hotspot criteria was furthermore mostly designed to give environmentalists an evidence where to invest their money, as not all places of the world can be protected the same way with donations. However, the biodiversity hotspot initiative is with 750 million donated Dollars the largest nature conservation project of the world (Myers 2003), even it is under criticism due to the inadequate representation of other species or the fact that loss of primary vegetation is more a statement of the past and not about the future threat (Kareiver & Marvier 2003).

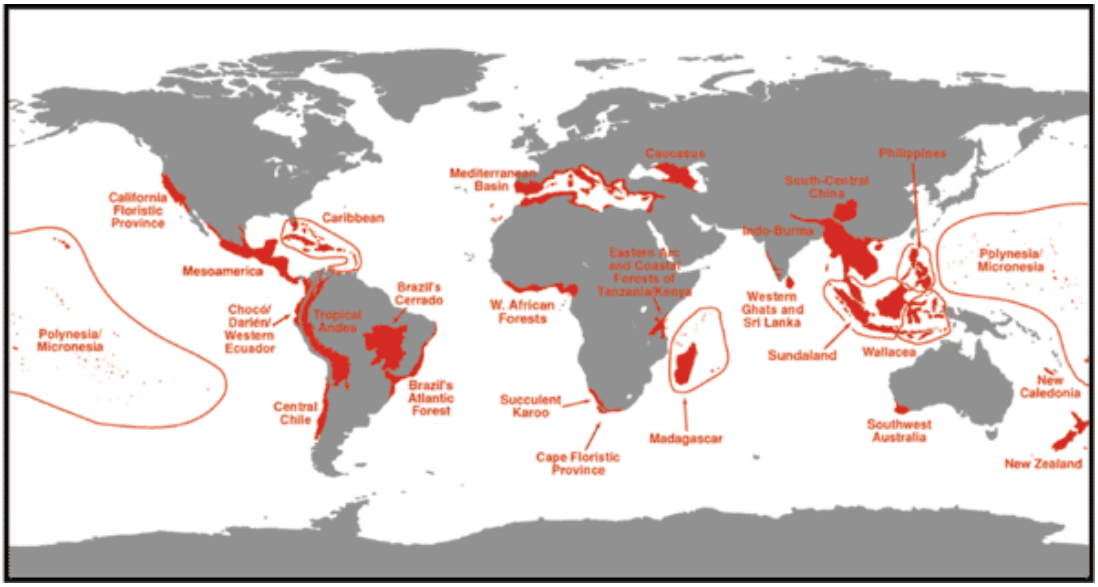

Figure I-1: The 34 Biodiversity Hotspots. Source: Conservation International 2005.

The biodiversity hotspots shown in Figure I-1 just cover 2.3% of Earth's land surface, but they support more than half of the world's plant species as endemics and nearly 43% of bird, mammal, reptile and amphibian species as endemics (CI 2015). One of these hotspots is the Caucasus region.

Figure I-2: The Biodiversity Hotspot Caucasus. Source: Caucasus Nature Fund 2015.

The Caucasus hotspot (Fig. I-2) includes the total area of the three South Caucasus countries Azerbaijan, Armenia and Georgia, the North Caucasus portion of the Russian Federation, north-eastern Turkey and part of north-western Iran (Williams et al. 2006) and spans 580,000 km² of mountain area between the Black Sea and the Caspian Sea (Tordorff et al. 2009). Concerning the aspect of vascular plants, the number of estimated species is about 7,500, of which ~35% are endemic (Nakhurtsrishvili et al. 2009) and the region has the highest level of endemic vascular plants in the temperate zone of the northern Hemisphere (Myers et al. 2000). Furthermore, the Caucasus has estimated 152 mammal species of which 32 are endemic to the hotspot (Zazanashvili et al. 1999), 380 species of birds (of which two are endemics) and a high importance of migratory species, as two major migration routes passing through the region, 87 species of reptiles, of which 21 are endemic, about 130 species of fish, of which 12 are endemic and a high diversity of insects

(Zazanashvili 2009). The biodiversity is being lost at an alarming rate due to different influences. Hence nowadays just 12% of the area's natural ecosystems are in their original state (Jungius 2009). Most heavily impacted are the foothills, subalpine belts and the plains. The major threats are overgrazing, poaching, overfishing, infrastructure development, pollution of rivers and wetlands as well as legal and illegal logging. Also the climate change let to new threats of the region as the frequency of floods is increasing and the area of high-mountain and dry grassland ecosystems decreasing. The direct threats to biodiversity in the Caucasus can be grouped to (i) socioeconomic, (ii) institutional and (iii) political origin. Dominate socioeconomic menace is poverty (Zazanashvili 2009). After the breakdown of the Soviet Union, the region impoverished dramatically (Davis et al. 2004) which led to poaching, overgrazing, fuel wood consumption etc. The societies of the countries are not aware of the importance of conservation of water, firewood and land and poor land use planning results in overgrazing, inefficient infrastructure and pollution (Zazanashvili 2009). Institutional threats are basically a lack of coordination, communication and knowledge of conservation issues among institutions and stakeholder (CEPF 2003). Political threats arise mostly due to gaps in legislation and a clear delineation of jurisdiction for agencies as well as military conflicts which result in increased logging, forest fires, pollution and poaching. A certain problem is the missing of transboundary cooperation to control conservation (Zazanashvili 2009).

Beside the negative consequences for the nature and natural resources due to the sudden pauperisation, the newly independent countries became a focus of international attention, conservation of the Caucasian nature and culture became important. The WWF started their work in the Caucasus already in 1990 in Georgia and expanded soon to the other countries (Jungius 2009). The CEPF started working in the biodiversity hotspot Caucasus in 2003 with preparing an ecosystem profile (Tordorff et al. 2009). In 2003/04 CEPF declared in total 205 potential dependencies, covering 19% of the target areas and mostly lying on ten conservation corridors, for the whole Caucasus region (Weizel 2010), of which five have priority status (Williams et al. 2006). When the three South Caucasus countries Armenia, Azerbaijan and Georgia were included to the Council of Europe at the late nineties and 2004 in the European Neighbourhood Policy (ENP), the international cooperation of Europe and the

Caucasus was redesigned. In this context, the German Ministry BMZ[1] has launched the Caucasus Initiative in 2001. The initiative should encourage cooperation between Armenia, Azerbaijan and Georgia, support the economic, social and political development of the region, and thus contribute to the reduction of conflict. The arrangements of the initiative are supporting the fields of economic development, energy, nature protection and democracy (BMZ 2015). Since 2008 also the German *Kreditanstalt für Wiederaufbau* (KfW), based on the data prepared by the CEPF is investing about 20 million Euro (Weizel 2010) in supporting nature reserve developments.

These briefly shown facts form the framework of this thesis. This doctoral thesis examines the impact of the developments, mentioned above, on the rural population in Georgia and Armenia, the effect of conservation areas on them and what role interactions play thereby. It was written within the context of the BMBF[2] funded international project "Socio-Economic Tools for Integrated Conservation Planning in the Multi-Ethnic South Caucasus" of the University of Goettingen. The project was applied in early fall 2010 and the research contract finally signed in December 2011. The project was designated with duration of 24 month and later on prolonged about additional 12 month. The administrative coordination was devolved from the BMBF to the international office of the *Deutsche Zentrum für Luft-und Raumfahrt* (DLR). Aim of the project was Capacity Building in the three South Caucasus Republics Armenia, Azerbaijan and Georgia in the context of nature protection and conservation planning. It was intended to provide a summer school in Goettingen in 2012, but due to budget cuts (about a third) this plan was reconstructed to a spring school in March 2012 in Tbilisi. All project meetings were hold in Georgia as the political situation of Armenia and Azerbaijan did not allow meeting in one of the other countries. However, by means of the budget it was initially possible to hire four Georgian, one Armenian and one Azeri researcher. Later in the project one additional researcher for Armenia and Azerbaijan could be found. In the spring school a general socialisation of the project among conservation, development and agricultural actors as well as the imparting of main methods was done. Furthermore, internal meetings on details of

[1] German Federal Ministry for Economic Cooperation and Development.
[2] German Federal Ministry of Education and Research.

project collaboration took place as well as common field trips to the project regions. The project was working in four regions in three of the nature conservation corridors in the Caucasus analysed by CEPF. Two of the four regions are of great interest as the KfW is investing in the establishment of protected areas there (Weizel 2012). Two of the target areas (in Georgia and Azerbaijan) are some of the oldest protected areas of the Caucasus and were enlarged several times over the past decades. The other two project areas (Georgia and Armenia) form the newest transboundary national park of the Caucasus and create conflicts between human land use and nature protection. A detailed presentation of the two Georgian and the Armenian project areas will be given in the following chapter. Therefore, it will be waived at this point.

At the beginning the project was designed to find out right socio-economic tools for conservation planning in consideration of the thoughts and information of different ethnic-specific usage of natural resources. All project areas are located at borders; settlements of ethnic minorities and different usage of the resources, due to cultural aspects were expected. Already at the first visits in March 2012, qualitative data and secondary literature was collected and it became clear, that the ethnic problems were overrated. All regions are mostly homogeneous concerning ethnic and household structure. However, it transpired that problems addressing national park establishing or enlarging mostly occurred because of the competitive position of the natural resource *land*. All regions are poor and households are dependent from subsistence farming. Pastureland is used as summer pasture for livestock and in some regions already the existing nature reserves cut access to land, while in other regions usage restrictions are feared by locals. Based on this information the overall hypothesis for the present PhD thesis was designed:

H1: Summer pasture has high economic value for peasant farmers in the buffer zones of protected areas in the South Caucasus.

This overall hypothesis is issue of the upcoming three chapters.
Based on the hypothesis a choice experiment (CE) was created and pretested in June 2012. The prestudy was realised in three villages of each region interviewing respectively 30 households for the full region. Already at this stage the CE included alternative income sources and was analysing people's worth of summer pasture and

other natural resources. Based on the results of the prestudy two additional hypotheses were included to the work:

H2: A positive attitude towards the management of a national park has influence on the willingness-to-pay (WTP)/willingness-to-accept (WTA) for a competitive resource

H3: Owning more private land reduces the WTP/WTA for additional/less access to summer pasture.

The main research study was realised in October 2012 with N=100 in each region. Besides the CE a large household survey was conducted in all regions. The survey included more than 150 different questions and represents, as far as we know, the largest collection of household data in all of the project areas Lake Arpi, Samtskhe-Javakheti and Lagodekhi. All interviews, this extends to the prestudy, were done by Caucasian researchers who were trained in interviewing and the choice experiment and accompanied during the field trips by the author. An expectation is the Azerbaijani region, which had to be excluded from data analyses as it can be assumed that the data was fake. The data was analysed in 2013 and the first results represented in an Expert Conference in Tbilisi on October 1st 2013. Furthermore, the project established a wikiversity homepage[3] showing the main results, the used theories and methods as a toolbox for similar future projects. Next to the huge amount of quantitative and qualitative data collected, the project created cooperation between organisations of the South Caucasus republics among themselves and with Germany. Within the project the author took the role as project coordinator. During the Spring School she was first involved in organising and teaching. She developed the household survey on team and was basically responsible for the CE. Before the pre- and the main study she was meeting with all researchers in the project areas for an intensive methodological, choice experiment and interviewing training. Furthermore she organised and accompanied the research in Armenia and Georgia and was responsible for data entry and evaluation. Besides the research, methodical and analytical aspects she was organising the final Expert Conference in October 2013, as well as all project

[3] http://en.wikiversity.org/wiki/CIVICS/Socio-economic_Tools_for_Integrated_Conservation_Planning_in_the_Multi-Ethnic_South_Caucasus

meetings, was the contact person for all project members and international organisations and wrote together with Dr. Barkmann the homepage, interim and final reports of the projects.

In the following three chapters II – IV the main results concerning the three mentioned hypotheses above will be presented. The present thesis is divided into:

- The choice experiment as a quantitative tool for socio-economically informed conservation planning in the South Caucasus: Design, administration, results.
- Influence of attitudes towards newly established national parks in the South Caucasus on the WTP for summer pasture and additional income sources.
- Restrictions in the access to summer pasture in the South Caucasus induce high monetary compensation demand by local small holder farmers.[4]

The first part is written as discussion paper. It will describe in detail the project and its regions, as well as the used survey material and specific problems of all three study areas. Focus of the study is the analyses of household data from the regions and a choice experiment concerning willingness-to-pay/willingness-to-accept for summer pasture access, additional income sources and natural goods. The paper shows in detail the design of the choice experiment and explains the used attributes. Analysing the main hypothesis H1, the study will give hints for conservation planning, as the establishment and/or enlargement of national parks in urban regions of the South Caucasus and possible ways for integrated conservation and development projects.
The H2 is taken up in the second study. The paper analyses different attitudes to national parks and impacts on WTP are suspected because of differences in attitudes due history of national park establishment. The target areas Lake Arpi (Armenia) and Samtskhe-Javakheti are on focus for this work. The regions make up a transboundary conservation reserve, established at the same time. The establishment, however, was done in different ways: while Lake Arpi was created in a bottom-up approach, integrating locals to the decision-making and information of the park, Samtskhe-Javakheti was created in a top-down way, excluding locals. The study will analyse the attitude of small scale farmers of both regions towards the specific national park and

[4] It is planned to publish the present articles separately in scientific journals. All studies refer to the same project and data. Therefore, content overlaps do occur in sections of methods and region descriptions.

show the impact that attitudes have towards the WTP/WTA of access to summer pasture and additional income alternatives. The study will give hints how integration of locals can positively influence behaviour towards the protected areas and the ICDPs.

The third and last study dedicates to H3 of the influence of private land on the WTP/WTA in the choice experiment. It shows the dependence of locals on the natural good land. Furthermore, one will see how communal land influences a WTA for restricted summer pasture access and where the dependence of land comes from.

The last chapter will be a final discussion and conclusion. Main findings, problems and strengths of the studies and the project as well as suggestions for management options are presented.

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II

The choice experiment as a quantitative tool for socio-economically informed conservation planning in the South Caucasus: Design, administration, results

1. Introduction

The Caucasus region is displaying a mosaic created of different cultures, political situations and an incredible variety of nature (CIA Factbook 2005, German 2012, Zazanashvili 2009). The region has a very high number of plant and animal species, including some charismatic ones like the Caucasian leopard (*Panthera pardus ciscaucasica - P.p. saxicolor*), long-clawed mole-vole (*Prometheomys shapochinskovi*) and the goitred gazelle (*Gazella subgutturosa*) – as well as a high anthropogenous degree of danger (Zazanishvili 2009). These are reasons why the Caucasus is allotted a markedly high priority for additional conservation measures from the nature conservation biology for temperate zones and defined as one of the biodiversity hotspots of the world (CEPF 2003/4, Myers et al. 2000).

It is known for Europe, that traditional agriculture, by small scale farmers, including pasture feeding near-natural habitats, produced a variety of landscapes with high aesthetic allure and biodiversity (Bürger-Arndt 2006, Ellenberg 1996, Parivainen 2005). Nearly all regions in Europe have been characterized by 2000 years of land use (Welzholz 2009). The Caucasus has a history of settlement for more than 2 Million years (Hoffecker 2005, King et al. 2003) and a unique variety of different ethnic land use, therefore a similar influence has to be considered for the Caucasus region, too. Following the breakdown of the Soviet Union, rural areas of the Caucasus countries struggle from difficult socio-economic and governance situations (Davis et al. 2004). This fragile situation leads to a point, where the implementation and extension of protected areas and conservation strategies are faced by huge challenges (Zazanashvili 2009). An implementing, extension and assertion of protected areas regularly results in significant costs in form of use restrictions of land and other natural resources, like wild plants or timber, from the local rural population living close to the conservation areas (Bawa et al. 2004). The economic profiteers of the global public good "biodiversity" on the other hand mostly can be found in countries of higher national income (Balmford & Whitten 2004, Hillmann & Barkmann 2009). As the biodiversity hotspot Caucasus is in a status, where the rural population is dramatically impoverished after the collapse of the Soviet system (Davis et al. 2004), any stringent restrictions on land use required by the establishment of protected areas could meet substantial resistance. In the worst case, such restrictions may act like an involuntary eviction from the area at stake (see World Bank Operational Policy Statement 4.12

2001). In face of massive political tensions in the region, the reduction of reasons for socio-economic, ethnic, or even religious strife should be a prime concern of politicians and administrators involved in protected area planning (BMZ 2005). While agriculture was just a minor part of the labour division during the time of the Soviet Union in the South Caucasus countries Armenia and Georgia, right after the breakdown of the system it became an important issue of subsistence and daily and economic survival for nearly the half of each countries individuals (Millns 2013). Therefore, already existing protected areas became "opponents" concerning land and new established ones have to handle situations where the protection of nature and land use of humans is in direct competition. Several studies in South America and Africa have shown that rural population living close to protected areas wish to be part of so-called indirect conservation and development programs (Garcia-Amado et al. 2013, Sunderlin 2005). These programs are called indirect, as they are Integrated Conservation and Development Projects which have the aim to obtain synergies between the conservation and the development of a region due to sustainable management of the specific area (Alpert 1996, Brandon & Wells 1992). Efficiency of indirect programs is not approved until today (Garcia-Amado et al. 2013). However, excluding locals from national park management is considered unethical (Holmes 2013) and the consideration of local population well-being is an important factor for success of wildlife conservation (Brockington 2004).

Individuals' behaviour and willingness-to-pay for biodiversity conservation, ecosystem services, nature protection and corresponding action alternatives has been studied over the last decades increasingly with the method of choice experiment (e.g. Cerda et al. 2013, Yan et al. 2008). Using this method to find out about resource competition between rural population living close to protected areas and the protection management, as well as for interest in indirect conservation and development programs, however, as far as we know, do not exist. Nevertheless, some studies have shown that the relationship between locals and protected area management is important for wildlife conservation (e.g. Berkes 2004, Brockington 2004). Socio-demographic factors, can play an important role for the relationship and therefore for the success of protection (Mutanga et al. 2015). For the Caucasus no such studies do exist.

The present discussion paper reports on results obtained within the BMBF-funded project "Socio-economic tools for integrated conservation-planning in the multi-ethnic South Caucasus" with a focus on nature conservation and national park planning. Aim of the project was Capacity Building in the three South Caucasus Republics Armenia, Azerbaijan and Georgia in the context of nature protection and conservation planning. The project was formed under the leadership of the University of Goettingen and formed an international research team of Armenian, Azerbaijani, Georgian, Iranian and German scientists. The project started in spring 2012 and was finished in summer 2015. Research areas were Mountain Protected Areas in the South Caucasus. The mountains of the lesser and the great Caucasus are not only eponymous but also a main characteristic of the whole area and rural population in these mountainous parts mostly focus on animal husbandry and the usage of summer pasture (Millns 2013). Therefore, implementing or extending protected areas in these kinds of regions could lead to a loss of summer pasture usage for small scale farmers.

This discussion paper focuses on the regions of Lake Arpi (Armenia), Samtskhe-Javakheti and Lagodekhi (both Georgia). In the project, also the nature reserve Zaqatala in Azerbaijan was included. However, this region is not part of the paper. All of these regions are protected areas with buffer zones very close to the protected areas, where small scale farmers are living (Schuerholz 2009, Mgmt SJ 2013, *pers. observations* Kalatas 2012) Lake Arpi and Samtskhe-Javakheti are newly established national parks in the South Caucasus (Mgmt SJ 2013, Schuerholz 2009) and represent the implementing status and situation of a national park in an area settled since centuries. Lagodekhi is the oldest nature reserve of the South Caucasus and shows the relationship of peasant farmers towards an old reserve, which was extending several times over the last decades. We will show the importance of summer pasture as essential income source for farmers in these regions in form of willingness-to-accept (WTA) to give up access to pastureland and willingness-to-pay (WTP) for access to additional pastureland. Furthermore we will show (i) respondent interest in integrated development programs expressed in WTP for additional income sources (trainings) and (ii) the usage of natural goods not related to traditional agriculture like wild plants and timber, which are essential for subsistence living. Based on respondent WTP and WTA we will propose management options, which could give advices for future establishments of protected areas in the South Caucasus. Results of the main study will

be shown in chapter 4, results of the pilot study and the questions of the choice experiment frame in chapter 3.5.2.1 and 3.5.3.1.

2. Protected (mountain) areas of the Caucasus

2.1 Mountain protected areas

In the mid till late 20th century, proposals for the protection of mountain areas became more frequent (Ives 1985). The IUCN showed active interest in mountainous areas during the 1970s which led to the strategies and guidelines of conservation of mountain areas. This led to the establishment of mountain-protected areas, so-called MtPA (Dasmann & Poore 1979). Seven reasons can be figured out for the increasing interest and the will to protect mountain areas: (Thorsell 1991)

1. Mountains often are homes for plenty of endangered and endemic species and are also the source for a lot of species living in the valleys
2. Mountains are a pivotal aspect for people who are searching for relaxation and aesthetic utility
3. In mountain areas human traditions can be found and a protection can lead to an alliance between conservation and a strengthens of local cultures
4. National parks in mountainous areas can be ideal measures of the stabilizing of upland resources use and huge downstream value concerning watershed protection and soil erosion control
5. MtPAs are easily destructible high-energy environments, which often require regulations and scrutiny of disturbing activities by human
6. MtPAs are good indicators for global climate change and therefore a perfect environment for research on this topic on species and ecosystems
7. MtPAs are natural buffer zones, as they often form frontiers between countries

Categories of protected areas have been defined by the IUCN. For defining MtPAs Thorsell (2002) is following three criteria: (i) minimum relative relief of 1500 m, (ii) minimum size of 10,000 ha and (iii) IUCN category of I – IV. In 2002 protected mountain areas covered about 40% of the total landscape of protected areas in the world (Thorsell 2002) and in 2012 17% of the total mountain areas were protected

(UNEP-WCMC 2012). However, for our research these official categories play a minor part and are just envisaged as basics.

2.2. History of protected areas in the Caucasus

The first *zapovedniks* (nature reserve) of the former Russian Empire were established at the end of the 18th, beginning of the 19th century (Pilāts & Laiviņš 2013). The oldest national parks were mostly established as areas for Russian tsars and Caucasian kings for hunting (Devidze 2012, Shtilmark 2003). The name *zapovednik* is a derivate of the former term *zapovedny mesto*, which means closed place and shows the exclusion of the ordinary. Already at the beginning of the 19th century beautiful landscapes and unique natures were popular tourist attractions for a special part of the former Russian Empire population (Pilāts & Laiviņš 2013). In 1803 Alexander I liked the region of Punkaharju Esker (Finland) during a vacation trip that much, that he forbade forest cutting there. Later on the region was created as the "crown park"[5] in 1843 (Vuorisalo & Laihonen 2000). In the 1890s, Dokuchayev (founder of soil science and geologist) created the scientific foundation of the protected areas of the Russian Empire, known as "*zapovednost*", strictly meaning: "the state of being protected in a *zapovednik*" (Shtilmark 2003).

The creation of nature protection in the Russian Empire was following the German and Prussian example from the beginning of the 19th century, e.g. in 1906 the first institution for nature conservation *"Staatliche Stelle für Naturdenkmalpflege in Preussen"* was founded in Prussia and from there spread all over the world, also to the Russian Empire (Pilāts & Laiviņš 2013). Independent from that, at this time already three different approaches existed within the former Russian Empire to establish protected areas: a practical, an ethical and a scientific one (Pilāts & Laiviņš 2013). The practical aspect dominated mostly the first step of protection: Even the Russian Empire was rich of species, at the beginning of the 19th century some species were in danger. Over the 19th century, the reason to protect areas changed from exclusive and excluding hunting grounds and areas for vacation to a protection of species and a "fence and fine" approach (Pilāts & Laiviņš 2013). The "fence and fine" approach means an exclusion of humans from the protected area where restrictive regulations are enforced since it is assumed that human presence is incompatible with biodiversity

[5] Early form of nature reserve, created by royal families.

conservation. Therefore among others no resource harvest, settlements inside the area, or productive land use is allowed. People are excluded from the areas (Kubo & Supriyanto 2010). In the Soviet Union, in general, no human activities, except scientific research were allowed at the *zapovedniks*. In 1934 new regulations were issued which envisaged definite functions of *zapovedniks*, in particular (re)acclimatisation of wild animals and plants to enrich the nature by economically valuable species (Shtilmark 2003). In nearly all *zapovedniks* of the USSR, an administration was established to ensure the protection of the areas and the scientific research work.

After the breakdown of the Soviet Union, the oldest protected areas of the region struggled to become more western oriented – public-open. As oldest protected area of the Caucasus region, the nature reserve of Lagodekhi can be mentioned for Georgia and the whole region (est. 1912), Zaqatala nature reserve for Azerbaijan (est. 1929) and the Dilijan nature reserve for Armenia (est. 1958). Today we can find in Armenia 22 protected areas with a total size of 311,000 ha (Ministry of Nature Protection of Armenia 2014), which is 10% of the surface of the country 48 protected areas in Georgia which cover about 7% of the country (384,684 ha) (Ministry of Environment Protection of Georgia 2014) and in Azerbaijan 44 protected areas which cover 4.5% of the country (901,799 ha) (Ministry of Ecology and Natural Resources of Azerbaijan Republic 2015)

3. Method

3.1 Study area

In order to find out what impact nature conservation has in the Caucasus region on the highly diverse local human population living close to newly established national parks and already existing nature reserves, we conducted our study in two adjacent protected areas in Georgia and in one area in Armenia. Figure II-1 shows the hotspot Caucasus and the priority sites defined by the Critical Ecosystem Partnership Fund (CEPF 2003).

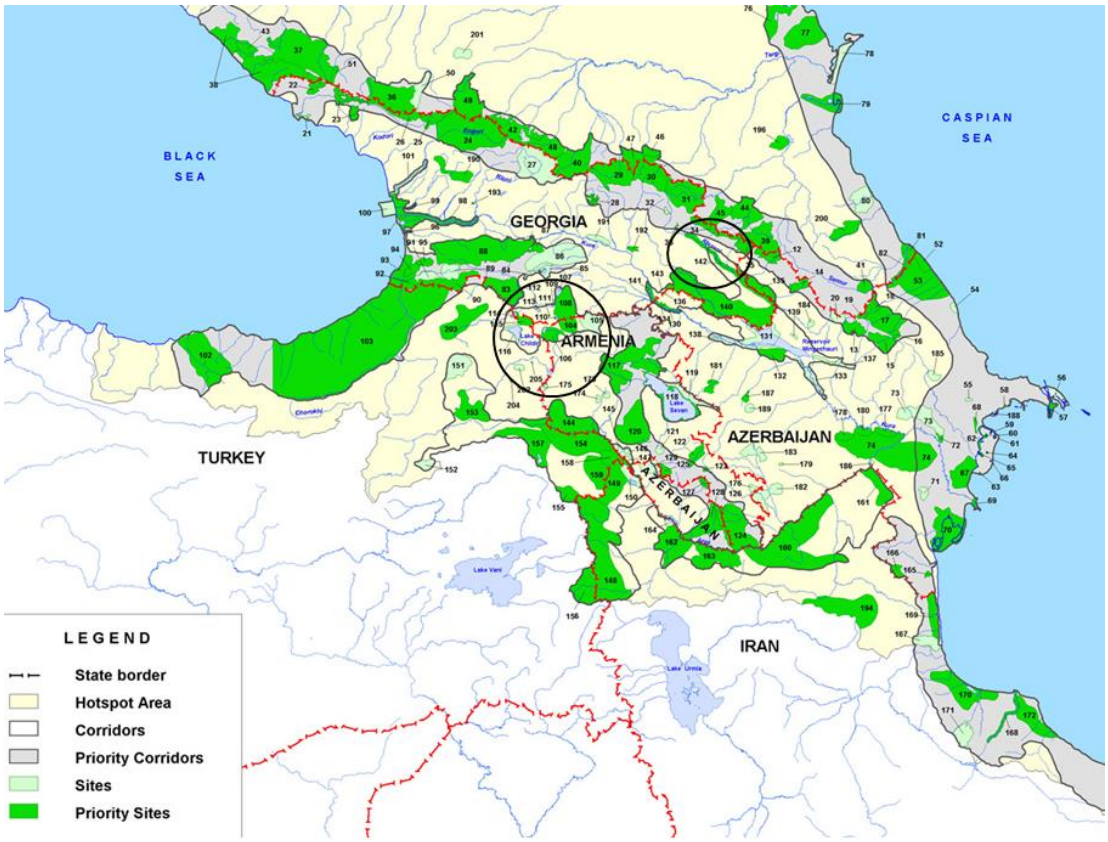

Figure II-1: The Caucasus Hotspot and its Priority Sites (marked in green). Black Circles: Left Circle Lake Arpi (Armenia) and Samtskhe-Javakheti (Georgia) national park. Right Circle Lagodekhi nature reserve (Georgia), bordering Zaqatala nature reserve (Azerbaijan). Source: own illustration according to WWF 2015.

Two of the researched regions are Lake Arpi in the northwest of Armenia and Samtskhe-Javakheti in the southwest of Georgia (left circle). These regions make up a transboundary national park area with a common border (Schuerholz 2009). In addition, the region of Lagodekhi (right circle), which includes the oldest existing nature reserve of the whole Caucasus, in eastern Georgia was studied.

The description of the study areas include information that we obtained and/or confirmed during several visits to the study areas during the pre-study phase of the project. In sections 3.1.1 – 3.1.4, we provide additional information to justify in detail the tested hypothesis and to key design decisions with respect to the survey instrument. It was planned to compare the respective twinning areas Lagodekhi/Zaqatala and Lake Arpi/Samtskhe-Javakheti. Since this was not to be realized, results consider only the protected areas Lake Arpi, Samtskhe-Javakheti and Lagodekhi which are briefly described in the following sections.

3.1.1 The twin MtPA zones Lake Arpi and Samtskhe-Javakheti

Lake Arpi and Samtskhe-Javakheti national park form the youngest MtPA twinning pair of the whole Caucasus region. The establishment of Lake Arpi and Samtskhe-Javakheti national park forms part of the Caucasus Initiative of the German Ministry of Cooperation and Development (BMZ) (Schuerholz 2009). The initiative has one focus on biodiversity conservation in the Caucasus and the common project of Georgia and Armenia is a promotion of transboundary cooperation for biodiversity conservation (BMZ 2005). Regarding a feasibility assessment of the CEPF in 2003, Georgia and Armenia agreed on conservation efforts, which are financially supported by Germany through the *Kreditanstalt für Wiederaufbau* (KfW) on the transboundary Samtskhe-Javakheti - Lake Arpi Conservation Area. The target area is located on the border region of Armenia, Georgia and Turkey (see Fig. II-1 left circle). The main objective is the establishment of a national park and wetland conservation area on both sides of the Georgian - Armenian border as well as the sustainable development of the respective support zones/buffer zones. The term "support zone" reflects the need for support by locals living adjacent to protect the area and its resources as well as the need to economically support locals (Schuerholz 2009). The terms "buffer zone" and "support zone" will be used equivalent.

The project to establish Lake Arpi - Samtskhe-Javakheti national park was launched in September 2007 and implemented by the WWF under the auspices of Armenia's and Georgia's Ministry of Nature Protection (Schuerholz 2009). Lake Arpi national park was confirmed by the Government of the Republic of Armenia on the 16th of April 2009 (Schuerholz 2009). At time of the project the borders of the Samtskhe-Javakheti national park were still not clarified (*pers. observations* Kalatas 2012[6]).

Both national parks are located on the Javakheti plateau, which is known for migratory birds (Schuerholz 2004). Over 140 bird species have been recorded in the area (Schuerholz 2009). 80-85 of this species are known to nest in the target area (Schuerholz 2009). The other species are summer visitors, migrants or under an unclear status. Most bird species are related to the lakes and wetlands. The plateau is one of the few regions of the Caucasus where breeding common crane (*Grus grus*),

[6] See Annex V.

white stork (*Ciconia ciconia*), grey heron (*Ardea cinerea*), various pelicans and velvet scoter (*Melanitta fusca*) can be found (Schuerholz 2009). Seven of the species are globally endangered (Schuerholz 2009). Almost 40 species of mammals, including two species of ungulates and 10 species of carnivores are visible in the region. Ungulates, lynx and bear, can just rarely be observed at these open spaces, but wolf (*Canis lupus*), marbled polecat (*Vormela peregusna*), European hare (*Lepus europaeus*), European otter (*Lutra lutra*), European badger (*Meles meles*) and fox (*Vulpes vulpes*) are more frequent. Six of the mammal species are endemic in the Caucasus. These are the Nehring's blind mole-rat (*Nannospalax nehringi*), the Turkish hamster (*Mesocricetus brandti*), the nazarov pine vole (*Terricola nasarovi*), the daghestan pine vole (*Terricola daghestanicus*), the Transcaucasian water shrew (*Neomys teres*) and the Caucasian shrew (*Sorex satunini Ognev*). Furthermore, 13 different reptiles and amphibians are found on the Javakheti Plateau. Of these the Darevsky's viper (*Vipera darevskii*), a live birth giving snake is endemic for the Caucasus (Mgmt SJ 2013).

3.1.2 Lake Arpi

The national park (NP) Lake Arpi is located in the province of Shirak in the north-western part of Armenia (Schuerholz 2009). The name giving lake is 2,023 m above sea level (22 km²) and the total area is about 58,711 ha. In the 1950s, the lake was artificially increased by the government up to 4.5 km² and became the second important water source of the country next to Lake Sevan. The lake is used for hydropower production as well as for irrigation and designated as Ramsar Site. The region lays on 1,500 to 3,000 m above sea-level and struggles with extreme and inhospitable climate conditions, with having a yearly mean temperature from -13 up to +13°C, a vegetation period of 160 days, 2400 hours of sunshine a year and 550 mm of mean annual precipitation (Schuerholz 2009) In winter the region is covered by 1.5 m of snow (Schuerholz 2004). Biogeographically the region is compounded by steppes, meadow-steppes, alpine meadows, sub-alpines and wetlands. Steppes are located mostly between 1800 and 2500 m and grow on chernozem soils. Field steppes just occur along northern slopes and are dominated by horsetail feather grass (*Stipa tirsa)*. The region of Lake Arpi is treeless since the Holocene (Schuerholz 2009).

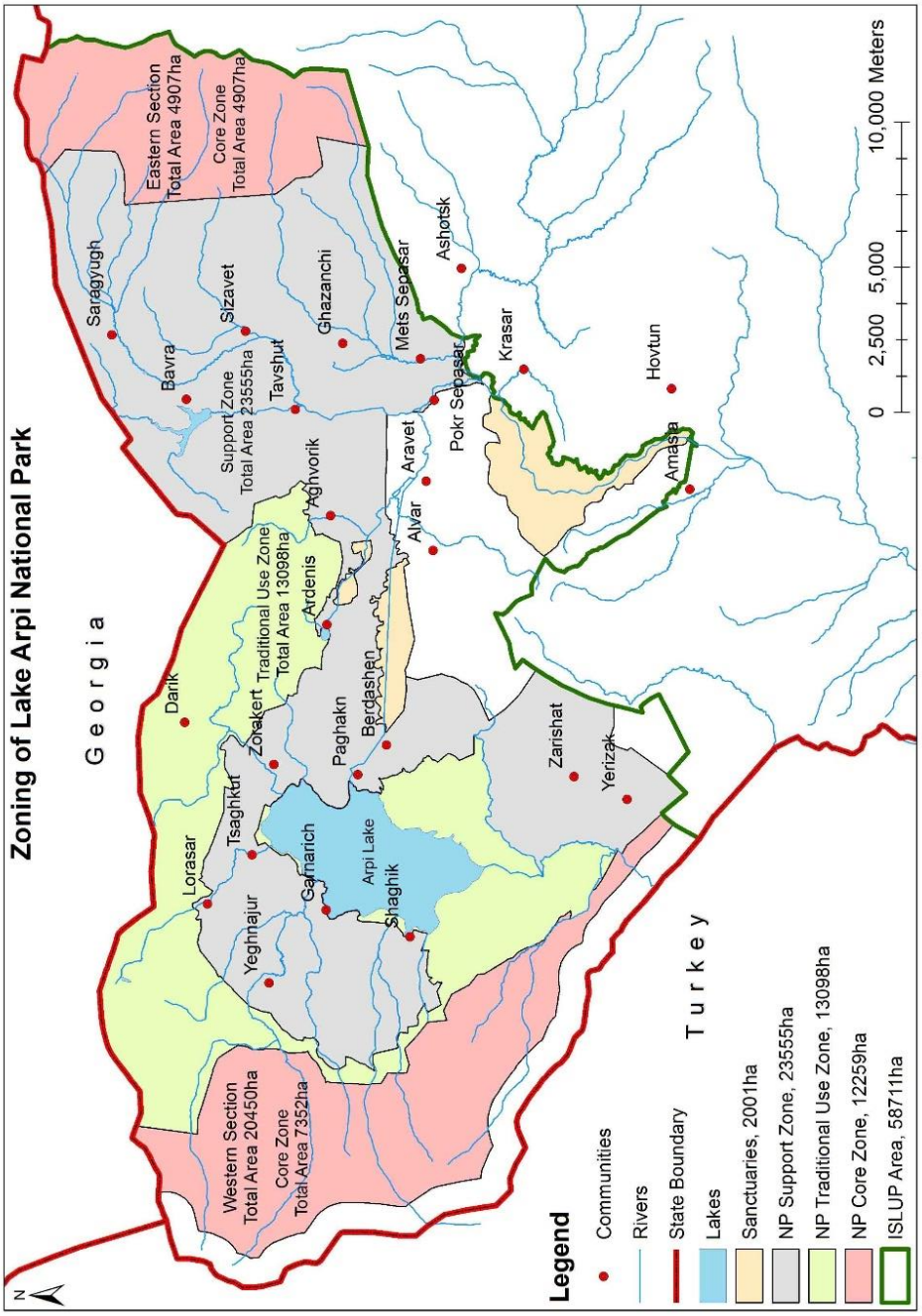

Figure II-2: Lake Arpi National Park. Zoning of the Park Area. Source: Schuerholz 2009.

Figure II-2 shows the region of the NP Lake Arpi. It is a draft division of the region from 2009. In 2012 the zones were valid in the presented division. The park is divided into two core zones, a traditional use zone a support zone and three sanctuary zones. The sanctuaries are zones where bird watching is possible and could offer chances of cultural tourism. The traditional use zone is the part of the area where agricultural productivity and livestock keeping is allowed for villagers. The support zone is the buffer zone of the NP. The villages of the zone have agreed to provide part of their lands to the national park under the condition that traditional lease agreements and user rights for grazing, hay production and agriculture are honoured and that financial assistance will be provided for the economic development of the villages (Schuerholz 2009). The two core zones of the NP are areas where no agricultural activity is allowed and nature has to be protected.

All villages are located in the NP territory and not at its borders. The only two villages which are directly bordering sanctuaries are Berdashen and Ardnis (the study includes data of both of these villages). 18 villages belong to the support zone. These are: Yeghanajur, Lorasar, Paghakn, Garnarich, Tsaghkut, Berdashen, Shaghik, Zorakert, Ardenis, Aghvorik, Tavshut, Sizavet, Saragyugh, Ghazanchi, Mets Sepasar, Zarishat and Yerizak. The village Bavra, which is also in the park area, however is not part of the support zone (*pers. observations* Kalatas 2012, WWF 2012).

The most important economic activity of the region is livestock production (Schuerholz 2009). Relatively low rangeland productivity, over-grazing and poor control is responsible for the visible range deterioration in some areas (Schuerholz 2009). Households use communal grazing areas, which belong to the villages and used of all households together. The communal grazing areas are leased out by the villages to livestock owners on a 25-year lease basis (Schuerholz 2009).

Prestudy visits to the region by the first author have shown that the region is also suffering by poverty and poor infrastructure including a lack of supply with natural gas (gas bottles have to be bought by households). Furthermore mobility, job opportunities and market connections appear severely restricted. (*pers. observation* Kalatas 2012).

3.1.3 Samtskhe-Javakheti

The NP Samtskhe-Javakheti is located in province of Samtskhe-Javakheti in the south-western part of Georgia. The national park lies on a height of 1,900 to 3,300 m above sea-level and has a total size of 42,509 ha. The whole region is formed by soft, volcanic forms, cones and clicker flows, high mountain meadows and steppes on mountain plateaus and slopes as well as lakes of volcanic origin. Six middle sized natural lakes and 60 small lakes are spread over the entire area with a total surface of 96 km². The Javakheti highland takes the second place in Georgia by concentration of wetland areas and is one of the most important reception basins in Georgia (Mgmt SJ 2013). Like Lake Arpi, the region of Samtskhe-Javakheti has a harsh, mainly continental climate, with mean yearly temperature between -10 and +15°C. In winter period, the lakes are covered with 30-35 cm of ice. The yearly annual precipitation level varies between 600 and 700 mm. At the region, little sub-alpine forests can be found at 1,800-2,100 m above sea level, east to Kartsakhi Lake. Birch (*Betula litwinowii*), aspen (*Populus tremula*) and rowan (*Sorbus aucuparia*) form the forests. At the upper edge of sub-alpine forests, (2,000–2,100 m above sea-level) pines (*Pinus kochiana*) can be found (Mgmt SJ 2013).

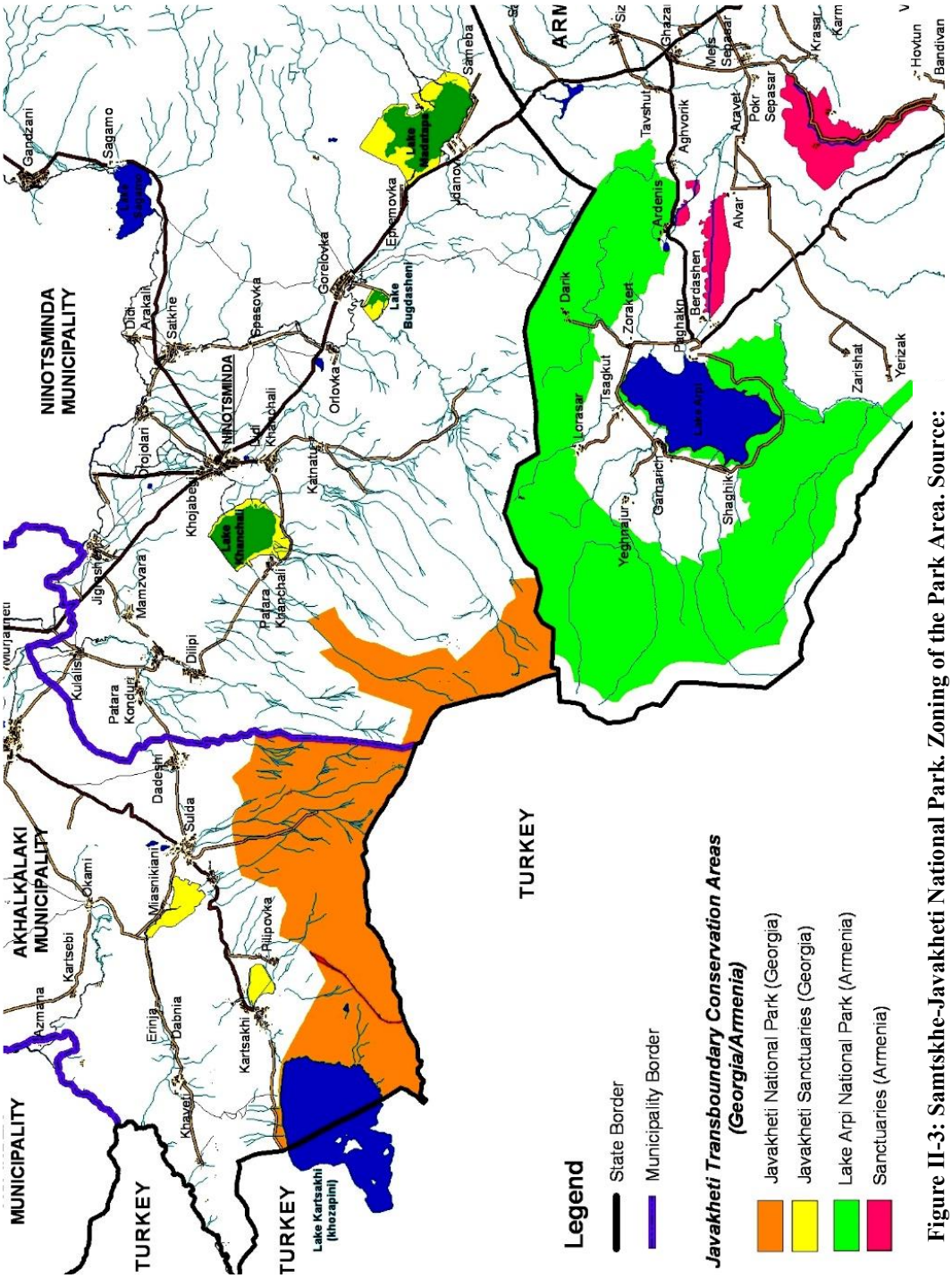

Figure II-3: Samtskhe-Javakheti National Park. Zoning of the Park Area. Source: WWF Georgia 2015.

Figure II-3 shows the territory of the NP Samtskhe-Javakheti. Area marked as "National Park" represents the core zone. Area marked as "Sanctuaries" are the sanctuaries of the NP (*pers. observations* Kalatas 2012). Samtskhe-Javakheti national park has a core zone of 1,897 ha, a traditional use zone (where agricultural productivity and livestock keeping is allowed) of 13,498 ha and five sanctuary zones of 27,114 ha. The sanctuaries are located at wetlands where bird watching is possible (Mgmt SJ 2013). These information represent the status of 2013, however no additional information are available at the current time. In total 10 of the villages belong to the support zone. These are: Kartsakhi, Philipovka, Sulda, Dadeshi, Miasnikiani, Patara Khanchali, Efremovka, Sameba, Zhabonui and Bozali (Mgmt SJ 2013). Other villages of the region are not part of the support zone (*pers. observation Kalatas 2012*).

Traditional activities in Javakheti are animal, partially crop farming and bee-keeping (mostly in the lower eastern part of the region) and the production of related goods. Summer pastures and hayfields are natural resources and traditionally used by locals and farmers coming from other parts of Georgia. Grazing practices in soviet times were non-systemic and still are not today in the region of Javakheti (Mgmt SJ 2013). Like in Lake Arpi, poverty is high in the region. The regions' infrastructure is weak and the supply of utility grid is poor. In addition prestudy visits have shown, that most families don't have own cars or a possibility to leave the village for trading or other necessary issues. Also possibilities to work outside of agriculture are very limited in the whole region (*pers. observation Kalatas 2012*).

3.1.4 The nature reserve Lagodekhi

The nature reserve (NR) Lagodekhi lies on the range of the Greater Caucasus of the alpine region of eastern Georgia (Pilāts & Laiviņš 2013), in the province of Kakheti. Nowadays it has a size of 22,266 ha, but was enlarged over the decades for several times. The last enlargement was done in 2003. Lagodekhi was enlarged by 6000 ha and divided in two parts with separated managements (Pilāts & Laiviņš 2013).

The NR lays on 400 to 3,500 m above sea-level and a vertical climate and biota division is visible from breech forests to alpine zones. About 70 % of the area is occupied by forests (altitude of 450 – 2,300 m above sea-level). The most dominant species are oriental beech (*Fagus orientalsis*), Caucasian hornbeam (*Carpinus*

caucasica) and maples (*acer*). Above 2,300 m, mostly subalpine and alpine meadows can be found. Nearly two thirds of the whole Georgian plants occur in the region of Lagodekhi, but also the fauna is very rich. East Caucasian tur, red deer, chamois, brown bear, lynx, bearded vulture, grey wolf, golden eagle, imperial eagle and steppe eagle are dominant in the reserve (Pilāts & Laiviņš 2013). 121 species of the Lagodekhi flora are endemic to the Caucasus and nine even to Georgia. Two impacts were important for the unique natural creation of the reserve: It was an isolation refuge for many species during the glaciations (Zazanashvilli 2009) and, it was isolated from human impacts due to political and historical issues. The region was first depopulated by Persians in times of war in the 16th century and later unsafe for living due to Dagestan tribes. When the Russian Empire annexed Georgia, the region became settled as a garrison was located down in the village of Lagodekhi in the 19th century (Pilāts & Laiviņš 2013). Important for the establishment of the NR was the polish naturalist Mlokosiewicz. During his military service in the middle of the 19th century in the garrison of Lagodekhi, he started to explore the nature, returned in 1867 to settle down, and spent the rest of his life in Lagodekhi. All his life he worked for the idea to create the NR of Lagodekhi and published material concerning the species of the area in Caucasian magazines. He died three years before Lagodekhi became the first PA of the South Caucasus in 1912 (Pilāts & Laiviņš 2013). As a typical Soviet *zapovednik*, the NR was closed to people, except for scientific research. After the breakdown of the Soviet Union, deforestation and illegal hunting appeared to happen at the reserve and the reserve became more western oriented. In 2003 the NR was divided into two management areas. The larger area covers 22,266 ha and the territory is kept under the status of strict nature reserve. The smaller part covers 1,992 ha and is located at the south of the NR as a strip between the strict reserve and the villages in adjacent (Pilāts & Laiviņš 2013). This part is called “managed reserve”. Human activities except vacation are prohibited (*pers. observation* Kalatas 2012).

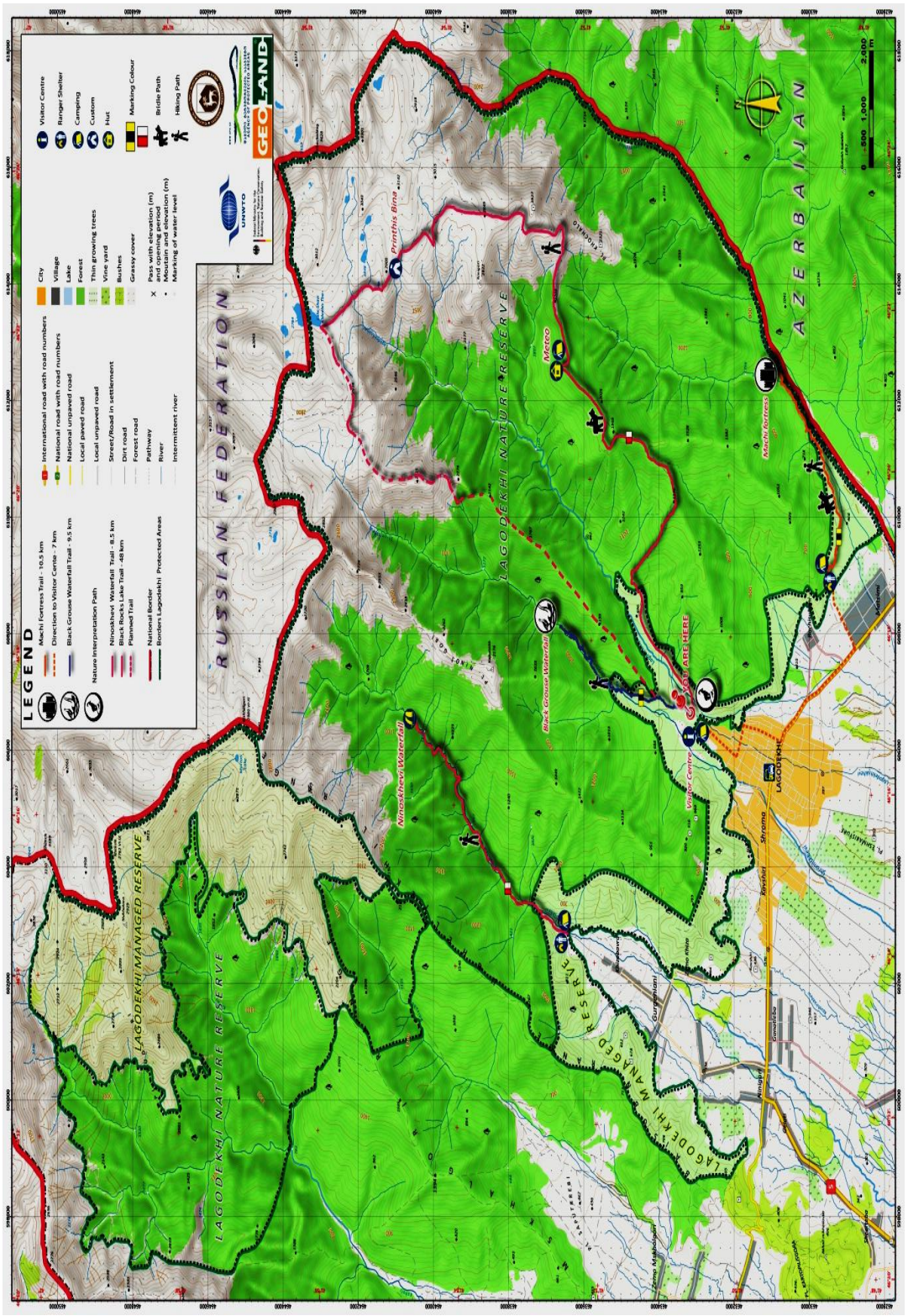

Figure II-4: Lagodekhi Nature Reserve. The Nature Reserve territory.
Source: Lagodekhi National Park 2015.

Figure II-4 shows the area of the NR. The smaller (managed reserve) part of the reserve is marked in light green. This territory is accessible for people. Usage of the resources however is prohibited. The territory in dark green and above shows the strict nature reserve. Any resource use here is prohibited and the territory is not accessible. As the reserve was established in a traditional fence and fine approach more than 100 years ago, no support zone villages exist. However, 10 of the villages close to the park are counted by administrative of the reserve and the local government as buffer zone villages (*pers. observations* Kalatas 2012). These are: Khizabavra, Zemo Khiza, Gurgeniani, Zemo Mskhalgori, Ninigori, Rachisubani, Matsimi, Kavshiri, Shroma and Ganatieba.

No official data about the region exists, however, pretest visits by the first author in June 2012 have shown that the region has a better infrastructure and utility grid support, than Lake Arpi and Samtskhe-Javakheti even though the incidence of poverty appeared high. Mobility options are quite adequate and infrastructure is overall better. Traditional activities in Lagodekhi are corn production and animal husbandry (*pers. observations* Kalatas 2012), but pretest visits have shown that families do also often have home gardens, where fruits and nuts are produced. Very little communal pastureland exists in the region and farmers see their chances for investments limited. Pretest visits by the author in June 2012 have shown furthermore that wives are often not living with their families and are working abroad for support.

3.2 Qualitative pre-studies and pilot study

Before starting with the quantitative survey, face-to-face qualitative interviews were conducted in the regions. The qualitative study comprises 33 in-depth interviews with regional administrations, farmers and NGOs (Interviews include also data from Azerbaijan). For detailed results of this study, please see the publication of qualitative results (Schott et al. “Opinions on Nature Conservation in the South Caucasus”, in preparation). By using the theories of the form of capital by Bourdieu (1986) and the Social Identity Theory by Tajfel (1978) and Tajfel and Turner (1979), we researched the opinion of the local population on protected areas and asked if they developed strategies with regard to the impact of these areas on their livelihoods. Results show that interviewees in three research regions perceive protected areas as a restricting

factor on their livelihoods. Especially the loss of summer pasture access is feared, as farmers see their main economic activity in animal husbandry and the production of related goods. In the region of Lake Arpi, the a newly established NP is perceived more positively which might be due to a support zone development plan and a bottom-up implementation process. The majority of interviewees show a positive attitude towards the development of (eco)-tourism as a new kind of income generating activity. This new kind of income, source which could serve as compensation for the economic losses that use restrictions (i.e. of pastures and forests) of land situated in the protected areas entail. The qualitative interviews also had the objective to ascertain specific issues for creating the choice experiment (CE).

3.3 The quantitative survey

This section deals with the different aspects of the quantitative survey which was conducted in the three project regions in 2012.

3.3.1 Structure of the quantitative survey instrument

To analyse the household and land use situation of the project regions, a face-to-face interview in a quantitative survey was designed. The first section addresses general household characteristics (household members, socio-economic information etc.). These questions purpose to give a general and representative overview of the researched population of the project regions and support an analysis of their possible influence on the choice experiment. Following that, respondents were asked several questions regarding access to facilities, employment, non-agricultural self-employment, crop production, livestock production, farming equipment, agricultural extension, additional income sources and the establishment of protected areas. In total the subjects were asked more than 150 different questions.

3.3.2 The assessment of household income

Respondents were not asked directly about their income. This was due to the reason, that cultural behaviour and non-trusting in foreigners could have led to wrong answers. The measurement was following the rural household model by Singh, Squire and Strauss (1986).

The structure of the survey allows calculations from:

(i) income outside agriculture in form of asking about monthly income of these jobs and how many month a year family members are working in this arrangement

(ii) income from agriculture, as questions were asked about market prices, how much was sold, what was bought etc. for farms Also including costs for machinery, seeds, labour, fodder, veterinary services etc.

(iii) income from own business outside agriculture (same questions like about employment work)

(iv) questions about state payments and remittances from family members living not within the household

(v) a calculation of subsistence income, which was composed by an average consumption of produced goods for each household

We calculated the yields of cash income from agriculture and outside agriculture, state payments and remittances. From that we subtracted any expenses (also loss of animals etc.). We calculated subsistence income from average statistics of Georgia and Armenia about food consumption and subtracted it from the hypothetical sales amount. Bartered goods were assessed with market prices. Analysing and calculating these five parts created an overview of income division for each family in the three regions.

3.3.3 The calculation of the monthly income of Lagodekhi for the choice experiment

As we will see later on, the average income of Lagodekhi is low. Some suggestions of this output will be discussed in the following chapters. To calculate the scenario of the choice experiment in chapter 4.2 for Lagodekhi the average income of Samtskhe-Javakheti is set. Several reasons let to this decision. First, both regions are rural areas of Georgia. Second, Lagodekhi has an even better connection to infrastructure (employment possibilities, farm facilities). We assume that the real average income of the region Lagodekhi cannot be lower than in Samtskhe-Javakheti. However, as we do not know, how much it could be higher than in Samtskhe-Javakheti we will use the same monthly income to generate the scenario.

3.4. The choice experiment

The following subchapters include the theoretical background of the choice experiment, as well as the tested hypothesis and the attribute design.

3.4.1 Background

A choice experiment is a stated preference method using data from a quantitative social science survey. The method was first developed in transport and marketing research (Louviere et al. 2003). The survey-based method investigates preferences and demand (Hanley & Barbier 2009). Out of several alternatives (options) forming a choice set, a respondent is asked to choose one alternative, which the respondent wants to be actualized (Hanley et al. 1998).

A number of attributes characterizes each of the alternatives. Attributes are represented in different levels. All combinations of levels that can be taken by attributes are covering specific scenarios, which are selected from the ensemble of possible scenarios (Adamowicz et al. 1998). Each Scenario in our choice experiment incorporated two ecological/socio-economic environment options and one status quo option. The ecological/socio-economic environment (environment) from which the respondent can choose is "built" by the different attributes of our CE which, taken together, describe a situation which can be feasible for respondents. The status quo refers to the situation in which each respondent is in the moment of taking part at the choice experiment. If the respondent does not like any of the proposed alternatives, she/he can always opt for the status quo.

3.4.2 Hypotheses for testing in choice experiment

We substantiated one hypothesis on respondent preferences that can be tested with the CE data:

Summer pasture has high economic value for peasant farmers in the buffer zones of protected areas in the South Caucasus.

Summer pastures have high economic value for dairy/meat production in the project areas, as access to summer pastures appears to be a limiting factor for the size of the individual farm's herds. Besides income to invest in larger herds the existence of land to send animals to is important. Vice versa a reduction of access to land can reduce

herd sizes. Where access is particularly low - and farmers complain about summer pasture scarcity, i.e. in Lagodekhi – income from cattle and sheep is particularly low (which will be shown in section 4). Still, potential reductions in summer pasture access are likely also to impact farming economies in Lake Arpi and Samtskhe-Javakheti. Thus, we predict that stated preferences for access to summer pastures is positive in all case study areas; and particularly high in Lagodekhi, where summer pastures are particularly scarce.

3.4.3 Attribute design

The different scenarios of our choice experiment were defined as combinations of the attributes. The attributes are: access to summer pasture, usage of wild plants, and availability of trainings for additional income sources and change of monthly income. Through the so-called payment vehicle (change in monthly income) a marginal willingness-to-pay (WTP) and a marginal willingness-to-accept (WTA) for an increase or decrease in any significant attribute can be estimated (Hanley et al. 1998). The payment vehicle can be positive or negative. The created scenarios were presented to all respondents. By repeating choices and systematically varying attribute levels, the researcher can infer which attribute influences choices and assess the trade-offs among the set of attributes.

Table II-1 gives an overview about the four attributes and their specific levels, as well as an explanation of the status quo option.

Table II-1: Levels of attributes in the choice experiment

Attributes	Attribute levels	Status quo
Change in access to Summer pastures	+25%; +50% access to pasture; -25%; -50% access to pasture; no change in access	No change in access
Access to plants and fuel wood	No collection of wild plants, fuel wood & timber is allowed; Home consumption of wild plants, fuel wood & timber is allowed; extensive collection of wild plants, fuel wood & timber is allowed	Home consumption of wild plants, fuel wood & timber is allowed
Trainings for income alternatives	Bee-keeping & honey production (2 month); cheese- production (2 month); tour guiding (2month); no training	No additional training
Change in monthly income	-10%; -20%; -33% of monthly income; +10% ;+20%; +33% of monthly income; no change	No change in monthly income

The following sub-sections will briefly explain why these attributes were chosen for the choice experiment.

3.4.3.1 Summer pasture

Livestock keeping is one of the largest agricultural activities in the regions. Livestock keeping is realised on summer pastureland. Therefore, summer pasture is an important aspect to generate income from livestock and related goods. Through the establishment or enlargement of a PA grazing land may be affected and a use of livestock could be excluded or minimized. As we will see in the results, the number of animals in households across and within in the regions can vary. Because of that the levels of this attribute are specified as a percentage change of access.

3.4.3.2 Access to wild plants and fuel wood

The studied regions are rich in wild plants (Schuerholz 2009, Zazanashvili 2009). Since the income of the habitants is weak, a part of the subsistence income may come

from the collection of plants. An establishment or enlargement of protected areas could ban this gathering of e.g. wild plants and firewood.

For the determination of the attribute levels, we decided to choose options of prohibition and permission. Permission of collecting wild plants and firewood was divided into: (1) a way that satisfies the household and (2) a way for commercial purposes (i.e. considerably higher). In the first kind of permission households are allowed to collect natural resources in an amount that is not higher than an average home consumption. The second permission allows households to collect an amount of natural resources that satisfies household consumption and is enough to sell the resources.

3.4.3.3 Additional trainings

We assumed that in the most rural areas of the South Caucasus few additional income sources exist outside agriculture/nature. However, since the agricultural income can actually be negatively affected by an increase or creation of a protected area, an attribute of trainings for additional income sources has been added to the CE. All trainings are related to agriculture. The levels were chosen based on the pilot study (see 3.5.2.1). For the main study we have chosen a training of bee-keeping and honey production, a training of cheese production and a training of tour-guiding.

3.4.3.4 Change in monthly income

For the monthly income attribute, a design of the levels in percentages was chosen. We have different currencies in the project regions and a percentage analyses makes comparison easier. In addition, it could be avoided to take, ppp and exchange rates into account. The income attribute is created independent of the influence of protected areas and expressed in government changes concerning the amount of taxes paid or subsidies received.

In stated preference methods, the WTP/WTA "anomaly" (Sugden 2005) is one of the most critically discussed issues due to the observed size of the divergence between WTP and WTA – two theoretically very similar measures of economic value (Willing 1976). Empirically, the WTP/WTA disparity observed in stated preference studies is higher if goods to be valuated have no substitutes, are non-market or environmental

goods, if the market experience of respondents is low, and if ownership of goods or payments are in and out of pockets (Sayman and Öncüler 2005). Likewise, the disparity tends to be lower if the valuation frame is better incentive compatible, if a within-subject design of valuation instruments is used, payments are not in and out of pocket, and if goods are not health related.

As our study addresses several issues that may increase the WTP/WTA disparity (e.g. environmental goods, partly no market experience), we opted for a study design that facilitates the estimation of WTP as well as WTA preference figures. By including the WTA levels into the payment vehicle in our experiment, we reduced the impact of wealth on respondent expressions of preferences. Via just using the WTP format, the influence of an individual on the aggregate compensating variation measure is bound by the personal budget of respondents. In other words: richer respondents have a higher influence on the final valuation result than poorer ones. A second reason to act like this is the fact that, if respondents feel entitled to a certain quantity of the environmental good, or to certain use right, proposed infringements of the entitlements call for a WTA format of the payment attribute.

Due to this reasons we opted a "mixed" WTA/WTP format of the monetary attribute with three WTA and three WTP attribute levels (see Table II-1; Cerda et al. 2007).

3.4.4 Experimental design of the choice sets

As a full-fractional design for all attribute-combinations is too large to answer by one individual (Bennet & Adamowicz 2001), we worked with a fractional-factorial main effects design. Requirement for this kind of design is orthogonality. Orthogonality ensures that the influence of a single attribute can be determined independently from the other attributes present on each choice card. We used Chrzen and Ormes (2000) procedure of Mix and Match to create the choice sets of all choice cards. In total, we obtained 46 choice cards. To create an orthogonal main effect design (Hensher et al. 2005) we used blocking (Bennet & Adamowicz 2001). We blocked all choice cards into six groups, so that each respondent was answering eight, respectively, seven, choice sets (21 resp. 28 cards) randomly. Figure II-5 shows an exemplary choice set of our experiment.

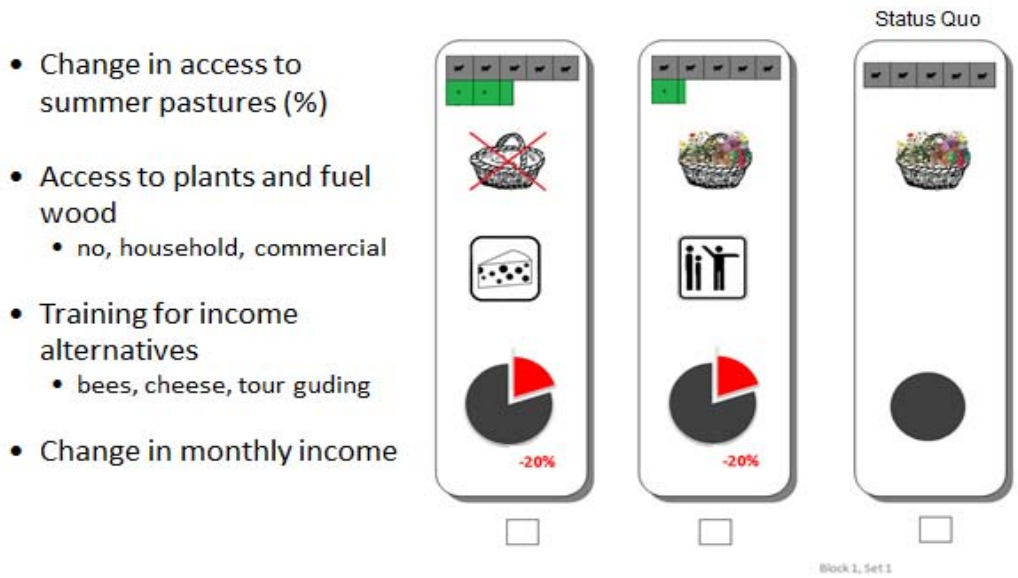

Figure II-5: Example of a choice card

The questionnaire was created in English and translated into Armenian und Georgian. We compared the original and translated versions to ensure that the questionnaires were correct, similar to interpret and reasonable in all three project regions (see Harkness 2003). Complete copies of the questionnaires are available from the authors.

3.4.5 Econometric analysis

Choice experiment analysis is based on the random utility theory (McFadden 1974) and Lancaster's characteristics theory of value. Choice experiments are regarded as suitable method for economic valuation of environmental goods (Adamowicz 1998). Following Lancaster's theory, it is not a good, which is the utility per se, it is the attributes of the good giving the utility (Lancaster 1966). McFadden states that utility is just a latent construction, which (if at all) exists only in individuals' minds (McFadden 1974). Human choice behaviours can be explained/forecasted as a function of the attributes that characterize the single options from which to choose from (McFadden 1973). Through analyses of the selection patterns between the options, the relative influence of attributes on choices can be determined and marginal economic values for an increase or decrease in statistically significant attributes can be calculated (Bateman et al. 2002). ´

We assume an additive utility function linear in parameters with respect to the attribute levels as coded in Table II-1. The utility function is separated into an observable component V_{in} and an unobservable (error) component ε_{in}

$$Uin = Vin + \varepsilon in$$

where U_{in} is the total utility of alternative i for individual n. The probability that individual n will choose option i over option j within the complete choice set C is

$$Prin = \mathrm{Pr}(Vin + \varepsilon in > Vjn + \varepsilon jn) \text{ (all } j \in C)$$

Choice decisions can be influenced by socio-economic parameters or attitudes towards the attributes. To assess such influences, interaction terms of the respective variables with attributes are calculated. If a deterministic utility component $V1$ is hypothesized to be a linear function of attribute $Z1$ with an individually varying socio-economic variable A, $V1$ can be formulated as

$$V1(Z1, A) = bA * Z1 + b1 * Z1$$

with bA as utility coefficient of the interaction term (Barkmann et al. 2008). In the econometrically estimated utility models, a positive sign of the coefficients b indicates a positive influence of the respective term on choices and thus on utility. To reduce collinearity between the interaction term and the non-interacted attribute term, the socio-demographic variables A were standardized before being multiplied with $Z1$.

The vector of utility coefficients is estimated with maximum likelihood techniques. The estimated models include a non-status quo alternative specific constant (NonSQ ASC) which picks up systematic differences in choice patterns between the choice cards. The NonSQ ASC was coded '0' for the Status Quo and '1' for the alternative choice cards A and B. Four socio-demographic variables (gender, age, education in years, monthly income) and three independent attitudinal variables (attitude towards national park, ha size of grassland, animals sent to summer pasture) were heuristically introduced into the NL model as interaction terms with the ASC to test for influence on choosing non-Status Quo alternatives.

Preliminary analyses showed that there might be a risk to violate the Independence from Irrelevant Assumptions (IIA) condition. Therefore, Nested Logit models were used as they rely on less strict assumptions. Models were estimated with NLOGIT 5. The inclusive value was set to 1.0 for the degenerated branch, and the models were initiated with starting values obtained from a non-nested NL model (Hensher et al. 2005). All scale parameters were normalized at the lowest level (RU1). We report

pseudo-R^2 values as model statistics in relation to "constants only" values. Values between 0.05 and 0.08 correspond to values approximately between 0.18 and 0.25 for the equivalent R^2 of a linear regression model (Domencich & McFadden 1975).

3.4.6 Calculation of welfare measures

WTP calculations are based on extrapolations from mean marginal WTP values. For attributes linear in parameters, marginal WTP (mWTP) equals the negative ratio of the respective attribute coefficient c_z and the coefficient of the monetary attribute c_y:

$$mWTP = \frac{\mathbf{cz}}{\mathbf{cy}}$$

3.5 Sampling and administration of the survey

The villages were drawn randomly from a bag. We defined the number of respondents we would like to survey before, so that we calculated households asked in the villages representatively from the total number of households living in the villages. After this we have chosen a number from a bank note randomly. This number stated the first household of a village we asked to take part at the survey. We walked through the villages on the basis of the village structure. For example we took the 9th number of an Armenian Dram note, which was 5 and walked to the 5th household in line. After this household we went five houses farer and so on. We did this from both ends of a village. All six enumerators of the choice experiment were thoroughly trained in the administration of the choice experiment and accompanied by a scientist of the research group.

3.5.1 Questions of the choice experiment frame

The frame of the choice experiment described the village and conservation development in rural areas of the South Caucasus. It explained the situation of protected areas roughly concerning the creation of new established protected areas and the enlargement of already existing ones. Furthermore it focused on the aspects of changes in usage of summer pasture, other natural resources of the area and of additional trainings for increasing income. Each attribute explanation was accompanied by specific questions to create independent variables which are needed for further calculations (see Annex II).

For the summer pasture attribute, respondents were asked if they send animals to the pasturelands, how many are sent, who is taking care of the livestock during this period, if the respondent would be willing to send more animals and if so, why this is not possible. Concerning to the usage of plants it was asked, how the usage of plants is controlled in the area and which type of usage fits best to the household situation (no usage, usage for home consumption and usage for home consumption and selling). For the training attribute it was asked, which kind of training was already offered in the specific village and which training out of several choices the respondent wish to take part in.

3.5.2 Pilot study

Our survey was piloted in June 2012 in all three case study regions on which we report main study results as a random clustered sample in three villages in each region (n = 3 x 30). A pilot study was also conducted in Zaqatala, Azerbaijan. Results however will not be presented.

In the pilot study, several attribute variants were tested. In addition to the attributes listed in Table II-1, we included an attribute on the supply of utility services (water, gas, electricity). Following hints from the qualitative interviews, the supply with utility services was of great concern for respondents. In addition, there are active village development programs that seek to improve access to utility services, e.g. in the Lake Arpi region (WWF 2012).

As our study addresses issues of integrated conservation planning, utility access appeared as a main topic for potential buffer zone management. The results of the pilot study showed that, in fact, utility access was of overriding concern for many respondents lacking access. Although this result warrants close attention by local administrators and policy makers, the result is little surprising given the livelihood realities in the rural Southern Caucasus. As we had tested more attributes than could be included in the main study, we opted to omit this one.

Also, several additional trainings for income alternatives were tested: wool production, leather production, and bed and breakfast. For these trainings, the pilot study did not indicate local demand.

3.5.2.1 Pilot study results of the choice experiment questions

The questions of the choice experiment frame pointed out that in Lake Arpi 29 of 30 respondents were using summer pastures and on average 38 animals were sent to it (min.: 0; max.: 300). 23 respondents wished to send more animals to the pastures, but mostly due to a lack of money, it is limited to invest in cattle. Usage and collection of wild plants is allowed in Lake Arpi. 26 of the respondents collected plants for home consumption, one respondent stated to sell it and three respondents did not collect plants at all. 12 respondents wished to take part at bee-keeping training, 13 at cheese-production training, nine at wool-production training, 10 at bed and breakfast training and a tour-guiding training and five at leather-production training.

In Samtskhe-Javakheti, on average, nine animals were sent to the pastures (min.: 0; max.: 25). All respondents were using the summer pastures and wished to send more animals to it. Due to a lack of money, respondents cannot afford to buy more animals. Collection of plants is allowed and all respondents stated to use plants for home consumption. Eight respondents wished to take part at bee-keeping training, 28 at cheese-production training, none at a wool-production and bed and breakfast training, five at a tour-guiding and 12 at leather-production training.

In Lagodekhi 22 of 30 respondents were using the summer pastures and sent, on average, nine animals (min.: 0; max.: 40) on it. 95 respondents wish to send more animals to the pastures and stated that it is not possible due to a lack of money and land. Collection of plants is allowed, but not of firewood (in the other regions no woods exist), as the woods are located at both parts of the nature reserve. 18 respondents said that they collect plants for their home consumption and 12 did not collect at all. Seven respondents wished to take part at bee-keeping training, 25 at cheese-production training, seven at a wool-production and four at bed and breakfast training, 10 respondents wished to take part at a tour-guiding and two at leather-production training.

3.5.2.2 Changes due to the pilot study

The monetary attribute was first stated in direct local amounts. After the pre-testing, we changed the monetary attribute into percentage because the financial situation over

the households and the regions differs widely and a percentage statement makes a comparison over the regions easier to estimate.

Also we created a summer pasture attribute in direct amount of animals. In addition, the summer pasture attribute was changed into percentage because the number of animals owned by farms and sent to the pastures differs already within the regions greatly. Even respondents wished to take part in different trainings only bee-keeping, cheese-production and tour-guiding were significant in CE analyses in all regions.
The main conclusion of the pre-test was that summer pasture is a main income source in all regions and a focus on that for the main study was important

3.5.3 Main study

The main study was implemented in October 2012. The survey was conducted as a random clustered sample in nine out of 18 villages of the Lake Arpi region, six out of 10 villages of the Samtskhe-Javakheti and six out of 10 villages of the Lagodekhi region. The household heads were targeted as the respondents. In case of absence their wives or another permanently resident-adult (> 18 years) in the households took part in the interview.

In Lake Arpi the villages Ardenis, Tsaghkut, Zorakert, Zarishat, Berdashen, Garnarich, Mets Sepasar and Ghazanchi were drawn. In Samtskhe-Javakheti the survey was conducted in the villages Sulda, Dadeshi, Kartsakhi, Philipovka, Efremovka and Sameba. In Lagodekhi we have randomly chosen the villages Khizabavra, Zemo Khiza, Gurgeniani, Ninigori, Rachisubani and Kavshiri.

All villages were located in the vicinity ("buffer zone") of the protected areas. In each region, two enumerators were interviewing the households. The frame questions of the choice experiment were similar as in the pre-test.

3.5.3.1 Main study results of the choice experiment question

The choice experiment was as in the main study embedded into a frame with additional questions (see Annex II). The presented sub-results are gained by this.

In Lake Arpi, 91 respondents used summer pastures, in Samtskhe-Javakheti 96 and in Lagodekhi 77. In Lake Arpi an average of 21 animals were sent to the pastures (min.: 0; max.: 93), in Samtskhe-Javakheti 19 (min.: 0; max.: 32) and in Lagodekhi five (min.: 0; max.: 10). In all regions, mostly the family is taking care of the animals at the pastures, but also shepherds were hired, neighbours were taking care and a rotation system exists. 83 respondents of Lake Arpi would like to send more animals to the summer pastures, in Samtskhe-Javakheti 84 and in Lagodekhi 77. However, most farmers cite a lack of money (all regions) why they cannot send more animals. In Samtskhe-Javakheti, also a lack of water and in Lagodekhi a lack of land was mentioned as limitations for sending more animals to pasturelands.

In Lake Arpi and Samtskhe-Javakheti, no wood exists and in Lagodekhi the respondents mentioned, that it is possible for them to buy a small amount of firewood from the national park administration but it is not allowed to collect it. 93 respondents in Lake Arpi stated to collect plants for home consumption, one respondent for selling and six respondents are not collecting at all. In Samtskhe-Javakheti 53, respondents are collecting for home consumption and 47 are not collecting. In Lagodekhi 87, respondents are not collecting wild plants at all, but 11 for home consumption and two for selling. 75 respondents of Lake Arpi stated that no training was offered to them until now, 20 were taking part at a bee-keeping and five at a tour guiding training. In Samtskhe-Javakheti, 98 respondents were not taking part at any training, but two respondents at a bee-keeping training. In Lagodekhi, just one respondent mentioned that he was taking part at cheese production training. Contemporary in Lake Arpi 33 respondents wish to take part at a bee-keeping training, 38 at cheese-production and 42 at a tour-guiding training. In Samtskhe-Javakheti 50 respondents would like to take part at bee-keeping, 73 at cheese-production and 20 at a tour-guiding training and in Lagodekhi most respondents wish to take part at a cheese-production (64), 50 at a bee-keeping and 22 at a tour-guiding training.

4. Results

Altogether 300 households provided complete responses (n = 3 x 100). In Lake Arpi 100 of 1150 households (8.6%), in Samtskhe-Javakheti 100 of 1732 households (5.7%) and in Lagodekhi 100 of about 3000 households (3%) were taking part in the survey. Of the 300 respondents who completed the questionnaires and the choice

experiment, 68 were female and 232 male. The most female respondents were found in Lake Arpi (50 out of 100). In Samtskhe-Javakheti 11 females were taking part in the survey and in Lagodekhi seven. A description of the sample is represented in Table II-2.

Table II-2: Sample description

Demographic Variables	Lake Arpi (Armenia)	Samtskhe-Javakheti (Georgia)	Lagodekhi (Georgia)
Gender:			
Female (%)	50.0	11.0	07.0
Male (%)	50.0	89.0	93.0
Age :			
Mean	52.0	59.9	54.9
Standard deviation (SD)	13.1	12.0	12.7
Education:			
Years of education Mean	11.9	10.7	10.6
Years of education SD	02.6	03.3	02.4

The age of the respondents is between 22 and 88. All respondents, accept two, finished secondary school. However, we decided to describe the level of education in years, as the systems of education changed in Georgia and Armenia before and after the breakdown of the Soviet Union several times. The highest mean level of education can be found in Lake Arpi (11.94 years) and the lowest in Lagodekhi (10.56 years). 51% of all respondents have a degree of higher education. We can find in mean the youngest respondents in Lake Arpi (52.02) and the oldest in Samtskhe-Javakheti (59.93).

To indicate the household income we calculated income and expenses from farming, employment work outside of agriculture, state payments, remittances and subsistence farming income (see Figures II-5 – II-7).

Based on the survey results we calculate for Lake Arpi a yearly average income of 3,840 € (before ppp adjustment), from which 1,940 € is subsistence farming income. For Samtskhe-Javakheti, a yearly income of 4,900 € (before ppp adjustment), from which 1,500 € is subsistence income and for Lagodekhi, a mean yearly income of 1,020 € (before ppp adjustment) with 210 € of subsistence income. If we apply ppp for a better comparison the yearly income for a household in Lake Arpi is 2,348 €

(4,292 €/average Armenia), 1,979 € in Samtskhe-Javakheti and 680 € in Lagodekhi (4,413 €/average Georgia). Our survey results show that the cash income of Armenia (1,162 €/year) is composed of 72% from employment work outside agriculture, 4% from selling agricultural products, 20% are state payments and 4% remittances (see Figure II-6).

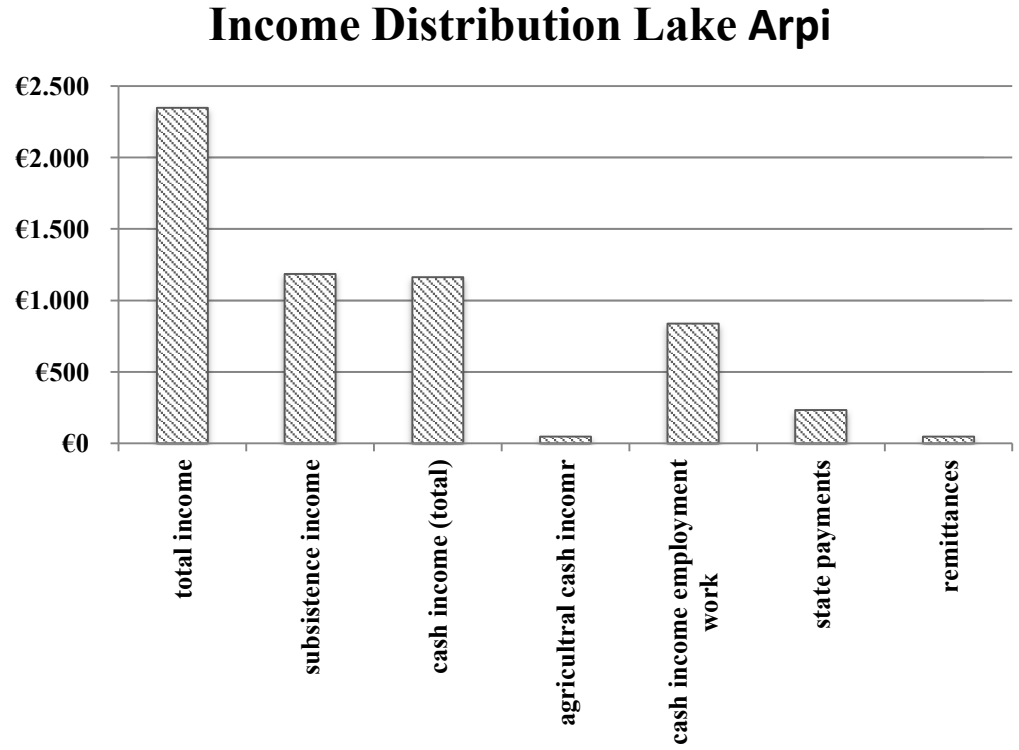

Figure II-6: Income Distribution of the buffer zone villages of Lake Arpi (in €, calculated in *purchasing power parity*; subsistence income is calculated in actual value, N=100).

The data from Samtskhe-Javakheti (see Figure II-7) indicates that 59% of the average cash income (1,373 €/year) are generated by employment work outside agriculture, 10% by selling agricultural products, 19% of the cash income are state payments and 12% remittances.

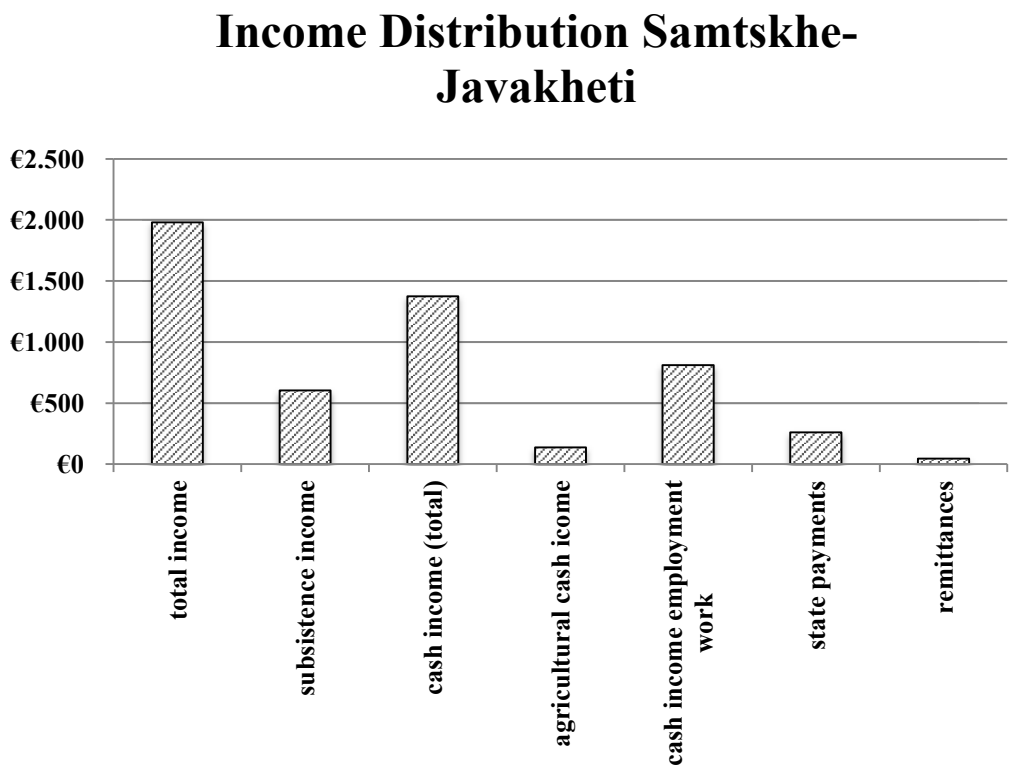

Figure II-7: Income Distribution of the buffer zone villages of Samtskhe-Javakheti (in €, calculated in *purchasing power parity*; subsistence income is calculated in actual value, N=100).

In the survey, results of Lagodekhi show that just 39% of the mean cash income (540 €/year) come from employment work outside of agriculture and 33% from selling farm products. 14% of the cash income are state payments and another 14% are generated by own businesses. Respondents of the region of Lagodekhi state no remittances (see Figure II-8).

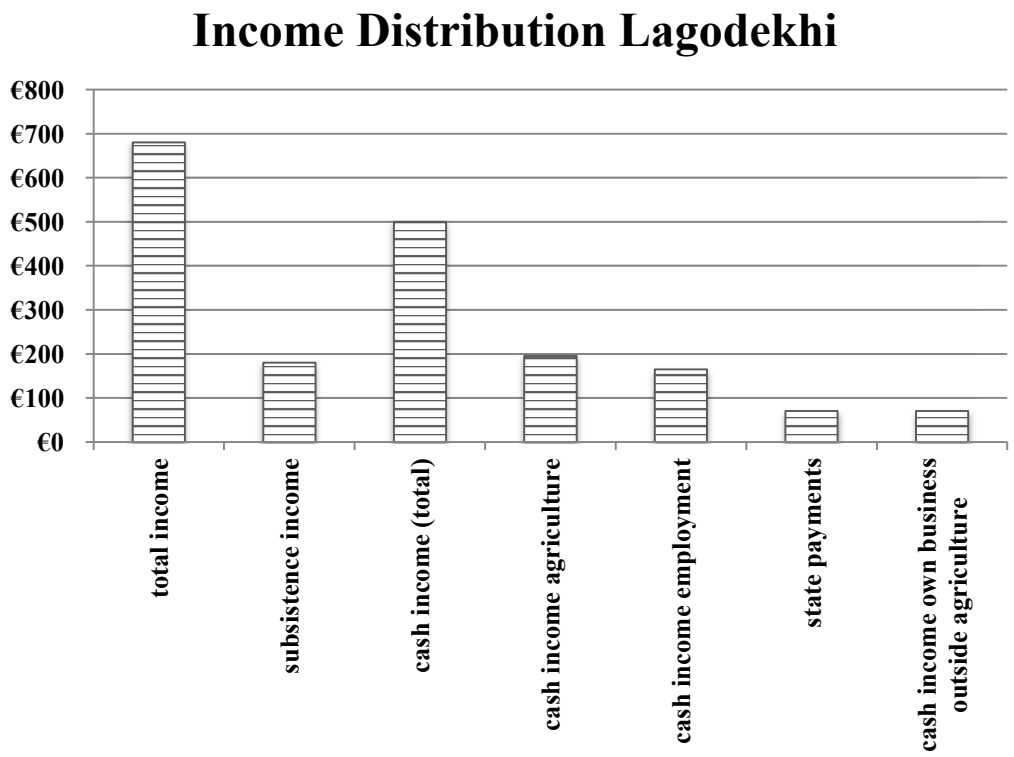

Figure II-8: Income Distribution of the buffer zone villages of Lagodekhi (in €, calculated in *purchasing power parity*; subsistence income is calculated in actual value, N=100).

4.1 Structural household data

The following subchapters show briefly the household structures of all three regions, based on the ascertained data. The data refers to the conducted household survey (see Annex I).

4.1.1 Household data Lake Arpi

Table II-3 shows the division of an average household in the region of Lake Arpi. All households are ethnic Armenians and mostly set together from three generations.

Table II-3: Household structure Lake Arpi sample (N=100)

	Household members	Members younger than 16	Education head of household	Members working outside agriculture
Average size in 2012	4.8	1	11.8 years	2.5

In the household survey we asked about all family members living within the household. From this data three typical forms of families can be found in the region:

(i) Both parents live in the household, with one grandparent and an adult child and spouse and partly with one grandchild as well

(ii) The mother lives together with two adult children and one or two grandparents

(iii) The mother lives together with two adult children, the spouse of one of the children (this child doesn't have to be in the household), one grandparent and one or two grandchildren

Distances to necessary facilities are wide. On average markets to buy important goods for the farms (technics, seeds, etc.) are about 47 km away from the villages and just located in the city of Gyumri, the capital of the region Shirak, which is on 1500 meter above sea level (500 – 1,000 m lower than the villages). Veterinary services, police stations and other related facilities are on average 17 km far away (in the village of Mets Sepasar). Banks and Doctors (no hospitals exist in the buffer zone) are on average 11 km away from households. Furthermore than the distance to necessary institutions, 97 out of 100 farmer in the buffer zone of the national park rate there situation as farmer as very bad, three as bad.

Mean farm area is 9.2 ha divided into three plots. About seven ha are used on average. Two ha are fallow grounds. Farms in Lake Arpi use, on average, about 83% of their land as grasslands to produce fodder for their animals. 6% of the land is used for growing potatoes, 3% for wheat, 2% for barley, and 5% for other agricultural products. Communal pastureland is available for grazing. Those pastures are located in the buffer/traditional zone of Lake Arpi national park. The pastures are rented out from communities on a 25-year basis, but the number of animals sent to the land is not limited. More wealthy families are able to hire shepherds, but mostly family members are taking care of the animals during the grazing period, or as common in the South Caucasus, a rotating system is existing, in which alternating one family is function as shepherd for the whole village. All villages use the near-by pasturing system. This means, animals are sent to the grazing fields in the morning, after milking, and brought back over night each day, as the area is not far away.

Table II-4 displays the average size of herds and related good production of an average household of Lake Arpis buffer zone.

Table II-4: Average size of herds and good production of Lake Arpi in 2012 (N=100)

	Cows	Cows sold	Calves	Pigs	Sheep	Chicken	Meat prod.	Milk prod.	Meat sold	Milk sold
Average size in 2012	10	1.5	2.5	< 1	9	16	120kg	16,000L	120kg	4,000L

Herds are small and families keep nearly the same amount of cattle and sheep. Less meat is produced and sold in the region. On Average two sheep were sold by a household in the year 2012 and one presented as a gift. If households produce meat by themselves, they sell the full amount. In the region of Lake Arpi a dairy factory exists in the village of Aghvorik, which buy milk from all farmers of the buffer zone. On average, 600 kg of dairy products were produced and bartered by the households per year. The remaining milk in 2012 was used for home consumption.

Households in Lake Arpi are suffering from inadequate utility grid supply. Table II-5 shows how many households of the target group would like to have an improvement of supply of the different supply kinds. Households were asked, if they wish an improvement and how much they would be willing to pay for that.

Table II-5: Need of utility grid improvement and willingness to pay in Lake Arpi (N=100)

Improvement of gas supply	Improvement of water supply	Improvement of electricity supply	Willingness to pay monthly for improvement in Euro
89%	62%	1%	19.6 €

We can see that households mostly suffer from a lack of gas supply. None of the households has a connection with gas. But also not even every second household has an adequate connection to water. Most households use wells and there is no connection with water for irrigation. Also no canalization system can be found in the whole region. Electricity supply is in nearly all households good. For an improvement of water and gas connections the households would be willing to pay in average 20 € a month.

4.1.2 Household data Samtskhe-Javakheti

Table II-6 shows the structure of an average household of the region Samtskhe-Javakheti. 97 of 100 head of households stated to be ethnical Armenians, the remaining three stated to be Georgian.

Table II-6: Household structure Samtskhe-Javakheti sample (N=100)

	Household members	Members younger than 16	Education head of household	Members working outside agriculture
Average size in 2012	5.4	1	10.7 years	2

Mostly the households are set together of three generations. The same three typical forms of families as in the Armenian twinning zone can be found.

Banks, markets to get needed goods for the farms or to sell produced ones are about 24 km away from the villages, as well veterinary services. These facilities are only available in the cities Ninotsminda and Akhakalaki. The towns are located on nearly the same height as the villages, but roads are under very bad conditions and furthermore most families do not own a car (*pers. observation* Kalatas 2012). Additionally a lot of families do not have phones and veterinary services and sellers are rarely coming to the region by themselves (*pers. observation* Kalatas 2012). In Georgia the provision of vaccination is free one time a year (*pers. observation* Kalatas 2012), so that this is mostly the only time farmers can contact a veterinary. Police stations are about 11 km away from households (in the village Sulda and in the village Sameba), as well as doctors, who are findable in some villages. No clinic exists in the whole buffer zone region. Public transportation possibilities are limited and without regular schedules (*pers. observation* Kalatas 2012). 99 out of 100 respondents rate their situation as farmers as very bad, one as bad.

Households own on average 1.5 ha of land. The farmland is mostly divided into two plots, which are not always close to each other. The most common agricultural activity is potato growing. The farms use, on average, about 43% of their land to grow potatoes, 27% for barley, 18% as grassland to produce fodder for their herds, 10% for wheat, 3% for vegetables (mostly cabbage) and 1% for other agricultural products. For grazing, the communities use communal pastureland, which is located in the

buffer/traditional zone of the national park, as all villages are located in the national park. Usage of the pastures is unorganized and number of animals sent to it is not regulated. Communal pastureland is closer to the households than the own plots, therefore families uses the near-by system. Animals are sent to the pastures in the morning, after milking and brought back each evening to stay overnight in the stable. Families take care of the animals by themselves, or use the in the South Caucasus common system of rotation. Table II-7 shows the small number of animals owned by families in the buffer zone. On average more sheep are hold by a household than cattle, even production is more focused on milk. Sheep are not sold, mostly given away as gifts (on average four/year) or slaughtered for home consumption. The main amount of milk stays in the households and is produced to 170 kg of dairy products, mostly cheese, which was bartered in 2012. Several dairy factories exist in the cities Akhakalaki and Ninotsminda (about 25 km away). These factories buy milk from farmer of the buffer zone, but due to bad contract conditions and lack of correct payments farmer prefer to use milk as a bartering good for fruits, clothes and other needed goods *(pers. observation* Kalatas 2012).

Table II-7: Average size of herds and milk production in Samtskhe-Javakheti in 2012 (N=100)

	Cows	Cows sold	Calves	Pigs	Sheep	Lambs	Chicken	Milk prod.	Milk sold
Average size in 2012	4.5	< 2	2	1	12	2	17	5,220L	1,430L

Households in Samtskhe-Javakheti are suffering from inadequate utility grid supply. Table II-8 shows how many households of the target group would like to have an improvement of supply of the different supply kinds. Households were asked, if they wish an improvement and how much they would be willing to pay for that.

Table II-8: Need of utility grid supply and willingness to pay in Samtskhe-Javakheti (N=100)

Improvement of gas supply	Improvement of water supply	Improvement of electricity supply	Willingness to pay monthly for improvement in Euro
88%	89%	1%	15 €

Households in Samtskhe-Javakheti mostly suffer from a lack of water supply. Most households do not have a direct connection to water and use (communal) wells for

their homes and to irrigate land. None of the households has a connection to a gas net and there is no canalisation system existing in the region. The connection with electricity is good. For a better supply of these needed utilities household in Samtskhe-Javakheti would be willing to pay on average 15 € a month.

4.1.3 Household data Lagodekhi

89 respondents of the sample to be ethnical Georgians, three households are of Ossetia origin and eight of Azerbaijani. Table II-9 shows the average household data of our survey.

Table II-9: Household structure Lagodekhi (N=100)

	Household members	Members younger than 16	Education head of household	Members working outside agriculture
Average size in 2012	4.5	1	10.6 years	1.5

The Lagodekhi sample show similar family structures as in the other two regions. The only exception is that often times the wife lives abroad and not constantly with the family. It can be taken as granted, that the wives are working in foreign countries to support their families in Lagodekhi (*pers. observation* Kalatas 2012).

The infrastructure in the area of the Lagodekhi protected area can be seen as acceptable. The city of Lagodekhi is located at the middle of the buffer zone region. It is on average 8 km far away from the villages. All important facilities, like market to buy and sell goods, veterinary services, police stations, banks and even a small clinic are located at the city. Most families own a car and the public transportation options in the region are quite well developed, which was noticed by personal observation. However, exceptions are existing for a few mainly Azerbaijan settled villages, which are located closer to the national park area and farer from the city of Lagodekhi. 90 out of 100 respondents rate their farming situation as very bad, 10 as bad.

Mean farm area is 1.2 ha. This land is mostly divided into two plots, which can be quite far away from each other. The total area is used by families. The households use about 74 % of their land to produce corn, 15% as grassland to produce fodder for their animals, 3% to grow wheat, 2% for vegetables, 1% for barley and 5% for other agricultural products. Personal observations have shown that families have gardens in which fruits and nuts are produced. The outputs from these are not mentioned by

respondents. For grazing households use communal pasture areas, which are small and unorganized. The amount of animals sent to the pastures is not limited and no rents have to be paid for it. A family are mostly taking care of the animals by themselves, however in some exceptions the rotation system, already elucidated in the first two regions, is used by households. The common near-by pasture regime is used in this region, as well. No land in the protected area is used by local respondents.

Households do own much less animals than in the buffer zones of the Javakheti plateau. Table II-10 shows the distribution of animals and the production of milk in 2012.

Table II-10: Average size of herds and farm production for Lagodekhi in 2012 (N=100)

	Cows	Cows sold	Calves	Pigs	Sheep	Chicken	Milk prod.	Milk sold
Average size in 2012	3.8	< 1	0.3	1	0.3	16	1,170L	1,030L

A household keeps on average 3.8 cows (min.: 0; max.: 60), and sold less than one head of these in 2012. Additionally, a household keeps about 0.3 calves, one pig, 0.3 sheep (min.: 0; max.: 30) and 16 chicken. The mean milk production in 2012 was 1,170 L, of which 1,030 L were sold. 30 kg of cheese were produced, from which 10% were bartered and the rest sold. Remaining milk was used for home consumption.

Table II-11 shows respondents' wish of improvement of utility grid support and their average willingness to pay for it.

Table II-11: Need of utility grid supply and willingness to pay Lagodekhi (N=100)

Improvement of gas supply	Improvement of water supply	Improvement of electricity supply	Willingness to pay monthly for improvement in Euro
63%	41%	2%	15 €

In Lagodekhi some villages are connected to the gas net, but more than the half are not. There is no canalisation system in the whole region and water to irrigate arable land does not exist. However, most households have a direct connection to water and just 41% of the respondents wish to improve this connection. A household of

Lagodekhi would be willing to pay in average 15 € a month for a better connection to utility grids.

4.1.4 Summary of quantitative results

The results show consistent a comparative high level of education and a preponderance of several generations living together in one household. Members of the household live partly abroad to support their families financially. In none of the regions, households can generate main income from agriculture. In Samtskhe-Javakheti and Lake Arpi, however, it is possible for households to generate considerable income from animal husbandry. But state a lack of money to invest in herd enlargements. The majority of the agricultural income is gained by selling milk. In Lagodekhi on the other hand respondents state mainly the lack of land is limiting factor for herd enlargements.

Huge communal summer pasture areas do have important influence on household income. It can be assumed that the more area a household has access to, the higher by tendency is the income from dairy farming. Access to summer pasture is very limited in Lagodekhi and results in the low income generated by agriculture.

4.2 Choice experiment results

Table II-12 shows the choice experiment results in form of the coefficient analysed by a nested logit model.

Table II-12: Valuation of the socio-economic choice experiment in all three project regions

	Lake Arpi (ARM)	Samtskhe-Javakheti (GEO)	Lagodekhi (GEO)
	Coefficient	Coefficient	Coefficient
Attributes			
Bee-Keeping Training	0.462**	0.378*	0.523***
Cheese-Production Training	0.351*	0.699***	0.525***
Tour Guiding Training	0.593***	0.163	0.166
Summer Pasture	0.021***	0.0269***	0.017***
Ban of Collection	-0.979***	-0.231	-0.119
Permission of Collection	-0.023	0.156	0.280*
Income Change	0.038***	0.013***	0.042***
Non Status Quo	-0.791***	1.592*	0.253
Log-likelihood	-657.7	-665.4	-585
Restricted log likelihood	-813.7	-960	-966.3
P (Chi²); DF	312.15; 9	589.15; 9	762.4; 9
Pseudo R^2 (const.only)§	0.189	0.1644	0.233
Radj (const. only)	0.185	0.159	0.229
Observations	764	764	754

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level.
§:Pseudo-R^2(constant only) values between 0.16 and 0.23 correspond to R^2 values between 0.85 and 0.95 value in the linear model equivalent (Hensher et al. 2005: 338f). N: 300

In the Lake Arpi sample, all coefficients for trainings are significant: The bee-keeping training on a 5% level, cheese-production training on a 10% level and tour-guiding training on a 1% level. Tour-guiding has the highest coefficient of all trainings. The ban to collect plants has a negative coefficient on the 1% level, as well as the NonSQ term. The negative coefficient of the NonSQ term shows a tendency that status quo was, independent from the attribute level, more frequently chosen than the changing choice cards (attribute level were seen as disadvantage of the choice set). The coefficient of the summer pasture attribute is positive on the 1% level. The permission to collect wild plants is not significant.

In Samtskhe-Javakheti the coefficient of the bee-keeping training is significant on the 10%, the coefficient of the cheese-production training on the 1% level. Cheese-production has the highest coefficient of trainings. The NonSQ term has a positive coefficient on the 10%. This term shows a positive tendency to choose the changing choice cards, beyond measure, as would be expected alone from the attribute level of the choice cards towards the status quo (attribute level were seen as advantages of the choice cards). The coefficient of the summer pasture attribute is significant on the 1% level.

In Lagodekhi bee-keeping training and cheese-production training have a coefficient significant on the 1% level and are similar. The attribute of a permission to collect wild plants and timber has a positive coefficient on the 10% level. The coefficient of the summer pasture attribute is positive on the 1% level.

Summer pasture and income change are the only attributes that are in all regions significant at the same level (1%). In this table already, specific preferences can be seen. The following Table II-13 shows the mean marginal willingness to pay at a 95% confidence interval and clarifies these preferences.

Table II-13: Mean marginal WTP as percentage of the average income and 95% confidence intervals for mWTP (Wald)

	Lake Arpi (ARM) Mean (CI)	**Samtskhe-Javakheti (GEO)** Mean (CI)	**Lagodekhi (GEO)** Mean (CI)
Bee-Keeping Training	**12%** (1.3%/23.14%)	**28%** (-3.02%/59.40%)	**12.6%** (3.67%/21.64%)
Cheese Production Training	**9%** (-1.18%/19.53%)	**32%** (17.68%/86.77%)	**12.6%** (3.67%/21.62%)
Tour Guiding Training	**15.6%** (5.97%/25.10%)	12% (-13.51%/37.82%)	4% (-3.56%/11.55%)
Ban of Collection	**-25.7%** (-34.95%/-16.33%)	17% (-42.74%/8.30%)	-3% (-10.13%/4.38%)
Permission of Collection	-0.6 (-9.2%/8.03%)	11.6% (-15.03%/38.33%)	**6.8%** (-1.10%/14.60%)
Summer Pasture	**0.7%** (0.3%/1.22%)	**2%** (1.66%/2.35%)	**0.4%** (0.31%/0.49%)

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level. N=300

If we calculate the mean willingness to pay in percentages of the monthly income, we see that the bee-keeping training would be worth 12% of the monthly income of respondents of Lake Arpi, 28% of the Samtskhe-Javakheti mean monthly income and 12.6% of the income of Lagodekhi. The cheese-production training would be 9% of the monthly income in Lake Arpi, 12.6% in Lagodekhi and 32% in Samtskhe-Javakheti. In Lake Arpi respondents would be willing to pay 16% of their monthly income for the tour-guiding training, which is the highest amount they would pay for any training. The ban to collect wild plants is in Lake Arpi a WTA of 25.7% of the monthly income, which is the highest willingness-to-pay/-accept for Lake Arpi. In Lagodekhi, on the other hand respondents would be willing to pay about 7% of their income for a permission to collect wild plants and fuel wood.

Coming to the summer pasture attribute, 0.4% (Lagodekhi) up to 2% (Samtskhe-Javakheti) of the monthly income seems to be a low WTP, but we have to keep in mind that this would be for 1% more summer pasture.

4.2.1 Scenario

To compare WTP values across the case study areas, an exemplary development scenario was designed. It consists of two-month trainings for bee-keeping, cheese-production or tour-guiding and 25% more access to summer pasture. We included two

variants, either if a general ban to use and collect wild plants and fuel wood exists or a general permission to use and collect wild plants and fuel wood in a commercial way was allowed. The ban and permission would influence the respondents for six month of the year, as well as the more access to summer pasture would do. Table II-14 gives an overview of the marginal WTP that was analysed by nested logit analyses. All outputs were generated in Euro (ppp).

Table II-14: WTP of Scenario in Euro (ppp) (Lagodekhi equated with income of Samtskhe-Javakheti)

	Quantity	**Duration** (month/ year)	**Lake Arpi (ARM)** Mean	**Samtskhe-Javakheti (GEO)** Mean	**Lagodekhi (GEO)** Mean
Bee-Keeping Training	1	2	**47**	**92**	**42**
Cheese Production Training	1	2	**35**	**106**	**42**
Tour Guiding Training	1	2	**61**	40	13
Ban of Collection	1	6	**-302**	168	30
Permission of Collection	1	6	-7	115	**67**
Summer Pasture +25/-25	25	6	**205**	**495**	**99**

N=300

Table II-14 shows that the willingness to pay for a two month training widely differs over the regions. While in Lake Arpi respondents would be willing to pay 47 € for a bee-keeping training, in Samtskhe-Javakheti respondents would even pay 92 € and in Lagodekhi just 42 €. Respondents from Lagodekhi and Lake Arpi would pay 35 € for cheese-production training whereas respondents from Samtskhe-Javakheti would be willing to pay 106 € for this two-month training. For the tour-guiding training, individuals from Lake Arpi would be willing to pay in mean 61 €. To accept a ban to collect wild plants and fuel wood respondents from Lake Arpi have to be paid 302 € a year, which is the highest WTP/WTA of the region of Lake Arpi. In Lagodekhi, people would be willing to pay 67 € a year to get a permission to collect. For all regions, the willingness to pay for 25% more summer pasture is relatively high. In Lagodekhi, respondents would be willing to pay 99 € a year, in Lake Arpi 205 € and in Samtskhe-Javakheti 495 €.

4.2.2 Interactions

This section describes (i) the impact gender has on the utility of the choice experiment and (ii) effects which are based on other socio-demographic interaction aspects.

4.2.2.1 Impact of gender

Table II-15 shows the different impact that gender has on choice experiment decisions. However, we have to keep in mind that just in Lake Arpi the gender ratio is balanced. Anyway, some significant influences could be found

Table II-15: Gender differences for WTP and utility coefficient

	Lake Arpi (ARM) Mean (Coefficient)	**Samtskhe-Javakheti (GEO)** Mean (Coefficient)	**Lagodekhi (GEO)** Mean (Coefficient)
Bee-keeping Training			
* Female	9.7% (0.422)	**14% (0.521**)**	12% (0.731)
* Male	**12.4% (0.392**)**	15% (0.265)	**13% (0.539***)**
Cheese-Production Training			
* Female	7.8% (0.341)	**13% (0.492**)**	6% (0.351)
*Male	**9.6% (0.305*)**	**27.8% (0.492**)**	**14% (0.566***)**
Tour-Guiding Training			
* Female	**9.8% (0.426*)**	**13% (0.486**)**	3% (0.175)
*Male	**25% (0.783***)**	**15% (0.26171*)**	4% (0.180)
Ban of Collection			
*Female	**-17.5 (0.763***)**	**-21% (-0.791***)**	11% (0.665)
*Male	**-40% (-1.277***)**	**-25% (-0.437***)**	-4% (-0.173)
Permission of Collection			
* Female	2% (0.089)	2% (0.036)	6% (0.380)
* Male	-5% (-0.156)	4% (0.149)	6% (0.260)
Summer Pasture			
* Female	**0.5 (0.021***)**	**0.5% (0.020***)**	**0.5% (0.030***)**
* Male	**0.8% (0.025***)**	**1.5% (0.027***)**	**0.4% (0.016***)**

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level.

In Samtskhe-Javakheti the willingness to pay for a bee-keeping training is just significant for female respondents, while in Lake Arpi and Lagodekhi it is only for men (12.4%/13%). In Samtskhe-Javakheti the cheese-production- and the tour-guiding training is significant for both genders, with higher WTP for men. Tour-guiding training is significant in Lake Arpi for both genders. A ban to collect wild plants creates in Lake Arpi and Samtskhe-Javakheti a WTA for both genders. In both regions the WTA is lower for female respondents. The summer pasture attribute is in all regions significant for female and male respondents. In Lake Arpi and Samtskhe-Javakheti the WTP for summer pasture is lower for females than for men (0.5%/0.5% female / 0.8%/1.5% male), but in Lagodekhi females have a higher WTP (0.5%).

4.2.2.2 Interaction of other socio influences

Most interactions can be found in the Lake Arpi sample (7), the least in the sample of Lagodekhi (4). The kinds of interactions vary quiet differ from the regions, but in all

regions interactions for the training attributes and the summer pasture attribute can be found (see Table II-16).

In Lake Arpi each one more year of age increases the WTP for a bee-keeping training about 7%, while it decreases the WTP in Samtskhe-Javakheti about 0.04%. In Lake Arpi also a 1% higher monthly income increases the WTP for this training about 10%. In Lagodekhi each one more year of education has the impact of increasing the WTP for this training about 3%. Each year a respondent is older in Lagodekhi the WTP for the cheese-production training is increasing about 2%, while in Samtskhe-Javakheti each 1% higher monthly income results in a 9.5% higher WTP for this specific alternative income source. In Lake Arpi each 1% higher monthly income leads to a 15% higher WTP to participate in a tour-guiding training. 1% higher monthly income results in a 9% higher WTA to accept the ban to collect wild plants in Lake Arpi. Each one year of age on the other hand increases the WTP to pay for a permission to collect wild plants in Samtskhe-Javakheti about 1%. In Lagodekhi each 1% more of monthly income leads to a 6% higher WTP for a permission to collect wild plants and timber.

Most interactions over the regions can be found for the WTP of the summer pasture attribute: Three interactions in Lake Arpi, two in Samtskhe-Javakheti and one in Lagodekhi. In all regions a higher education leads to an interaction. While each one more year of education leads in Samtskhe-Javakheti to a 0.06% higher WTP for access to 1% more pastureland and in Lagodekhi to a 0,025% higher WTP, in Lake Arpi higher education decreases the WTP about 0.17%. Having 1% more of a monthly income leads to a 0.2% higher WTP in Lake Arpi and a 0.17% higher WTP in Samtskhe-Javakheti. Each one more year of age, decreases the WTP for summer pasture access in Lake Arpi about 0.1%.

Table II-16: Socio-economic interactions in WTP for all three regions

	Lake Arpi (ARM) Mean (Coefficient)	**Samtskhe-Javakheti (GEO)** Mean (Coefficient)	**Lagodekhi (GEO)** Mean (Coefficient)
Bee-Keeping Training	**13% (0.513**)**	**18% (0.505***)**	**13.5% (0.580***)**
*z-Age	**7% (0.275*)**	**-0.04% (-0.001*)**	
*z-Education in years			**3% (0.144**)**
*z-Income per Month	**10% (0.393*)**		
Cheese-Production Training	**8% (0.325**)**	**21% (0.591***)**	**15% (0.643***)**
z-Age			**2% (0.070**)**
*z-Income per Month		**9.5% (0.267**)**	
Tour-Guiding Training	**16% (0.628***)**	**7% (0.202*)**	4% (0.157)
*z-Income per Month	**15% (0.585***)**		
Ban of Collection of Goods	**-27% (-1.042***)**	-6% (-0.160)	-3% (-0.132)
*z-Income per Month	**-9.4%(-0.372***)**		
Permission to Collect Goods	0.2% (0.009)	**-8% (0.233*)**	**9% (0.387**)**
*z-Age		**1% (0.028**)**	
*z-Income per Month			**6% (0.256**)**
Access to Summer Pasture	**0.6% (0.023***)**	**0.7% (0.021***)**	**0.4% (0.017***)**
*z-Age	**-0.1% (-0.004***)**		
*z-Income per Month	**0.2% (0.008***)**	**0.17% (0.004***)**	
*z-Education in years	**-0.17% (0.006***)**	**0.06% (0.002***)**	**0.025% (0.001**)**

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level. *z: Z-transform of respondents age, education in years and income per month. N=300

5. Discussion and Conclusion

The following subchapters will first discuss the income situation and measurement of Lagodekhi. After that, the importance of access to summer pasture will be discussed in more detail, as well as the interest in additional income sources and the importance of other natural resources. The discussion will end with a closer look on the influences found on WTP.

5.1 Income of the Lagodekhi sub sample

The overall yearly income of 680 € found in the Lagodekhi sub-sample may be too low, especially compared to the rural areas of Lake Arpi (2,348 €) and Samtskhe-Javakheti (1,989 €). There are two reasons why the income in fact could have been underestimated:

(i) It is possible, that respondents withhold information about some income sources. Through informal talks, we found out that the wife of a male household head often lives abroad and sends money to the families. However, none of the respondents from the Lagodekhi sub-sample indicated that the household would receive any remittances at all (as opposed to the other regions, where remittances were stated from most households). Underreporting is also supported by Ferry (2014), who states that Georgian women represent 50.8% of all Georgian migrants outside the Commonwealth of Independent States (CIS) and 36% of all Georgian migrants inside the CIS countries. Women are working mostly in the house keeping sector and sending, contrary to men, the main income to their families in Georgia. In rural households of Armenia and Georgia it is likely that family members work abroad. This money is an important part of the income but often under-reported (Davis et al. 2004). However, for Armenian families it is more common to send remittances (Pearce 2011).

(ii) Just six households from Lagodekhi reported to have gardens in our household survey. These respondents mentioned in the questions concerning agricultural production their home gardens, and what they produce there. There is little overall arable land and the climate is more suitable for garden production in Lagodekhi than in Lake Arpi or in

Samtskhe-Javakheti. Thus, production from home gardens may be relatively more important here. As our survey was not specifically geared towards the analysis of production from home gardens, we may have underestimated income here.

On the other hand, there are also reasons to believe, that some income components are in fact low:

(iii) Agricultural income was, in fact low in 2012 in Georgia. There is less agricultural land and fewer animals per household than in the other regions. The main arable crop is corn. Farms produced on average in the region of Kakheti in the year 2012 just 2,5 t per ha, which is 0.2 less than in 2011 and 0.6 than in 2009. Coupled with the very low market price of corn for 2012 (450 – 500 Lari/t), low-income results (Tsakadze et al. 2013).

(iv) Access to summer pasture is low. Consequently, income from dairy and meat production is low and lower than in other regions. An average household owns 4-5 cows. Herd sizes in Samtskhe-Javakheti and Lake Arpi are about 4 times higher.

5.2 Access to summer pasture

The results show, that access to summer pasture has high economic value (WTP). In Lagodekhi, the WTP is the lowest and in Samtskhe-Javakheti the highest. In Samtskhe-Javakheti the marginal WTP for 1% more access to summer pasture is 2% of the monthly income, which is more as double as in Lake Arpi (0.7%).

Summer pasture is meaningful in Lake Arpi. Results have shown that households do own about six ha of grassland and use it for winter fodder production. If access to summer pasture would be reduced own private grassland would have to be used as grazing areas and less winter fodder could be produced. The more percentage of summer pasture households would lose access to, the higher the compensatory damages would be. If in future of the national park planning, summer pasture areas would be included to the strict zones massive negative effects on animal husbandry can be assumed. Payments to households as compensation would be relatively high.

From the scenario we have seen that WTA for 25% less access to summer pasture would be minimum 205€ a year.

Households in Samtskhe-Javakheti do have less land and just 0.2 ha are used as grassland. If changes in demarcation of the national park would cancel access to communal pastures there would be no local replacements. Compensation damages would be by comparison very high. In the scenario WTA for 25% less access to summer pasture was 495 € and reflects the importance of the resource.

In Lagodekhi, the marginal WTP for access to 1% additional summer pasture areas is just 0.4% of the monthly income. Respondents here own the lowest amount grassland of all regions as due to the location of the nature reserve no additional available land exists near the villages in adjacent of the reserve. This relatively high WTP (keeping the overall low income in mind) shows a sensitivity towards expansions of the nature reserve, which has already be done in the history of structuring the reserve area. Also this can be underpinned by the WTA of the scenario of 99 € a year.

In Lake Arpi and Samtskhe-Javakheti, households keep more animals and send more to summer pasture than in Lagodekhi, thus the need of communal pasture areas is higher. WTP in Lake Arpi for access to summer pasture (in % of income) is probably lower than in Samtskhe-Javakheti because more communal land is available that can be rented. The very high WTP of Samtskhe-Javakheti could correlate with the fact, that national park zones were not fully clarified and transparent for locals at the study time (see chapter 3.1.3). Respondents see their main source of income in danger. In Lake Arpi, the zones are clear. Based on that, their WTP is lower as they see no danger to lose pastures. Anyway, differences in marginal WTP in all regions are just slightly.

5.3 Willingness-to-pay for additional income trainings

The trainings are appreciated as an alternative for economically income in all the regions. However, there are some pronounced regional differences. WTP for a bee-keeping training is quiet high in Lake Arpi. As part of the creation of the national park such a project was already implemented in the region (Meghvik 2012). Some households of the buffer zone therefore do know the benefit of honey production. Honey is relatively expensive in Armenia and can be produced easily. As the main

interest of the small scale farmers in Lake Arpi lay on animal husbandry, this training is not in the same demand for all respondents. Lowest WTP can be found for the cheese-production training concerning the aspect that milk production is the biggest factor of the agricultural income, but already one dairy factory exists in Arpi, which buys all the milk from farms. Cheese can be bought from the factory strongly required or is produced for home consumption. Furthermore infrastructure aggravates it to reach the 45 km distant city markets to sell produced cheese. In addition, especially in winter period, nearly no mini busses with barter goods are reaching the region. Respondents seem not to see a cheese-production training as profitable as the other trainings, as marketing situation is more difficult. The highest WTP however can be found for the tour-guiding training. This could mean that households see the national park as a chance to generate income, as they think more tourists would come to the region.

The training of cheese-production displays the highest WTP in the Samtskhe-Javakheti region (32% of the monthly income). From the quantitative results, we have seen that households produce much cheese for auto consumption as well as for bartering. Improved expertise for cheese-production is likely to be a decisive factor for improving very marginal farms in Samtskhe-Javakheti economically. In contrast to the region of Lake Arpi, there is no dairy factory in the buffer zone. Even there are factories in the cities of Akhakalaki and Ninotsminda locals of the Samtskhe-Javakheti buffer zone have little trust in contracts (*pers. observation* Kalatas 2012). Nevertheless, the main part of the milk stays in the households for home consumption or is processed to yoghurt or cheese for exchange into other goods (as fruits or clothes). These goods are provided by mobile retailer, which come irregularly to villages. Training in this field would mean for locals of Samtskhe-Javakheti to produce a higher quality product by them, which have a higher worth for bartering. Since the breakdown of the Soviet System households in rural Georgia increasingly rely on barter to provide themselves with needed goods, they cannot produce (Davis et al. 2004). To produce a more specialized product would increase the worth of the bartered good. In addition, the WTP for bee-keeping is high (28%), which (also for cheese production) can show that respondents see a chance in these trainings to generate a higher income. Bee-keeping is traditional for the region of Samtskhe-Javakheti (Mgmt SJ 2013). In the buffer zone however, no small honey farms can be found. Honey is a relatively

expensive good in Georgia which can be produced with low effort. Therefore it would seem to be a good way, if the national park administration would offer such kind of training to locals, as it would be a good way to incorporate locals positively into national park management.
For the training of tour-guiding, no WTP can be found. This training has a direct connection to the national park and it could be assumed that respondents do not have interest in national park related income sources. At the time of the survey, it was probably hard to imagine for respondents that they personally could profit from future tourism. It is in contrast to the high WTP of this training on the other side of the border. The contrast is especially noticeable, as on both sides of the border respondents identify themselves as ethnic Armenians.

The same can be said for Lagodekhi, where the trainings for bee-keeping and cheese production are on a quite high level, but the tour guiding training has no WTP at all. Honey production is seen as a good opportunity in the region of Lagodekhi to generate additional income. As access to land is limited bee-keeping could be a good alternative to livestock keeping. Cheese-production training is at the same level significant with the same WTP. As possibilities to expand herds are limited in the region, an interest of a qualitative upgrade of the value chain is understandable. Like the beekeeping training, a successful training could lead to higher income. The tour-guiding training is as in Javakheti not significant. Like in Samtskhe-Javakheti the disinterest correlates with the less interest in nature issues. The non-agricultural population however could have interest in nature related trainings, but was not part of the survey.

The created scenario in Table II-14, however, gives an overall better understanding for the marginal WTP for access to summer pasture, additional income sources and other natural resources. A two month training of bee-keeping and honey production shows up with the highest WTP in Samtskhe-Javakheti (92 €) and the lowest in Lagodekhi (42 €), due to the higher income of Lake Arpi the WTP is 5 € more than in Lagodekhi. In Samtskhe-Javakheti the WTP for cheese-production training is with 106 € extremely high. In Lake Arpi the lowest WTP for all trainings can be found here (35 €). The WTP in Lake Arpi for tour guiding is the highest (61 €) and this can be connected to the very positive attitude of the respondents towards the national park in general. A study realised by Pienaar et al. in 2015 has already shown, that trainings

for additional income sources could reduce compensation payments in Botswana. This could also be conceivable for Armenia and Georgia. The national parks Lake Arpi and Samtskhe-Javakheti are both planned with support zones, to support the economic situation of the locals living in the park area (Schuerholz 2009, Mgmt SJ 2013). However, such trainings were not part of the action plans of both areas. Concerning Lagodekhi it is not known, if such trainings are planned. However, enlargements of all three projects areas therefore could possibly go hand in hand with training programs for locals.

5.4 Importance of other natural resources

Access to wild plants is over the regions less important, than may be suggested. A huge exemption, however, is the region of Lake Arpi, where the subsistence income is higher than the cash income. Lake Arpi is one of the poorest regions of Armenia (Schuerholz 2009) and it can be assumed that wild plants take a larger share of subsistence income in Lake Arpi as suggested and are seen as a basic need, as 93 out of 100 households state to collect wilds plants for home consumption. The collection of these resources furthermore has cultural worth for respondents (*pers. observations* Kalatas 2012). Any restrictions ought, from an ecological-economic point of view, handled carefully, possibly compensation payments or arrangements should be kept in mind for NP management options. On average, the respondents of Lake Arpi have to be paid 25.7% of their monthly income to accept a ban to collect wild plants for home consumption. In the scenario this WTA is expressed in 302 € a year. There is no significant WTP or WTA for this attribute in the other regions. Nevertheless, a WTP for permission to collect wild plants and fuel wood can be found in Lagodekhi. Respondents would be willing to pay 6.8% of their monthly income for that. In Lagodekhi, where income is very low, it would be helpful for people living in the buffer zone to have a permission to collect, mostly firewood, from the nature reserve region, which is absolutely prohibited in both reserve parts (*pers. observations* Kalatas 2012). As there is no other wood source in the region, people have to buy fire wood, even the national park administration shares a little amount of fire wood with the people from the buffer zone. A relaxation of existing prohibitions could come into consideration if protective goals are not endangered by this.

5.5 The NonSQ term

An interesting result is the coefficient of the Lake Arpi and Samtskhe-Javakheti samples for the NonStatusQuo term. While the coefficient is positive in Samtskhe-Javakheti, it is negative in Lake Arpi. Both coefficients are significant. This shows that changed choice options were strongly preferred in Samtskhe-Javakheti and rejected in Lake Arpi. Living conditions in both regions are similar, so similar results were suggested. However, Lake Arpi respondents are more likely to choose the status quo situation, while respondents in Samtskhe-Javakheti prefer changes. A reason for the negative coefficient in Lake Arpi could be that at the time of the project integrated development programs to improve the situation of the support zone of the protected area were planned and communicated to locals (Schuerholz 2009). However, individuals do have a strong tendency to remain at their status quo. This is a result of loss aversion, as disadvantages always are felt stronger than advantage (Kahneman et al. 1991). Therefore respondents could have been less willing in leaving the status quo concerning, they seem to be more risk averse. However, nearly all attributes were significant in Lake Arpi. Samtskhe-Javakheti respondents seem to be less loss averse. In Samtskhe-Javakheti no communication between the local population and the national park existed. The status quo situation is bad and respondents could prefer to choose the changed choice cards to (i) a common discontent with the status quo conditions, (ii) no trust in development of the region by the NP management, as no communication existed and (iii) an overall feeling of exclusion from Georgian society and politics. Respondents were mostly ethnic Armenians, who were not able to communicate in Georgian, thus excluded from markets outside the support zone and political issues (*pers. observations* Kalatas 2012).

5.6 Socio-demographic factors

Kidegesho et al. indicate in their study from 2007 that gender has no influence on the relationship between locals and protected areas. In our study however, we find, that females seem to have a lower WTP or WTA in all regions and attributes. The only exception can be found for summer pasture in Lagodekhi, where females would be willing to pay 12.5% of their income a year for 25% more access, while men would pay just 10%. Influences on gender concerning relationships between locals and protected areas were also found by Kaltenborn et al. (1999), who stated that differences can occur due to livelihood situations and the role of decision making

within a household. However we just find a balanced quantity of both sexes of respondents only in Lake Arpi. It can be assumed that female heads of households have lower WTP, due to tighter economic circumstances and lower overall income (Frick et al. 2003). However, for the lower WTA this is irrelevant.

The WTP for additional income sources could be increased by national park managements in integrating females in special trainings and arrangements for female head of households. Special programs for females, also trainings for additional income sources, could be thinkable for adequate management options and lead to an overall better relationship. We know that in the region of Lake Arpi meetings with locals were arranged by the NP management, however, mostly due to culture, meetings, arrangements and programs are aimed at men (Schuerholz 2009, *pers. observations* Kalatas 2012).

The other socio-demographic interactions show the importance of summer pastures as an economic tool for households in all three regions. Having a higher income per month results in Lake Arpi and Samtskhe-Javakheti in a willingness to pay even more for 1% more pastureland. The result is contrary to other studies, which figured out, that having more income leads to lower WTP as these households are less dependent on the protected area resources (Mutanga et al. 2015). We can assume for our study, that especially the focus of mountainous farmers just on livestock keeping and not on a wide production range means that respondents having more money are more likely to spend a bigger amount of it for the essentially needed good pastureland. A higher monthly income results in Samtskhe-Javakheti and Lake Arpi in a higher WTP for trainings: In Lake Arpi for the bee-keeping and the tour-guiding training, in Samtskhe-Javakheti for the cheese-production training. As we see the trainings as alternative ways to generate income we assume that household with smaller income are more risk averse than others. On the other hand the smaller WTP could just be through a limitation of income and if households would have a higher income they would spend more.

Having one more year of education leads in Samtskhe-Javakheti and Lagodekhi to a higher WTP for 1% more access to summer pasture (0.06% and 0.25%). Also Songowa (1999) argues that people with higher education oppose conservation initiatives and therefore would even buy access to land for a higher amount, as long

as it is usable and not under protection. In Lake Arpi on the other hand each one more year of education decreases the WTP. This is underpinned by the studies of Kidegesho et al. (2007) and McClanahan et al. (2005) who have proven, that higher education leads to better overall opportunities for employment and new livelihood strategies with lower dependence on the resource. Anyway, as in the South Caucasus a high level education is normal also for rural population and as the study has shown more than 50% do have a degree of higher education (e.g. chapter 4), there are no other livelihood strategies in the rural mountain areas. So the fact, that Lake Arpi has huge amount of communal pastureland, which is not touched by the restrictions of the national park and having a better education could have let respondents understand, that there is less need to pay more for additional land and a less awareness of the need to buy additional land is a more clearer reason. A higher education includes a better knowledge about biodiversity and understanding (McCalahan et al. 2005) that the region should be a national park. In Lagodekhi a higher education leads to a higher WTP for bee-keeping. A possible reason is the understanding of earning money with less effort.

Being older in Lake Arpi makes respondents more willing to pay for a bee-keeping training. This could be, as honey production is very lucrative in the Caucasus and is connected with less physical work than animal husbandry. In Samtskhe-Javakheti on the other hand the WTP for this training decreases with each one more year of age, which again could show the dislike in changing agricultural main activity.

Also interesting are the interactions concerning the ban/permission to collect wild plants and timber in the regions. We have mentioned before that wild plants could be an essential part of the subsistence income in Lake Arpi. It is plausible that having more income leads to a higher WTA to accept this ban to collect wild plants, as it is a worth protecting part of the household income. In Lagodekhi, where collecting wild plants and especially firewood is forbidden in the area of both sites of the nature reserve, a permission to collect is absolutely wished by respondents, so that having more income logically leads to a higher WTP for this attribute, which would ease peasants life.

5.7. Conclusion

Overall, we can conclude that summer pastures do have high economic value in all three regions. In all regions, the WTP is high. We assumed finding a higher WTP in Lagodekhi, which we can state as not correct. However, it is the highest WTP for any attribute in the region Lagodekhi. Lower WTP can be traced back on the overall lower income.

Also the interactions show that income, age and education influences the WTP for our attributes. Also we can say that respondents in all regions see trainings as alternative income sources to improve their living conditions, even if WTP differs over the regions. We have shown that summer pasture is a main resource to generate income in rural areas around MtPAs. For that, an extension or implementation of protected areas should always be done carefully in regions settled by humans. Furthermore it should be taken into account, that animal husbandry is, especially due to a lack of income chances and the small monthly income families live with, also a basic need for subsistence living.

If income would be higher in these regions, small scale farmers would spend money on additional trainings to generate income. As the income is that low, small scale farmers are risk-averse, even the interest in alternative ways to generate income is high. These kinds of trainings could be a good way for protected area administrations to work together with people living in adjacent and even function as a compensation of usage restrictions concerning the major competitive resources in the protected area zone.

Conflicts between the protected areas and the people living close by are not different, as far as we can say, over ethnical groups. The problems, and competition between the needed and protected good nature are the same for all groups. Independent from ethnic, gender, age or education people are concerned about their economic future but willing to invest in additional income sources which are less competitive with conservation. Peoples concerns should be treated most carefully by the management of the specific protected areas. Fears of locals should be analysed in detail by the specific administration. The study suggests that introducing people from the buffer zones to

alternative income sources would be a good way for reducing fears. By doing so, the protected area administrations may be seen in a better way and people could even increase their income in switching into other agricultural production ways.

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III

Influence of attitudes towards newly established national parks in the South Caucasus on the WTP for summer pasture and additional income sources

1. Introduction

Establishing national parks (NPs) often creates conflicts with local population, especially if the regions are settled (Brandon & Wells 1992). If regions are settled for a long period of time like the Caucasus (Hoffecker 2005, King et al. 2003), the worth protecting biodiversity can also be influenced by the agricultural usage (Bawa et al. 2004). Furthermore the biodiversity can be a main resource of habitants' farm productivity. The most common way to protect nature is the creation of national parks (Kareiva et al. 2007). Transboundary nature conservation areas are a way to create national parks across countries. Establishments of transboundary conservation areas are gaining popularity, as they are useful tools in conservation planning (Vasilijevic et al. 2015). Furthermore, founders try to bring political stability to conflict areas, through joint planning land use management and sustainable economic development (Schuerholz 2004). Often these transboundary NPs can be found in mountainous areas (Thorsell 2002), as so-called mountain protected areas (MtPAs) (Hamilton & McMillan 2004). The Caucasus is a unique mountain area due to its plant and animal species. Regarding its current degree of danger it has a high priority for additional conservation measures and is marked as one of the biodiversity hotspots of the world (CEPF 2003/4, Myers et al. 2000). Some of the world's MtPAs can be found in the South Caucasus (Vasilijevic et al. 2015).

Studies concerning the management of land use and the relationship of natural resources and humans in protected areas are quite common nowadays (DeFries et al. 2007, Brandon & Wells 1992). As far as we know, rarely studies about the influence of attitudes of humans living adjacent to protected areas on choices on NP related changes exist. Humans' attitude towards biodiversity is based on affection and sympathy, but also on economic self-interest (Martin-Lopez et al. 2007). We suppose that affection and sympathy can be influenced by an integration of local people into buffer zone management, while exclusion could result in a negative attitude towards the NP. A successful management of protected areas should hence include the cooperation and support of local people. More as resulting in a negative attitude, the exclusion without providing alternatives of generating income it, according to Brandon and Wells (1992) and Holmes (2003), is political infeasible and even more ethically irresponsible.

Over the years it has been discussed if locals should be excluded from NP management in a fence and fines approach (especially in developing countries) (DeFries et al. 2007), or if they should be integrated in a people-centred or community conservation approach (Stevens 1997a, McNeely 1995). The people-centred approach includes a mixed use of strict protected zones, buffer zones and so-called Integrated Conservation and Development Project (Stevens 1997b). Representatives of this people-centred approach insist that excluding locals from the protected area management would increase monitoring costs and would not benefit from local knowledge (Hayes 2006). The people-centred model has shown mixed results due to insufficient implementation and restrictions (Barrett & Arcese 1995, Schelhas et al. 2002, Bruner et al. 2001), but due to Schwartzmann et al. (2000) is undeniable that locals are essential for a successful long-term conservation. It turned out that effective management should account for the human use of NPs' natural resources (DeFries et al. 2007). Studies of humans' relationships between protected areas and their economical existence in the South Caucasus nowadays still do not exist. Biodiversity hotspots on the African or Asian continents are more likely to be analysed (e.g. Allendorf 2012). This paper analyses hence two barley studied fields: (i) the influence of attitude of people living in the vicinity of national parks on choices concerning the usage of natural resources and additional income sources and (ii) in the set of the South Caucasus region.

We will compare the youngest transboundary NPs of the South Caucasus region: Lake Arpi National Park in Armenia and Samtskhe-Javakheti National Park in Georgia. Both parks were officially established in 2009 and form part of the Caucasus Initiative of the German Ministry of Cooperation and Development (BMZ) (Schuerholz 2009). The initiative has one focus on biodiversity conservation in the Caucasus and the common project of Georgia and Armenia is a promotion of transboundary cooperation for biodiversity conservation (BMZ 2005). Regarding a feasibility assessment of the Critical Ecosystem Partnership Fund in 2003, Georgia and Armenia agreed on conservation efforts, which are financially supported by Germany through the *Kreditanstalt für Wiederaufbau* (KfW) on the transboundary Javakheti - Lake Arpi Conservation Area. The main objective is the establishment of a national park and wetland conservation area on both sides of the Georgian - Armenian border as well as the sustainable development of the respective support zones/buffer zones. The term "support zone" reflects the need for support by locals living adjacent to protect the

area and its resources as well as the need to economically support locals (Schuerholz 2009). On behalf of the Armenian Ministry of the Environment, WWF Germany and WWF Armenia sought to implement Lake Arpi NP using a bottom-up approach. The bottom up approach included discussions concerning the NP biodiversity and zoning of the park, as well as negotiations about land which was handed over from villages to the strict protected zones (Schuerholz 2009). These matters were realised by the NGO WWF (WWF 2012). The villagers were able to speak about fears and hopes (WWF 2012). Furthermore integrated conservation and development programs were introduced and arranged with locals. For example a bee-keeping project started in 2012 (Meghvik 2012), housing constructions realised and a slaughterhouse planned (WWF 2012). In Samtskhe-Javakheti, the implementation on behalf of the Georgian Ministry of Environment and WWF Georgia was done in a top-down way. Local population was excluded by the NGO from the implementation stage and mostly even not informed. It was planned by the WWF Georgia to build guesthouses inside the support zone and to give biodiversity classes (Mgmt SJ 2013). However at the time of the project no projects were realised (*pers. observations* Kalatas 2012)

This present study analyses in a first step locals attitudes towards national parks. Subsequently we will try to figure out (i) where different attitudes come from and (ii) if different attitudes have influences on economic valuations. The results will suggest management options for national park establishments in the South Caucasus.

2. Study Area and Sample

Both NPs are located on the Javakheti plateau, which is known for migratory birds (Schuerholz 2004). Over 140 bird species have been recorded in the area (Schuerholz 2009). 80-85 of this species are known to nest in the target area (Schuerholz 2009). The other species are summer visitors, migrants or under an unclear status. Most bird species are related to the lakes and wetlands. The plateau is one of the few regions of the Caucasus where breeding common crane (*Grus grus*), white stork (*Ciconia ciconia*), grey heron (*Ardea cinerea*), various pelicans and velvet scoter (*Melanitta fusca*) can be found (Schuerholz 2009). Seven of the species are globally endangered (Schuerholz 2009). Almost 40 species of mammals, including two species of ungulates and 10 species of carnivores are visible in the region. Ungulates, lynx and bear, can just rarely be observed at these open spaces, but wolf (*Canis lupus*), marbled polecat (*Vormela peregusna*), European hare (*Lepus europaeus*), European otter (*Lutra lutra*),

European badger (*Meles meles*) and fox (*Vulpes vulpes*) are more frequent. Six of the mammal species are endemic in the Caucasus. These are the nehring's blind mole-rat (*Nannospalax nehringi*), the Turkish hamster (*Mesocricetus brandti*), the nazarov pine vole (*Terricola nasarovi*), the daghestan pine vole (*Terricola daghestanicus*), the transcaucasian water shrew (*Neomys teres*) and the Caucasian shrew (*Sorex satunini Ognev*). Furthermore, 13 different reptiles and amphibians are found on the Javakheti Plateau. Of these the Darevsky's viper (*Vipera darevskii*), a live birth giving snake is endemic for the Caucasus (Mgmt SJ 2013).

Lake Arpi National Park is located in the province of Shirak in the north-western part of Armenia (Schuerholz 2009). The name giving lake is 2,023 m above sea level (22 km²) and the total area is about 58,711 ha. In the 1950s, the lake was artificially increased by the government and became the second important water source of the country next to Lake Sevan. The lake is used for hydropower production as well as for irrigation and designated as Ramsar Site. The region lays on 1,500 to 3,000 m above sea-level and struggles with extreme and inhospitable climate conditions, with having a yearly mean temperature from -13 up to +13°C, a vegetation period of 160 days, 2400 hours of sunshine a year and 550 mm of mean annual precipitation (Schuerholz 2009) In winter the region is covered by 1.5 m of snow (Schuerholz 2004). Biogeographically the region is compounded by steppes, meadow-steppes, alpine meadows, sub-alpines and wetlands. Steppes are located mostly between 1800 and 2500 m and grow on chernozem soils. Field steppes just occur along northern slopes and are dominated by horsetail feather grass (*Stipa tirsa)*. The region of Lake Arpi is treeless since the Holocene (Schuerholz 2009). 18 villages belong to the support zone. These are: Yeghanajur, Lorasar, Paghakn, Garnarich, Tsaghkut, Berdashen, Shaghik, Zorakert, Ardenis, Aghvorik, Tavshut, Sizavet, Saragyugh, Ghazanchi, Mets Sepasar, Zarishat and Yerizak.

Samtskhe-Javakheti National Park is located in province of Samtskhe-Javakheti in the southwestern part of Georgia. The NP lies on a height of 1,900 to 3,300 m above sea-level and has a total size of 42,509 ha. The whole region is formed by soft, volcanic forms, cones and clicker flows, high mountain meadows and steppes on mountain plateaus and slopes as well as lakes of volcanic origin. Six middle sized natural lakes and 60 small lakes are spread over the entire area with a total surface of 96 km². The

Javakheti highland takes the second place in Georgia by concentration of wetland areas and is one of the most important reception basins in Georgia (Mgmt SJ 2013). Like Lake Arpi, the region of Samtskhe-Javakheti has a harsh, mainly continental climate, with mean yearly temperature between -10 and +15°C. In winter period, the lakes are covered with 30-35 cm of ice. The yearly annual precipitation level varies between 600 and 700 mm. At the region, little sub-alpine forests can be found at 1,800-2,100 m above sea level, east to Kartsakhi Lake. Birch (*Betula litwinowii*), aspen (*Populus tremula*) and rowan (*Sorbus aucuparia*) form the forests. At the upper edge of sub-alpine forests, (2,000 – 2,100 m above sea-level) pines (*Pinus kochiana*) can be found (Mgmt SJ 2013). In total 10 of the villages belong to the support zone. These are: Kartsakhi, Philipovka, Sulda, Dadeshi, Miasnikiani, Patara Khanchali, Efremovka, Sameba, Zhabonui and Bozali (Mgmt SJ 2013).

In both regions livestock keeping is one of the most important economic activities. Grazing practices in soviet times were non-systematic and are still not everywhere today (Mgmt SJ 2013). In Lake Arpi relatively low range productivity, found along slopes of north extern, exposure over-grazing and poor control is responsible for deterioration in some areas. Communal grazing areas are leased of by the communities to livestock owners on a 25 year lease basis (Schuerholz 2009), while they are not controlled in Samtskhe-Javakheti (Mgmt SJ 2013). In both regions pastureland is close to the villages and a “nearby” grazing system is used. Here animals are brought to the pasture fields in the morning and brought back every evening (Tumanian 2006). The grazing area is bordering the strict core zones of the NPs. Prestudy visits have shown that both areas are suffering from poor infrastructure, high poverty and insufficient utility supply (mostly water and gas). Mobility, job opportunities and market connections are bad. In winter the Javakheti plateau is cut off from the rest of the countries for about six month due to snow levels of 1.5 m and above (Schuerholz 2004).

The study was implemented in October 2012. The survey was conducted as a random clustered sample in nine out of 18 villages of the Lake Arpi region and six out of 10 villages of the Samtskhe-Javakheti. The household heads were targeted as the respondents. In case of absence their wives or another permanently resident-adult (> 18 years) in the households took part in the interview. Respondents were answering a

household survey, belief questions concerning the NPs and a choice experiment. In total the subjects were asked 150 different questions.

The villages were drawn randomly from a bag. We defined the number of respondents we would like to survey before, so that we calculated households asked in the villages representatively from the total number of households living in the villages. After this we have chosen a number from a bank note randomly. This number stated the first household of a village we asked to take part at the survey. We walked through the villages on the basis of the village structure. For example we took the 9th number of an Armenian Dram note, which was five and walked to the 5th household in line. After this household we went five houses farer and so on. We did this from both ends of a village. All six enumerators of the survey were thoroughly trained in the administration of interviewing and the choice experiment and accompanied by a scientist of the research group.

In Lake Arpi the villages Ardenis, Tsaghkut, Zorakert, Zarishat, Berdashen, Garnarich, Mets Sepasar and Ghazanchi were drawn. In Samtskhe-Javakheti the survey was conducted in the villages Sulda, Dadeshi, Kartsakhi, Philipovka, Efremovka and Sameba.

3. Methods

3.1 Attitude and belief measurments

Respondents completed a household survey, which included questions on beliefs to and influences of the specific NP on their economic situation. Questions were mostly created as open-ended questions (see Tab. III-1). The questions referred to (1) involvement of respondents in decision making of the establishment of the NP, (2) influences of the NP on respondents life and (3) expected future effects and use restrictions. From these questions positive and negative overall attitudes towards the national parks were deducted.

Attitudes are generalized responses towards a context and a stimulus and mostly treated by an inner unspecified source of "true knowledge" (Guerin 1994). Hence are often verbal reports of an individual's emotions towards an object or event. Beliefs on the other hand are a verbal knowledge about something (Guerin 1994). Attitudes can be separated from beliefs by the fact that they always imply dislike or like, while this

is not necessary for beliefs. One relationship between both is, that people often argue, that their attitudes are based upon a belief and have positive or negative attitudes due to their beliefs in bad or good outcomes of the regarded object (Guerin 1994). Ajzen and Fishbein (1980) see the behaviour as being predicted by the attitude and the social pressure behaves in that way. Therefore the attitude is predicted by the sum of beliefs about the outcome of the behaviour multiplied by the evaluations of these outcomes. They further point out that attitudes consist of beliefs, which are compounded by individuals among the attitude object and several attributes (Ajzen & Fishbein 1980). In the theory of reasoned action Ajzen and Fishbein (1980) posit that behavioral intentions are immediate reasons for behaviour and therefore a function of noticeable information and beliefs about likelihoods which are performing a particular behaviour that leads to a certain outcome. Beliefs are divided into normative and behavioral beliefs. While the normative beliefs influence individual's personal norm about performing behaviour, behavioral beliefs are assumed to underlie influence on individual's attitude towards the performance of the behaviour (Fishbein & Ajzen 1975). The theory of planned behaviour by Ajzen (1985) amplifies marginal conditions of desired control specific by the theory of reasoned action. This is done by including belies regarding the presence of requisite resources and opportunities for behavioral performances. The more opportunities and resources an individual think it ha, the greater should be the behavioral control

Studies have shown that attitudes towards national parks can be influenced by the history of the creation of the respective protected area (Choudhry 2004), by wildlife benefits and conflicts (Tessema et al. 2010, Gadd 2005), by integrated conservation and development programs (Brandon & Wells 1992), and by socio-economic variables of locals in the vicinity (Snyman 2012, Kidegesho et al. 2007).

Our survey was asking questions about beliefs concerning the national parks Samtskhe-Javakheti and Lake Arpi. From these beliefs we deducted positive and negative overall attitudes of the respondents towards the specific national park. However, influences of socio-economic factors and history of creation will be considered in the analyses. Benefits from wildlife equate in our study the access and usage of the resource summer pasture.

Table III-1: Belief questions

Number question/acronym	Belief question	Coding examples
1 inv-if	Would you like to be actively involved making rules for the national park/protected area?	+1: yes, -1 no, 0: do not know
2 inv-how	How would you like to actively involved making rules for the national park/protected area?	0: no answer, + 1 one kind of involvement, +2 two kinds of involvement
3 imp-if	Have the activities of your household already been affected by the protected area in your region?	+1: yes, 0:no
4 imp-how	How has your household been affected by the national park/ protected area in your region?	+1: one positive effect, + 2 two or more positive effects, 0: no effect/one positive and one negative effect, -2: two negative effect, -1: one negative effect
5 imp-exp	What kind of effects do you expect in future?	+1: one positive effect, + 2 two or more positive effects, 0: no effect/one positive and one negative effect, -2: two negative effect, -1: one negative effect
6 exp-restr	Do you think there will be (further) use restrictions at the national park area during the next years?	+1: yes, 0: no

3.2 The choice experiment

Subsequently farmers were conducting a choice experiment (CE) of different socio-economic livelihood situations and asked to choose their preferred one. The different situations of our CE were defined as combinations of the attributes access to summer pasture, usage of wild plants, additional income sources and change of monthly income, as summarized in Table III-2. A marginal economic value (WTP/WTA) for an increase or decrease in any significant attribute can be estimated through the so-called payment vehicle (change in monthly income) (Hanley et al. 1998). The payment vehicle can be positive or negative. Created situations were presented to all respondents.

Table III-2: Levels of attributes in the choice experiment

Attributes	Possible expressions of the attribute	Status Quo
Change in access to Summer pastures	+25%; +50% access to pasture; -25%; -50% access to pasture; no change in access	No change in access
Access to plants and fuel wood	No collection of wild plants, fuel wood & timber is allowed; Home consumption of wild plants, fuel wood & timber is allowed; extensive collection of wild plants, fuel wood & timber is allowed	Home consumption of wild plants, fuel wood & timber is allowed
Trainings for income alternatives	Bee-keeping & honey production (2 month); cheese- production (2 month); tour guiding (2 month); no training	No additional training
Change in monthly income	-10%; -20%; -33% of monthly income; +10%; +20%; +33% of monthly income; no change	No change in monthly income

As a full-fractional design for all attribute-combinations is too large to answer by one individual (Bennet &Adamowicz 2001), we worked with a fractional-factorial main effects design. Requirement for this kind of design is orthogonality. Orthogonality ensures that the influence of a single attribute can be determined independently from the other attributes present on each choice card. We used Chrzen and Ormes (2000) procedure of Mix and Match to create the choice sets of all choice cards. In total, we obtained 46 choice cards. To create an orthogonal main effect design (Hensher et al. 2005) we used blocking (Bennet & Adamowicz 2001). We blocked all choice cards into six groups, so that each respondent was answering eight, respectively, seven, choice sets (21 resp. 28 cards) randomly. Figure III-1 shows an exemplary choice set of our experiment.

Characteristics	Situation A	Situation B	Status Quo
Access to summer pasture	+50%	+25%	No change in access
Access to plants, fuel wood & timber	No collection is allowed	Collection for home consumption is allowed	Collection for home consumption is allowed
Training for income alternatives	Cheese-production training	Tour guiding training	No additional training
Change in monthly income	-20%	-20%	No change in monthly income
I choose…	O	O	O

Figure III-1: Example of a choice card

The questionnaire was created in English and translated into Armenian und Georgian. We compared the original and translated versions to ensure that the questionnaires were correct, similar to interpret and reasonable in all three project regions (see Harkness 2003).

3.3 Modelling approach of the choice experiment

Choice experiment analysis is based on the random utility theory (McFadden 1974) and Lancaster's characteristics theory of value. Choice experiments are regarded as suitable method for economic valuation of environmental goods (Adamowicz 1998). Following Lancaster's theory, it is not a good, which is the utility per se, it is the attributes of the good giving the utility (Lancaster 1966). McFadden states that utility is just a latent construction, which (if at all) exists only in individuals' minds (McFadden 1974). Human choice behaviours can be explained/forecasted as a function of the attributes that characterize the single options from which to choose from (McFadden 1973). Through analyses of the selection patterns between the options, the relative influence of attributes on choices can be determined and marginal economic values for an increase or decrease in statistically significant attributes can be calculated (Bateman et al. 2002). ´

We assume an additive utility function linear in parameters with respect to the attribute levels as coded in Table II-1. The utility function is separated into an observable component V_{in} and an unobservable (error) component ε_{in}

$$Uin = Vin + \varepsilon in$$

where U_{in} is the total utility of alternative i for individual n. The probability that individual n will choose option i over option j within the complete choice set C is

$$Prin = \Pr(Vin + \varepsilon in > Vjn + \varepsilon jn) \text{ (all } j \in C)$$

Choice decisions can be influenced by socio-economic parameters or attitudes towards the attributes. To assess such influences, interaction terms of the respective variables with attributes are calculated. If a deterministic utility component $V1$ is hypothesized to be a linear function of attribute $Z1$ with an individually varying socio-economic variable A, $V1$ can be formulated as

$$V1(Z1, A) = bA * Z1 + b1 * Z1$$

with bA as utility coefficient of the interaction term (Barkmann et al. 2008). In the econometrically estimated utility models, a positive sign of the coefficients b indicates a positive influence of the respective term on choices and thus on utility. To reduce collinearity between the interaction term and the non-interacted attribute term, the socio-demographic variables A were standardized before being multiplied with $Z1$.

The vector of utility coefficients is estimated with maximum likelihood techniques. The estimated models include a non-status quo alternative specific constant (NonSQ ASC) which picks up systematic differences in choice patterns between the choice cards. The NonSQ ASC was coded '0' for the Status Quo and '1' for the alternative choice cards A and B. Four socio-demographic variables (gender, age, education in years, monthly income) and three independent attitudinal variables (attitude towards national park, ha size of grassland, animals sent to summer pasture) were heuristically introduced into the NL model as interaction terms with the ASC to test for influence on choosing non-Status Quo alternatives.

Preliminary analyses showed that there might be a risk to violate the Independence from Irrelevant Assumptions (IIA) condition. Therefore, Nested Logit models were used as they rely on less strict assumptions. Models were estimated with NLOGIT 5.

The inclusive value was set to 1.0 for the degenerated branch, and the models were initiated with starting values obtained from a non-nested NL model (Hensher et al. 2005). All scale parameters were normalized at the lowest level (RU1). We report pseudo-R^2 values as model statistics in relation to "constants only" values. Values between 0.05 and 0.08 correspond to values approximately between 0.18 and 0.25 for the equivalent R^2 of a linear regression model (Domencich & McFadden 1975).

WTP calculations are based on extrapolations from mean marginal WTP values. For attributes linear in parameters, marginal WTP (mWTP) equals the negative ratio of the respective attribute coefficient c_z and the coefficient of the monetary attribute c_y:

$$mWTP = \frac{\mathbf{cz}}{\mathbf{cy}}$$

3.4 Data analysis

The attitude, belief and intention items from the attitude questions were scored following the example of the study of Sheperd et al. (1992). For each respondent, the number of positive and negative tainted responses in each question was counted and negative responses subtracted from positive ones. Respondents making more positive than negative responses were ascribed a positive attitude (one more/code +1: positive attitude; > two more/code +2: very positive attitude). The respective attitude scores were assigned to respondents with more negative responses (-1; -2). Respondents without, with neutral statements, or with an even balance were coded with "0". Stated positive features include: better living conditions, better infrastructure, more jobs, tourism development etc. Stated negative features were: lack of land, higher taxes, more foreign land users, destruction of harvest by wild animals etc. The choice experiment and interactions were analysed with the program NLOGIT.

4. Results

4.1 Composition of the sample

Tab. III-3: Sample description

Demographic Variables	Lake Arpi (Armenia)	Samtskhe-Javakheti (Georgia)
Gender:		
Female (%)	50.0	11.0
Male (%)	50.0	89.0
Age :		
Mean	52.0	59.9
Standard deviation (SD)	13.1	12.0
Education:		
Years of education Mean	11.9	10.7
Years of education SD	02.6	03.3
Average yrl. Income (ppp applied) in EUR		
Cash Income	1,162	1,141
Subsistence Income	1,186	838
Heard of National Park		
Yes	96	60
No	4	40
Attitude towards National Park		
Very negative Attitude towards	10	37
Negative Attitude towards	4	19
Neutral Attitude towards	14	25
Positive Attitude towards	23	10
Very positive Attitude towards	49	9

N:200

In mean, the respondents in Lake Arpi are slightly younger (52.02), than in Samtskhe-Javakheti (59.93). Mean level of education in Lake Arpi is 11.94 years and in Samtskhe-Javakheti 10.7 years. 51% of all respondents have a degree of higher education.

To indicate the household income we calculated income from faming, employment work outside agriculture, state payments, remittances and subsistence farming income. Based on the household survey we calculate for Lake Arpi, a yearly income of 2,348 € (ppp applied/average 4,292 € in ARM), from which 1,186 € is subsistence income and for Samtskhe-Javakheti, a yearly income of 1,979 € (ppp applied/average 4,413 € in GEO), with 606 € subsistence income. The cash income of the Armenian sample (1,162 €/year) is composed of 72% from employment work outside agriculture, 4% from selling agricultural products, 20% state payments and 4% remittances. The

Samtskhe-Javakheti data indicates that 59% of the cash income (1,141 €/year) are from employment work outside agriculture, 10% from agricultural products, 19% of the cash income are state payments and 12% remittances.

4.2 Results of the belief questions

96 respondents of the Lake Arpi sample mentioned that they have heard of the NP before. Information were mostly generated by the regional administration (81 respondents), and the local office of the WWF (50 respondents). 26 heard about the NP from friends, 17 from close family members, eight from relatives and one person from the NP director. In Samtskhe-Javakheti 40 respondents state that they had not heard of the NP in October 2012. 31 people have heard of the implementation by the NP director, one from close family members, two from relatives, eight from friends, eight from the local government and 10 only have heard about the NP in TV. Respondents of the Lake Arpi sample mainly had positive attitudes. We categorized 49 respondents as having a very positive attitude (more than two positive aspects mentioned). 23 respondents mentioned one or two positive features (positive attitude). 14 respondents had a neutral position. Four respondents mentioned rather negative and 10 respondents expressed a very negative attitude (more than two negative features). Across most Lake Arpi respondents, a high willingness to participate in the process of NP planning (trainings, discussions, decision making) was found. 72 of 100 respondents wished to be actively involved. 28 did not want to be involved, or did not care. 53 of Lake Arpi respondents think, in the near future, there will be further use restrictions concerning pastureland in near future. In Samtskhe-Javakheti, respondents had rather negative attitudes. 37 had a very negative and 19 a negative attitude towards the NP. 25 were neutral. 10 respondents were categorized having a positive and nine a very positive attitude. A generally indifferent willingness to participate in national park planning (trainings, discussions, decision making) was found. 46 of respondents wish to be actively involved, while 54 did not want to or did not. 84 of the respondents there fear further use restrictions concerning the pastureland in near future.

To be already negatively influenced (losing pasture) by the NP was stated by nine respondents in Lake Arpi and 16 respondents in Samtskhe-Javakheti. These nine Lake Arpi subjects mentioned at the same time, that they think NP will create new jobs and

better living conditions, while in Samtskhe-Javakheti the 16 respondents think living conditions will get even worse in next years.

4.3 Socio factors on the attitude division

Table III-4 shows how attitude is divided in both project regions over age, gender and education. We did not differentiate over respondents' ethnic, as nearly all subjects in both regions are ethnic Armenians.

Table III-4: Contingency table of socio factors and attitude towards national parks

	Very negative attitude	Negative attitude	Neutral attitude	Positive attitude	Very positive attitude
Lake Arpi					
Female	2	2	8	11	27
Male	6	4	6	12	22
Young Age (22 – 39)	1	0	4	5	4
Middle Age (40 – 65)	7	2	8	13	30
Old Age (66 – 88)	2	2	2	5	15
Less than 8 years education	---	---	---	---	---
8 – 10 years education	8	3	7	10	24
Above 10 years education	2	1	7	13	25
Samtskhe-Javakheti					
Female	3	1	4	1	2
Male	34	18	21	9	7
Young Age (22 – 39)	4	1	1	1	0
Middle Age (40 – 65)	14	8	13	4	3
Old Age (66 – 88)	19	10	11	5	6
Less than 8 years education	4	5	2	1	0
8 – 10 years education	15	10	10	6	6
Above 10 years education	19	4	12	3	3

N:200

Table III-4 shows that in both regions females have less negative attitudes. Age is positively correlated with a positive attitude in Lake Arpi, but in all age groups negative or very negative attitudes are few. Age is also positivel correlated with a positive attitude in Samtskhe-Javakheti. However, very negative attitudes are highly found over all age groups.

The positive attitude correlates positively with higher education in Lake Arpi. In Samtskhe-Javakheti most positive attitudes are found in the education group of 8-10 years of education. A positive attitude correlates negatively with higher education and lower education.

4.3 Choice experiment results

Table III-5 shows the choice experiment results in form of the coefficient analysed by a nested logit model.

Table III-5: Valuation of the socio-economic choice experiment in both project regions

	Lake Arpi (ARM)	**Samtskhe - Javakheti (GEO)**
	Coefficient	Coefficient
Attributes		
Bee-Keeping Training	0.462**	0.378*
Cheese-Production Training	0.351*	0.699***
Tour Guiding Training	0.593***	0.163
Summer Pasture	0.021***	0.0269***
Ban of Collection	-0.979***	-0.231
Permission of Collection	-0.023	0.156
Income Change	0.038***	0.013***
Non Status Quo	-0.791***	1.592*
Log-likelihood	-657.7	-665.4
Restricted log likelihood	-813.7	-960
P (Chi²); DF	312.15; 9	589.15; 9
Pseudo R^2 (const.only)§	0.189	0.1644
Radj (const. only)	0.185	0.159
Observations	764	764

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level.
§:Pseudo-R^2(constant only) values between 0.16 and 0.18 correspond to R^2 values between 0.85 and 0.95 value in the linear model equivalent (Hensher et al. 2005: 338f). N: 200

In the Lake Arpi sample, all coefficients for trainings are significant and tour-guiding has the highest coefficient of all trainings. The ban to collect wild plants has a negative coefficient on the 1% level, as well as the NonSQ term. The negative coefficient of the NonSQ term shows a tendency that status quo was, independent from the attribute level, more frequently chosen than the changing choice cards (attribute level were seen as disadvantage of the choice set). The coefficient of the summer pasture attribute is positive on the 1% level. The permission to collect wild plants is not significant.

In Samtskhe-Javakheti the coefficient of the bee-keeping training and the coefficient of the cheese-production training are significant. Cheese-production has the highest coefficient of trainings. The NonSQ term has a positive coefficient on the 10%. This term shows a positive tendency to choose the changing choice cards, beyond measure, as would be expected alone from the attribute level of the choice cards towards the status quo (attribute level were seen as advantages of the choice cards). The coefficient

of the summer pasture attribute is significant on the 1% level.

We have seen that the attitude towards the NP is different in the regions. Therefore, we reassess a more positive attitude towards the NP results in a higher WTP. Table III-6 shows results of interactions in the mean marginal WTP at a 95% confidence.

Table III-6: The interaction of positive attitude towards NP and the mean marginal WTP as percentage of the average income and 95% confidence intervals for mWTP (Wald)

	Lake Arpi (ARM)	Confidence-Intervall	Samtskhe-Javakheti (GEO)	Confidence-Intervall
Bee-Keeping Training	**12%**	1.3%/23.14%	**28%**	-3%/59.4%
*z-Attitude towards NP	**+3.2%**	-5.69%/12.12%	**+12%**	-11.62%/34.56%
Cheese-Production Training	**9%**	-1.18%/19.53%	**32%**	17.68%/86.77%
z-Attitude towards NP	**ns**	ns	**ns**	ns
Tour-Guiding Training	**16%**	5.97%/25.10%	**12%**	-13.51%/37.82%
*z-Attitude towards NP	**+6.4%**	-0.24%/13.17%	**+1.49%**	-18.4%/21%
Ban of Collection of Goods	**-26%**	-34.95%/-16.33%	**-17%**	-42.74%/8.30%
*z-Attitude towards NP	**-0.17%**	-6.39%/6.03%	**ns**	ns
Permission to Collect Goods	**-0.6%**	-9.2%/8.03/	**11,6%**	-15.03%/38.33%
*z-Attitude towards NP	**ns**	ns	**ns**	ns
Access to Summer Pasture	**0.7%**	0.43%/1.22%	**2%**	2.66%/2.35%
*z-Attitude towards NP	**-0.11%**	-0.22%/-0.002%	**+0,14%**	-0.16%/0.43%
Costs	**0.038*** **		**0.013*** **	

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level. *z: Z-transform of attitudes towards national park. N=200

If we calculate the mean WTP in percentages of the monthly income, bee-keeping training is worth 12% of the monthly income of Lake Arpi and 28% of Samtskhe-Javakheti respondents. Positive attitudes increase WTP in Lake Arpi about 3.2% and in Samtskhe-Javakheti about 12%. Tour-guiding training is not significant in Samtskhe-Javakheti. In Lake Arpi, respondents would be willing to pay 16% of their monthly income for it. A positive attitude increases for additional 6.4% and creates a 1.49% high WTP in Samtskhe-Javakheti.

In Lake Arpi the ban to collect wild plants is a WTA of 25.7%. A positive attitude increases it about 0.17%. No influences are visible for Samtskhe-Javakheti.

A WTP of 0.7% (Lake Arpi) up to 2% (Samtskhe-Javakheti) of the monthly income is visible for 1% more access to summer pasture. Positive attitudes decrease the WTP in Lake Arpi for 1% more access to summer pasture about 0.11% and increase it in Samtskhe-Javakheti about 0.14%.

5. Discussion and Conclusion

5.1 Attitudes towards national parks

Results show that the attitudes in the twin MtPA differ widely. The sample of Lake Arpi shows more people having a positive attitude towards the NP than in Samtskhe-Javakheti. Attitude is in both regions influenced by socio factors.

In both regions gender seem to have influence on the attitude. In Lake Arpi, as well as in Samtskhe-Javakheti female respondents do have more positive attitudes towards the specific NP. While King and Peralvo (2010) have shown, that gender affects attitudes towards national parks due to gender differences in the livelihood strategies of the regions, Kidegesho et al. found out that gender has no influence (2007). Kidegesho et al. lead this back that costs and usage restrictions can, due to protected area creation, affect woman and men on the same level. For our study we can say, that gender has an influence on attitude. Livelihood patterns within the community are gendered, as males are the most likely to take care of cattle and farm plots. Females are responsible for care-giving, task within the household and if possible to have jobs outside agriculture. Female respondents were more likely to mention positive future

developments in the belief questions. The tendency of having a better attitude is less marked for female respondents in Lake Arpi as in this region often female head of households assume male livelihood pattern.

Shibia (2010) states in his study that younger people living close to national parks do have a more positive attitude towards conservation, similarly that older respondent have a less positive attitude. He argues that respondents' age is associated with the length of experience with benefits from natural resources and is more likely to be affected by restrictions than younger respondents (Shibia 2010). Our data can not approve this for the South Caucasus. In our study a positive attitude is increasing with age. In both Caucasus regions, older respondents tend to have a more positive attitude towards the NP than younger respondents. The most negative attitude is in both study sides found in the group of youngest respondents. This affirms Tessema et al. (2007) and Mutanga et al. (2015) who state that older community members can have more positive attitudes as in some areas as older people become more understanding and tolerate. Reasons why older respondents in our study have more positive attitudes cannot be explained, just assumed by the theory of becoming more tolerate with getting older.

In our sample positive attitudes increases with higher education in the region of Lake Arpi. This effect was already found in other studies, as people with higher education indicate to be more supporting of the status of protected areas (Kidegesho et al. 2007). Also it can be suggested that higher education is a key to better opportunities for the rarely existing employment opportunities outside agriculture. Therefore a way for alternative income strategies may also explain the results. In Samtskhe-Javakheti respondents with 8-10 years of education (high school graduation) have more positive attitudes towards the national park than respondents with higher education. Hence we cannot conclude that higher education leads overall to more positive attitudes towards national parks in the South Caucasus. Moreover it is depended from the region. All respondents do benefit from the natural resources of protected areas, in form of monetary and subsistence income. Therefore a negative attitude may also be a reflection of fear to lose access to natural resources.

Mutanga et al. (2015) found out, that the beginning of the establishment process of national parks does have influence on the relationship between locals and the

administration of the protected areas. Our study shows for the region of Samtskhe-Javakheti that even though respondents are living in the buffer zone of the NP, 40 people of the sample state that they have not heard about it. In the region of Lake Arpi just four respondents state to have not heard about the NP before.

People in Armenia mostly heard of the implementation from local administrations and the realising NGO WWF. In Samtskhe-Javakheti people even mentioned just to have heard about the NP in TV. Although the NPs were established at the same time both under the leadership of the WWF, the implementation was diverse. In Lake Arpi it was paid attention to involve local population of the buffer zone into planning and decision making of the zones and integrated conservation and development programs. Locals in Samtskhe-Javakheti were excluded from the process. A bad supply of information therefore may be a reason for the more negative attitude towards the national park and the fear about future restrictions concerning the NP. While in Lake Arpi respondents have hope in future, respondents of the Samtskhe-Javakheti sample see the establishment and concerning influences on their livelihood situations more critical. However, the good bottom-up approach realised in Lake Arpi may have led to an overall positive attitude of the communities living in the buffer zone, while the exclusion of locals of the National Park Samtskhe-Javakheti from decision making processes could have led to a more negative attitude towards the NP.

5.2 Influence of attitudes on choices

Our CE has shown that respondents of both regions are willing to pay for trainings of additional income sources. A reason could be the fear of losing pasture access in the next years due to the NPs and a search for new opportunities.

In Lake Arpi the WTP for tour-guiding training is significant, while it is not in Samtskhe-Javakheti. This may show a trust into the NP as an improvement of living conditions and a chance to generate income out of it. The results have proven that a positive attitude towards the NPs result in both regions in a higher WTP for tour-guiding training.

A positive attitude has also influence on the bee-keeping training. WTP is increasing with a more positive attitude. A reason may be that a positive attitude leads to a willingness to generate income from a less resource intensive alternative.

The WTA for a ban to collect wild plants in Lake Arpi is even increasing slightly with having a positive attitude towards the national park. More than half of the households' income is subsistence income, and collection of natural goods is necessary for people. Therefore we suggest that the dependence from natural goods even transcends the positive attitude. No WTP exists in both regions for a permission to collect wild plants more extensively. This may suggest that natural resources, expect pastureland, is mostly needed for home consumption and households do not want to draw profit out of them

Access to summer pasture is in the regions highly significant. The WTP in Samtskhe-Javakheti is higher than in Lake Arpi and may be explained by the less positive attitudes towards the NP found in the sample, as well as the as the fear of further use restrictions. In both regions a positive attitude influences the WTP. In Lake Arpi the WTP decreases about 0.11% for 1% more access to summer pasture. Lake Arpi respondents high trust in the NP and mention fewer worries about further use restriction concerning the pastureland. In Samtskhe-Javakheti the WTP increases about 0.14%. Respondents have overall more negative attitudes. Furthermore, respondents mention, independent from attitude fears about further use restrictions. Therefore WTP even increases with a positive attitude.

5.3 Conclusion

We have seen that positive attitudes influence the WTP in both regions. A positive attitude is mostly linked with information about the NP and with socio factors. Influences due to gender, age and education are visible in the project regions. In Lake Arpi, where small scale farmers of the buffer zone were widely involved in NP planning and informed projects in the region, more positive attitudes are found. People have less fear concerning their future and more trust that they will not lose land and living conditions will improve.

Involving people of the buffer zones from the beginning the wish to be more involved into planning and decision making even increases. In Samtskhe-Javakheti people of the buffer zone were excluded from the planning and there is less trust, even the wish to participate in these important issues is low. Establishing a new MtPA in a region settled since centuries may therefore be done in a bottom-up way.

Our CE has shown that positive attitudes results in a lower WTP for the needed resource land and less positive attitudes in a higher WTP. The CE has also shown that trainings are a way of compensation. It could be possible that offering trainings to locals could generate also generate positive attitudes. Positive attitudes on the other hand raise the interest and WTP for biodiversity-friendly income alternatives. In both regions a main competitive resource of nature exists. The attitude towards the NP influences peoples WTP/WTA for it. But also NP management should keep in mind, that hidden competitive resources (like wild plants in Lake Arpi) are existing and important for household survival. A better attitude lead may lead to a more common protection of the region and locals could be interest to work in more eco-friendly agricultural alternative (e.g. WTP bee-keeping and tour-guiding trainings).

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IV

Restrictions in the access to summer pastures in the South Caucasus induce high monetary compensation demands by local smallholder farmers

1. Introduction

Human land use and biodiversity conservation often result in conflicts between national park (NP) management and local habitants, as natural resources become competitive goods. Land use mostly occurs outside the administrative boundaries of a NP, but can have negative consequences for the protected area itself (Hansen & DeFries 2007). Land use surrounding a protected area can threaten the conservation objectives inside the NP as the biodiversity is locked inside a small area (Baker 1992, Hansen & Rotella 2001). On the other hand, implementations or extensions of NPs regularly impose significant costs in form of use restrictions onto the rural population living close by (Bawa et al. 2004). In an ideal situation, land use management of national parks achieves a win-win solution, which satisfies human needs, while maintaining ecological functioning (Daily &Ellison 2002, Rosenzweig 2003). Boundaries of national parks are influenced by and influence at the same time the sociological properties associated with rural land use and human communities in the vicinity (Machlis & Tichnell 1985). Therefore, for a better transition from agricultural used land to protected areas and reduction of negative influences, so-called inhabited buffer zones around the protected areas, with a limited or restricted land use are frequently used (Kintz et al. 2006).

People living close to the national parks in development or transition countries are often poor, have limited access to government services and no political power (Brandon & Wells 1992). As costs due to loss of access to natural resources inside the NP are often higher than local benefits, local communities often experience the implementation of strictly protected areas a as a threat to their livelihoods . Projects to support locals often take place around the strictly protected area. These areas are frequently referred to as “buffer zones”, even if they exist *de lege* (Brandon & Wells 1992).

In developing and transition countries land is a limiting factor to the improvement of the livelihood situation of locals, who mostly suffer from restrictions created to protected areas (PAs) in the adjacent region. Therefore, the management of buffer zones has to balance e.g. grazing areas. Independent from former losses of land, due to boundary settings, locals tend to respect PAs present boundaries. In future, however,

if their welfare or survival is threatened, they would probably ignore agreed regulation and push the generated edge inwards (Schonewald-Cox 1992).

The relationship between NPs and the local population was mostly studied in South America and Africa (e.g. Garcia-Amado et al. 2013, Sunderlin 2005). However, some results can be applied to the situation in transition countries such as Georgia and Armenia. In Georgia and Armenia, the rural non-farm economy was well-placed under socialism. Industries and factories related to agriculture were mostly located in rural areas as a sign of developing and industrializing (Davis et al. 2004). Agriculture at the same time was organized in big collectives and no small private farms were existing in the Soviet Union. At the beginning of the 1990 these collectives as well as rural industries collapsed with the breakdown of the Soviet Union, dramatically reducing income options for the local population. Furthermore, Georgia and Armenia were struck by war, further impoverishing vulnerable households either directly, by interrupted trade, or by the reduced ability of the nation state to initiate sustainable rural development (cf. Davis et al. 2014).

The land of the collectives was allotted to the population after the breakdown of the Soviet Union. For example, 20% of the national labour in Armenia was working in agriculture in the 1980ies, from 1990-1995 94% of the population practised subsistence farming (Lerman et al. 2003). But Armenia is a special example of the former Soviet Countries. The country suffered from a devastating earthquake at the end of the 1980s, which destroyed much of the country's industry and infrastructure, plus the war with Azerbaijan triggered blockades that disrupted critical imports of energy and inputs. Labour migrated to rural areas, as the industry was in total disarray in the early 1990s. Land reforms were done soon and collective farms were split up and the land assigned to individuals. Georgia's agricultural labour increased from 28% to 76% after the demise of socialism (Lerman et al. 2003). A land market was first invented in the year 1996 (Mathijs & Swinnen 1998); it is still not working properly (Millns 2013).

Most regions of the Caucasus, including rather remote mountain areas, have been settled since time immemorial. Thus, the creation of strictly protected areas in this "biodiversity hotspot" (Myers et al. 2003) directly concerns the interest of many rural populations. However, land use was not that considerable during Soviet times, it

became first important for subsistence farming in both countries after the system collapse (Davis et al. 2004). Understanding the worth and need of the used land can lead to important management options in the term of establishing or enlarging NPs. But also giving locals the opportunity to generate income in other fields (related to agriculture and biodiversity protection) can be a way to manage the usage of the competitive resource land.

The present paper was designed to identify how restrictions of NPs can have influence on the willingness-to-pay/-accept (WTP/WTA) of access to grazing land and to give appropriate suggestions for right human-NP management options.

2. Grazing situation in Georgia and Armenia

The rural population of Georgia and Armenia is dramatically impoverished since the breakdown of the Soviet Union (Davis et al. 2004), so that any stringent restrictions on land use required by the establishment of protected areas are likely to meet substantial resistance. A large number of the population of the former Soviet Union countries live in rural areas, have less social, economic or educational opportunities than population from urban regions, and therefore lower income (Pearce 2011). Unemployment in the two South Caucasus countries is high. In 2010 32% of the Armenian und 37% of the Georgian population was unemployed, mostly in rural areas (Pearce 2011). The construction of rural infrastructure had low level of priority for the specific governments after the breakdown of the Soviet Union (Millns 2013) and still in 2009 just about 76% of the rural Armenian and 35% of the rural Georgian population had connection to water and gas for some days in a week (Pearce 2011). In 2012 40% of the population of Armenia and 50% in Georgia were working in agriculture (Millns 2013). In Armenia, 869 large collective farms were divided into 338,000 farms with small pieces of land. Average farm size nowadays is 1.4 – 3 ha with 88% smaller than 2 ha. On average, the private land is divided into three parcels and a third of farmers do not cultivate their land at all in Armenia. Even a large amount of the Armenian population is involved in agriculture still more than 150 000 hectares of arable land and 50% of former pastures are out of use. In Georgia the most rural dwellers received less than 1.5 ha and today 98.4% of the farms are still smaller than 5 ha (Millns 2013).

Credits do not function in both countries. Interest rates are too high for rural farmers, and the rural banking system is not working properly (Millns 2013). If credit is used,

it is used to satisfy household consumption needs and not for agricultural investments. Most credits are informal through neighbourhood, ethnic or patronage links (Davis & Gaburici 2001, Bezemer & Davis 2003 a, b).

In both countries, small-scale farmers are specialised in livestock keeping especially at mountainous regions (Tumanian 2006, Kokhia et al. 2010). In Armenia 138,907 ha of the used land is grassland for haymaking and 694,015 ha are pastures (Tumanian 2006), in Georgia of the available land about 10,200 ha is grassland for haymaking; there are no data on the national pastures area (Tsakadze et al. 2014). Pastures in Armenia and Georgia are not privatized. Small-scale farmers use communal village pastures. These pastures belong to villages and can be used by all habitants. The use of communal village pastures is not regulated and pastures are overgrazed. Grazing period is from early spring to late autumn. Natural cover of pastures became thinner and infested by unusable weeds. Pastures are trampled and eroded down by livestock to a lower level of productivity. The poor circumstances of pastures led to underfed livestock (Tumanian 2006). After privatization, seed farms collapsed. This has led to the reduction of areas sown to fodder crops currently major fodder sources maintained are natural grasslands and pastures (Tumanian 2006, Kokhia et al. 2010).
Two different pastoral systems do exist in Armenia and can be transferred on some regions of Georgia: The “remote” and the “nearby” system (Tumanian 2006, *pers. observations* Kalatas 2012). If pastures are far away, families drive their livestock for the complete grazing period to the pastures but the “nearby” system is more common. Here farmer use pasturelands closer to their farmyard. Animals are brought daily to the farms for milking and overnight animal housing (Tumanian 2006).

3. Method

The following subchapters will describe the study areas as well as the used research methods.

3.1 Study area

3.1.1 The Javakheti plateau

The Javakheti plateau is mostly known for migratory birds. Over 140 bird species have been recorded in the area (Schuerholz 2009). 80-85 of this species are known to nest in the target area (Schuerholz 2009). The other species are summer visitors, migrants or under an unclear status. Most bird species are related to the lakes and wetlands. The

plateau is one of the few regions of the Caucasus where breeding common crane (*Grus grus*), white stork (*Ciconia ciconia*), grey heron (*Ardea cinerea*), various pelicans and velvet scoter (*Melanitta fusca*) can be found (Schuerholz 2009). Seven of the species are globally endangered (Schuerholz 2009). Almost 40 species of mammals, including two species of ungulates and 10 species of carnivores are visible in the region. Ungulates, lynx and bear, can just rarely be observed at these open spaces, but wolf (*Canis lupus*), marbled polecat (*Vormela peregusna*), European hare (*Lepus europaeus*), European otter (*Lutra lutra*), European badger (*Meles meles*) and fox (*Vulpes vulpes*) are more frequent. Six of the mammal species are endemic in the Caucasus. These are the nehring's blind mole-rat (*Nannospalax nehringi*), the Turkish hamster (*Mesocricetus brandti*), the nazarov pine vole (*Terricola nasarovi*), the daghestan pine vole (*Terricola daghestanicus*), the transcaucasian water shrew (*Neomys teres*) and the Caucasian shrew (*Sorex satunini Ognev*). Furthermore, 13 different reptiles and amphibians are found on the Javakheti Plateau. Of these the Darevsky's viper (*Vipera darevskii*), a live birth giving snake is endemic for the Caucasus (Mgmt SJ 2013).

Lake Arpi National Park is located in the province of Shirak in the north-western part of Armenia (Schuerholz 2009). The name giving lake is 2,023 m above sea level (22 km²) and the total area is about 58,711ha. In the 1950s, the lake was artificially increased by the government and became the second important water source of the country next to Lake Sevan. The lake is used for hydropower production as well as for irrigation and designated as Ramsar Site. The region lays on 1,500 to 3,000m above sea-level and struggles with extreme and inhospitable climate conditions, with having a yearly mean temperature from -13 up to +13°C, a vegetation period of 160 days, 2400 hours of sunshine a year and 550 mm of mean annual precipitation (Schuerholz 2009) In winter the region is covered by 1.5 m of snow (Schuerholz 2004). Biogeographically the region is compounded by steppes, meadow-steppes, alpine meadows, sub-alpines and wetlands. Steppes are located mostly between 1800 and 2500 m and grow on chernozem soils. Field steppes just occur along northern slopes and are dominated by horsetail feather grass (*Stipa tirsa)*. The region of Lake Arpi is treeless since the Holocene (Schuerholz 2009). 18 villages belong to the support zone. These are: Yeghanajur, Lorasar, Paghakn, Garnarich, Tsaghkut, Berdashen, Shaghik, Zorakert, Ardenis, Aghvorik, Tavshut, Sizavet, Saragyugh, Ghazanchi, Mets Sepasar, Zarishat and Yerizak.

Samtskhe-Javakheti National Park is located in province of Samtskhe-Javakheti in the southwestern part of Georgia. The NP lies on a height of 1,900 to 3,300 m above sea-level and has a total size of 42,509 ha. The whole region is formed by soft, volcanic forms, cones and clicker flows, high mountain meadows and steppes on mountain plateaus and slopes as well as lakes of volcanic origin. Six middle sized natural lakes and 60 small lakes are spread over the entire area with a total surface of 96 km². The Javakheti highland takes the second place in Georgia by concentration of wetland areas and is one of the most important reception basins in Georgia (Mgmt SJ 2013). Like Lake Arpi, the region of Samtskhe-Javakheti has a harsh, mainly continental climate, with mean yearly temperature between -10 and +15°C. In winter period, the lakes are covered with 30-35 cm of ice. The yearly annual precipitation level varies between 600 and 700 mm. At the region, little sub-alpine forests can be found at 1,800-2,100 m above sea level, east to Kartsakhi Lake. Birch (*Betula litwinowii*), aspen (*Populus tremula*) and rowan (*Sorbus aucuparia*) form the forests. At the upper edge of sub-alpine forests, (2,000 – 2,100 m above sea-level) pines (*Pinus kochiana*) can be found (Mgmt SJ 2013). In total 10 of the villages belong to the support zone. These are: Kartsakhi, Philipovka, Sulda, Dadeshi, Miasnikiani, Patara Khanchali, Efremovka, Sameba, Zhabonui and Bozali (Mgmt SJ 2013).

In both regions livestock keeping is one of the most important economic activities. Grazing practices in soviet times were non-systematic and are still not everywhere today (Mgmt SJ 2013). In Lake Arpi relatively low range productivity, found along slopes of north extern, exposure over-grazing and poor control is responsible for deterioration in some areas. Communal grazing areas are leased of by the communities to livestock owners on a 25 year lease basis (Schuerholz 2009), while they are not controlled in Samtskhe-Javakheti (Mgmt SJ 2013). In both regions pastureland is close to the villages and a "nearby" grazing system is used. Here animals are brought to the pasture fields in the morning and brought back every evening (Tumanian 2006). The grazing area is bordering the strict core zones of the NPs. Prestudy visits have shown that both areas are suffering from poor infrastructure, high poverty and insufficient utility supply (mostly water and gas). Mobility, job opportunities and market connections are bad. In winter the Javakheti plateau is cut off from the rest of the countries for about six month due to snow levels of 1.5 m and above (Schuerholz 2004). Figures IV-1 and -2 show the location of the villages and core zones of the NPs on the Javakheti plateau.

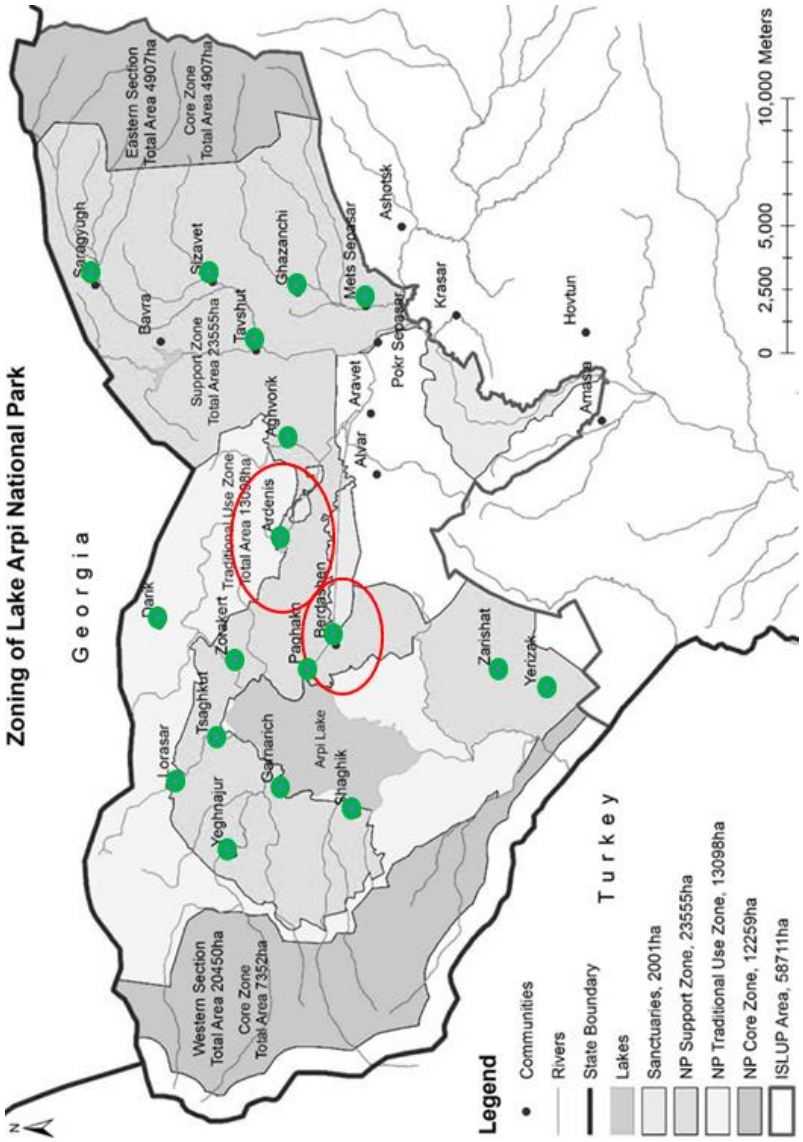

Figure IV-1: Lake Arpi National Park villages and zoning. Source: Schuerholz 2009.

Villages are using pasturelands surrounding them. Circled are villages using pastures in Sancutry zones. Information of pastures are given by locals. The marked villages are the 18 buffer zone villages: Yeghnajur, Lorasar, Paghakn, Garnarich, Tsaghkut, Berdashen, Shaghik, Zorakert, Ardenis, Aghvorik, Tavshut, Sizavet, Saragyugh, Ghazanchi, Mets Sepasar, Zarishat and Yerizak.

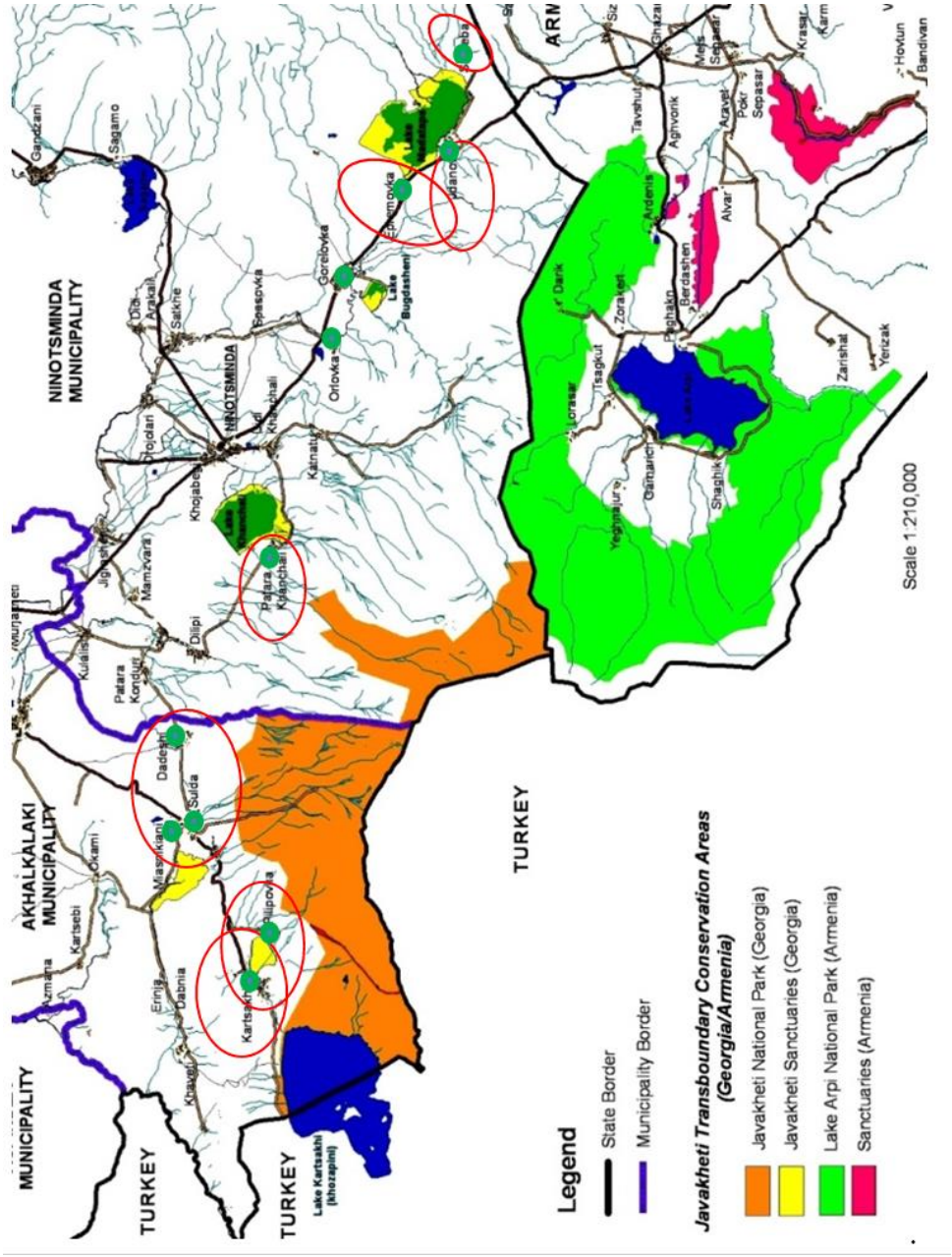

Figure IV-2: Samtskhe-Javakheti National Park villages and zoning. Source: WWF 2015.

Villages are using pasturelands surrounding them. Circled are villages using pasturelands in Sancutry zones. Information of pastures are given by locals. The marked villages are the 10 zone villages: Kartsakhi, Pilipovka, Sulda, Dadeshi, Miasnikiani, Bozali, Patara Khanchali, Efremovka, Sameba and Zhabonui.

Figure IV-1 shows the area of the national park Lake Arpi. The area is divided into different zones: a 12,259 ha core zone of strict nature protection and no agricultural productivity; a 13,098 ha sized traditional use zone where agricultural productivity is allowed, three sanctuary zones of 2001 ha where bird watching is possible and a support zone of 23,555 ha, where the villages are located. The traditional use zone is composed by 221ha of private and 13,098 ha communal land owned by the villages. In total 52% of the NP area is communal land, while private land is just 0.9%. Wetlands of the region are used for haymaking, which are in short supply and insufficient for the high number of livestock (Schuerholz 2009). Just 25,397 tons of hay can be produced yearly from the region, so that farmers have to buy expensive additional fodder for winter (Schuerholz 2009). None of the villages are in the core zone of the park, but the villages Ardenis and Berdashen are bordering the sanctuary zones. However, core and use zones of the park are close together, an enlargement of the strict core zone would automatically mean a reduction of the use zones. Information about the usage of pasture area are given by farmers and visible from field researches (*pers. observations* Kalatas 2012).

Figure IV-2 shows the location of villages of the national park Samtskhe-Javakheti. Less official information of the buffer zone is provided by the Georgian local administration of WWF, the Georgian Ministry of Nature Protection or the NP direction. However, we can see that villages are not in the sanctuary or core zones of the park. However, the villages Philipovka, Kartsakhi, Sulda, Dadeshi, Patara Khanchali, Efremovka and Sameba are directly bordering sanctuary zones. Villages are using summer pasture area directly around their communities (*pers. observation Kalatas 2012*). This means that in some villages an overlap of pasture area and sanctuaries already exists, local farmers also tell this information. An enlargement of the park closer to these villages therefore would automatically endanger people's usage of land.

3.1.2 Lagodekhi

The nature reserve (NR) lies on the range of the Greater Caucasus of the alpine region of eastern Georgia (Pilāts & Laiviņš 2013), in the region of Kakheti. Nowadays it has a size of 22,266 ha, but was enlarged over the decades for several times. The last enlargement was done in 2003. Lagodekhi was enlarged by 6000 ha and divided in two parts with separated managements (Pilāts & Laiviņš 2013).

The reserve lays on 400 to 3,500 m above sea-level and a vertical climate and biota division is visible from breech forests to alpine zones. About 70 % of the area is occupied by forests (altitude of 450 – 2,300 m above sea-level). The most dominant species are oriental beech (*Fagus orientalsis*), Caucasian hornbeam (*Carpinus caucasica*) and maples (*acer*). Above 2,300 m, mostly subalpine and alpine meadows can be found. Nearly two thirds of the whole Georgian plants occur in the region of Lagodekhi, but also the fauna is very rich. East Caucasian tur, red deer, chamois, brown bear, lynx, bearded vulture, grey wolf, golden eagle, imperial eagle and steppe eagle are dominant in the reserve (Pilāts & Laiviņš 2013). 121 species of the Lagodekhi flora are endemic to the Caucasus and nine even to Georgia. Two impacts were important for the unique natural creation of the reserve: it was an isolation refuge for many species during the glaciations (Zazanashvilli 2009) and, it was isolated from human impacts due to political and historical issues. The region was first depopulated by Persians in times of war in the 16th century and later unsafe for living due to Dagestan tribes. When the Russian Empire annexed Georgia, the region became settled as a garrison was located down in the village of Lagodekhi in the 19th century (Pilāts & Laiviņš 2013). Important for the establishment of the NR was the polish naturalist Mlokosiewicz. During his military service in the middle of the 19th century in the garrison of Lagodekhi, he started to explore the nature, returned in 1867 to settle down, and spent the rest of his life in Lagodekhi. All his life he worked for the idea to create the NR of Lagodekhi and published material concerning the species of the area in Caucasian magazines. He died three years before Lagodekhi became the first protected area of the South Caucasus in 1912 (Pilāts & Laiviņš 2013). As a typical Soviet *zapovednik*, the nature reserve was closed to people, except for scientific research. After the breakdown of the Soviet Union, deforestation and illegal hunting appeared to happen at the reserve and the reserve became more western oriented. In 2003 reserve was divided into two management areas. The larger area covers 22,266 ha and the territory is kept under the status of strict nature reserve. The smaller part covers 1,992 ha and is located at the south of the NR as a strip between the strict reserve and the villages in adjacent (Pilāts & Laiviņ 2013). This part is called “managed reserve”. Human activities except vacation are prohibited (*pers. observation* Kalatas 2012). While the NPs on the Javakheti plateau were planning with buffer zones, Figure IV-3 will show that de facto no such zone exists in Lagodekhi. The park was established before most of the settlements.

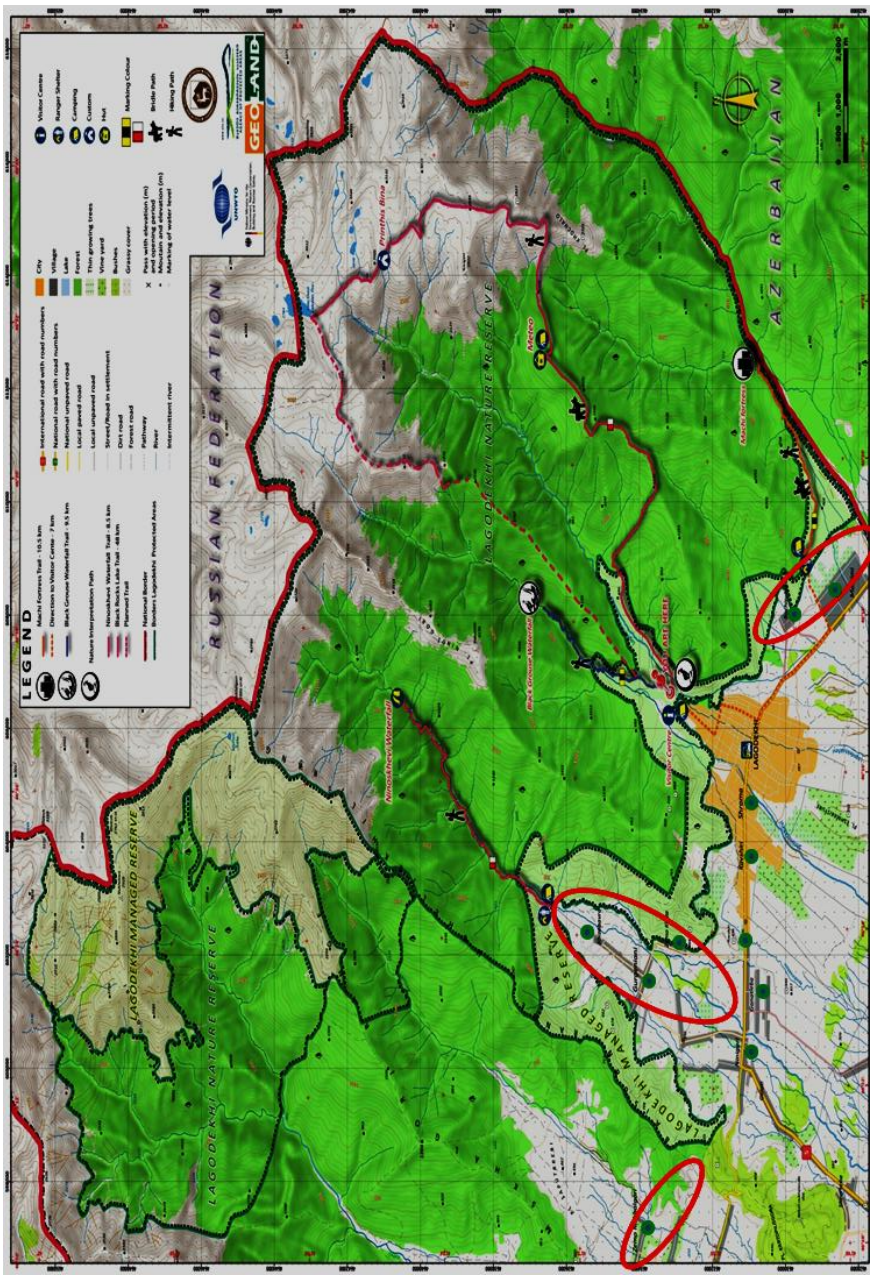

Figure IV-3: Lagodekhi National Park villages. Source: Lagodekhi NP administration 2015. Villages are using pasturelands surrounding them. Circled are villages using pastures very near NP territory. Information of pastures are given by locals. The marked villages are the 10 buffer zone villages: Khizabavra, Zemo Khiza, Gurgeniani, Zemo Mskhalgori, Ninigori, Rachisubani, Matsimi, Shroma, Kavshiri and Ganatieba.

Figure IV-3 shows, that the villages Khizabavra, Zemo Khiza, Gurgeniani, Rachisubani, Zemo Mskhalgori and Matsimi are bordering with their communal pastureland the managed reserve. Any enlargement of the park mountain downwards would automatically integrate these villages into the protected area zone.

3.2 Study sampling

The study was implemented in October 2012. The survey was conducted as a random clustered sample in 9 out of 18 villages of the Lake Arpi region and 6 out of 10 villages of the Samtskhe-Javakheti. The household heads were targeted as the respondents. In case of absence their wives or another permanently resident-adult (> 18 years) in the households took part in the interview. Respondents were answering a household survey, belief questions concerning the NPs and a choice experiment. In total the subjects were asked 150 different questions.

The villages were drawn randomly from a bag. We defined the number of respondents we would like to survey before, so that we calculated households asked in the villages representatively from the total number of households living in the villages. After this we have chosen a number from a bank note randomly. This number stated the first household of a village we asked to take part at the survey. We walked through the villages on the basis of the village structure. For example we took the 9th number of an Armenian Dram note, which was 5 and walked to the 5th household in line. After this household we went five houses farer and so on. We did this from both ends of a village. All six enumerators of the survey were thoroughly trained in the administration of interviewing and the choice experiment and accompanied by a scientist of the research group.

In Lake Arpi the villages Ardenis, Tsaghkut, Zorakert, Zarishat, Berdashen, Garnarich, Mets Sepasar and Ghazanchi were drawn. In Samtskhe-Javakheti the survey was conducted in the villages Sulda, Dadeshi, Kartsakhi, Philipovka, Efremovka and Sameba.

3.3 Choice experiment

We showed farmers a choice experiment (CE) of different socio-economic livelihood situations and asked to choose which their preferred situation is. The different situations of our CE were defined as combinations of the attributes access to summer pasture, usage of wild plants, additional income sources and change of monthly

income, as summarized in Table IV-1. Through the so-called payment vehicle (change in monthly income), which can be positive or negative, a marginal willingness-to-pay and a marginal willingness-to-accept for an increase or decrease in any significant attribute can be estimated (Hanley et al. 1998). Created situations were presented to all respondents.

Tab. IV-1: Levels of attributes in the choice experiment

Attributes	Possible expressions of the attribute	Status quo
Change in access to Summer pastures	+25%; +50% access to pasture; -25%; -50% access to pasture; no change in access	No change in access
Access to plants and fuel wood	No collection of wild plants, fuel wood & timber is allowed; Home consumption of wild plants, fuel wood & timber is allowed; extensive collection of wild plants, fuel wood & timber is allowed	Home consumption of wild plants, fuel wood & timber is allowed
Trainings for income alternatives	Bee-keeping & honey production (2 month); cheese- production (2 month); tour guiding (2 month); no training	No additional training
Change in monthly income	-10%; -20%; -33% of monthly income; +10%; +20%; +33% of monthly income; no change	No change in monthly income

In stated preference methods, the WTP/WTA "anomaly" (Sugden 2005) is one of the most critically discussed issues due to the observed size of the divergence between WTP and WTA – two theoretically very similar measures of economic value (Willing 1976). Empirically, the WTP/WTA disparity observed in stated preference studies is higher if goods to be valuated have no substitutes, are non-market or environmental goods, if the market experience of respondents is low, and if ownership of goods or payments are in and out of pockets (Sayman and Öncüler 2005). Likewise, the disparity tends to be lower if the valuation frame is better incentive compatible, if a within-subject design of valuation instruments is used, payments are not in and out of pocket, and if goods are not health related.

As our study addresses several issues that may increase the WTP/WTA disparity (e.g., environmental goods, partly no market experience), we opted for a study design that facilitates the estimation of WTP as well as WTA preference figures. By including the WTA levels into the payment vehicle in our experiment, we reduced the impact of wealth on respondent expressions of preferences. Via just using the WTP format, the influence of an individual on the aggregate compensating variation measure is bound by the personal budget of respondents. In other words: richer respondents have a higher influence on the final valuation result than poorer ones. A second reason to act like this is the fact that, if respondents feel entitled to a certain quantity of the environmental good, or to certain use right, proposed infringements of the entitlements call for a WTA format of the payment attribute.

Due to this reasons we opted a "mixed" WTA/WTP format of the monetary attribute with three WTA and three WTP attribute levels (see Table IV-1; Cerda et al. 2007).

As a full-fractional design for all attribute-combinations is too large to answer by one individual (Bennet & Adamowicz 2001), we worked with a fractional-factorial main effects design. Requirement for this kind of design is orthogonality. Orthogonality ensures that the influence of a single attribute can be determined independently from the other attributes present on each choice card. We used Chrzen and Ormes (2000) procedure of Mix and Match to create the choice sets of all choice cards. In total, we obtained 46 choice cards. To create an orthogonal main effect design (Hensher et al. 2005) we used blocking (Bennet & Adamowicz 2001). We blocked all choice cards into six groups, so that each respondent was answering eight, respectively, seven, choice sets (21 resp. 28 cards) randomly. Figure IV-4 shows an exemplary choice card of our experiment.

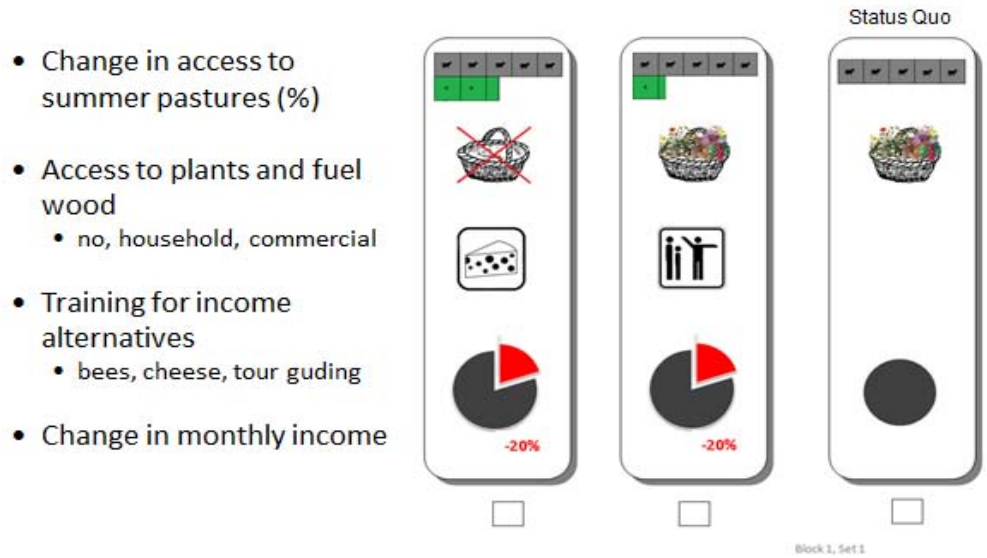

Figure IV-4: Example of a choice card

The questionnaire was created in English and translated into Armenian und Georgian. We compared the original and translated versions to ensure that the questionnaires were correct, similar to interpret and reasonable in all three project regions (Harkness 2003). A complete copy of the questionnaire is available from the authors.

3.4 Moddeling approach

Choice experiment analysis is based on the random utility theory (McFadden 1974) and Lancaster's characteristics theory of value. Choice experiments are regarded as suitable method for economic valuation of environmental goods (Adamowicz 1998). Following Lancaster's theory, it is not a good, which is the utility per se, it is the attributes of the good giving the utility (Lancaster 1966). McFadden states that utility is just a latent construction, which (if at all) exists only in individuals' minds (McFadden 1974). Human choice behaviours can be explained/forecasted as a function of the attributes that characterize the single options from which to choose from (McFadden 1973). Through analyses of the selection patterns between the options, the relative influence of attributes on choices can be determined and marginal economic values for an increase or decrease in statistically significant attributes can be calculated (Bateman et al. 2002). ´

We assume an additive utility function linear in parameters with respect to the attribute levels as coded in Table II-1. The utility function is separated into an observable component V_{in} and an unobservable (error) component ε_{in}

$$Uin = Vin + \varepsilon in$$

where U_{in} is the total utility of alternative i for individual n. The probability that individual n will choose option i over option j within the complete choice set C is

$$Prin = \mathrm{Pr}(Vin + \varepsilon in > Vjn + \varepsilon jn) \text{ (all } j \in C)$$

Choice decisions can be influenced by socio-economic parameters or attitudes towards the attributes. To assess such influences, interaction terms of the respective variables with attributes are calculated. If a deterministic utility component $V1$ is hypothesized to be a linear function of attribute $Z1$ with an individually varying socio-economic variable A, $V1$ can be formulated as

$$V1(Z1, A) = bA * Z1 + b1 * Z1$$

with bA as utility coefficient of the interaction term (Barkmann et al. 2008). In the econometrically estimated utility models, a positive sign of the coefficients b indicates a positive influence of the respective term on choices and thus on utility. To reduce collinearity between the interaction term and the non-interacted attribute term, the socio-demographic variables A were standardized before being multiplied with $Z1$.

The vector of utility coefficients is estimated with maximum likelihood techniques. The estimated models include a non-status quo alternative specific constant (NonSQ ASC) which picks up systematic differences in choice patterns between the choice cards. The NonSQ ASC was coded ‘0’ for the Status Quo and ‘1’ for the alternative choice cards A and B. Four socio-demographic variables (gender, age, education in years, monthly income) and three independent attitudinal variables (attitude towards national park, ha size of grassland, animals sent to summer pasture) were heuristically introduced into the NL model as interaction terms with the ASC to test for influence on choosing non-Status Quo alternatives.

Preliminary analyses showed that there might be a risk to violate the Independence from Irrelevant Assumptions (IIA) condition. Therefore, Nested Logit models were used as they rely on less strict assumptions. Models were estimated with NLOGIT 5. The inclusive value was set to 1.0 for the degenerated branch, and the models were

initiated with starting values obtained from a non-nested NL model (Hensher et al. 2005). All scale parameters were normalized at the lowest level (RU1). We report pseudo-R^2 values as model statistics in relation to "constants only" values. Values between 0.05 and 0.08 correspond to values approximately between 0.18 and 0.25 for the equivalent R^2 of a linear regression model (Domencich & McFadden 1975).

WTP calculations are based on extrapolations from mean marginal WTP values. For attributes linear in parameters, marginal WTP (mWTP) equals the negative ratio of the respective attribute coefficient c_z and the coefficient of the monetary attribute c_y:

$$mWTP = \frac{\mathbf{cz}}{\mathbf{cy}}$$

4. Results

The following subchapters show the composition of the sample as well as the CE results.

4.1 Composition of the sample

100 respondents answered the questionnaire in each region. A description of the sample is represented in Table IV-2. The study was implemented in October 2012. The survey was conducted as a random clustered sample in 9 out of 18 villages of the Lake Arpi region, 6 out of 10 villages in Samtskhe-Javakheti and 6 out of 10 villages of the Lagodekhi region. All villages were located in the buffer zones of the PAs.

Table. IV-2: Sample description

Demographic variables	Lake Arpi (Armenia)	Samtskhe-Javakheti (Georgia)	Lagodekhi (Georgia)
Gender:			
Female (%)	50.0	11.0	07.0
Male (%)	50.0	89.0	93.0
Age :			
Mean	52.0	59.9	54.9
Standard deviation (SD)	13.1	12.0	12.7
Education:			
Years of education Mean	11.9	10.7	10.6
Years of education SD	02.6	03.3	02.4
Mean Ha Grassland owned	5.8	0.2	0.18
Grassland away from home (in minute)			
Mean	32	45.7	12.9
Standard deviation (SD)	30.2	34.8	4.2
Animals sent to Summer Pasture	21	19	5
Wish to send more animals to Pasture			
Yes	83	84	77
No	17	16	23
N: 300			

In mean, the respondents in Lake Arpi are slightly younger (52.02), than in Lagodekhi (54.9) and in Samtskhe-Javakheti (59.93). Mean level of education in Lake Arpi is 11.94 years, in Samtskhe-Javakheti 10.7 and in Lagodekhi 10.6. 51% of all respondents have a degree of higher education.

In Lake Arpi, 91 respondents were using summer pastures, in Samtskhe-Javakheti 96 and in Lagodekhi 75. In Lake Arpi on average 22 animals were sent to the pastures (min.: zero; max.: 93), in Samtskhe-Javakheti 19 (min.: zero; max.: 32) and in Lagodekhi four (min.: zero; max.: 10). In all three regions there are different ways of taking care of the animals at the pastureland: (i) the family is taking care by themselves, (ii) the family hires a shepherd and (iii) different families of the specific villages are taking care of all animals in a rotation-system way. 83 respondents of Lake Arpi would like to send more animals to the pasturelands, in Samtskhe-Javakheti 84 and in Lagodekhi 77. However, respondents state that mostly due to a lack of money (all regions) it is not possible for the farmers to invest in larger herds. In Samtskhe-Javakheti, also a lack of water and in Lagodekhi a lack of land was mentioned. Families in Lake Arpi own more grassland than households of the other regions. In mean households own 5.8 ha (of 9 ha) of grassland to produce fodder. In Samtskhe-Javakheti an average household use 0.2 ha (of 1.5 ha) and in Lagodekhi on average 0.18 ha (of

1.2 ha) as grassland for fodder production. An average household in Lake Arpi owned in 2012 10 cows, 2.5 calves and nine sheep, which were all sent to the summer pasture. In Samtskhe-Javakheti on average a family had about 5 cows, 12 sheep and two calves and in Lagodekhi 3.8 cows, 0.5 calves and one sheep. Also in the two Georgian samples, all of the animals were sent to the summer pastures. The cows are hold for milk and dairy production, sheep mostly for home consumption. During the winter period, animals are hold in stables and fodder has to be bought. Summer pastureland in all regions is mostly communal land. In contrast to the own land, the pastures are closer to the villages and the sizes differ widely in each region (smallest in Lagodekhi) (*pers. observations* Kalatas 2012). In Lake Arpi a family needs on average about 32 minutes, in Samtskhe-Javakheti 46 minutes and in Lagodekhi about 10 minutes to reach their plots.

To indicate the household income we calculated income from farming, employment work outside agriculture, state payments, remittances and subsistence farming income. Based on our household survey we calculate for Lake Arpi, a yearly income of 2,348 € (ppp applied/average 4,292 € in ARM), from which 1,186 € is subsistence income, for Samtskhe-Javakheti, a yearly income of 1,979 € (ppp applied/average 4413 € in GEO), with 838 € subsistence income and for Lagodekhi a yearly income of 680 €, from which just 140 Euro are subsistence income. The cash income of the Armenian sample (1,162 €/year) is composed of 72% from employment work outside agriculture, 4% from selling agricultural products, 20% state payments and 4% remittances. The Samtskhe-Javakheti data indicates that 59% of the cash income (1,141 €/year) are from employment work outside agriculture, 10% from agricultural products, 19% of the cash income are state payments and 12% remittances. In the survey results of Lagodekhi draw a picture where just 39% of the mean cash income (540 €/year) come from employment work outside agriculture and 33% from selling farm products. 14% of the cash income are state payments and another 14% are generated by own businesses. Respondents of the region of Lagodekhi state no remittances.

4.2 Choice experiment results

The choice experiment results in form of the coefficient analysed by a nested logit model are shown Table IV-3.

Table IV-3: Valuation of the socio-economic choice experiment in all three project regions

	Lake Arpi (ARM)	Samtskhe-Javakheti (GEO)	Lagodekhi (GEO)
	Coefficient	Coefficient	Coefficient
Attributes			
Bee-Keeping Training	0.462**	0.378*	0.523***
Cheese-Production Training	0.351*	0.699***	0.525***
Tour Guiding Training	0.593***	0.163	0.166
Summer Pasture	0.021***	0.0269***	0.017***
Ban of Collection	-0.979***	-0.231	-0.119
Permission of Collection	-0.023	0.156	0.280*
Income Change	0.038***	0.013***	0.042***
Non Status Quo	-0.791***	1.592*	0.253
Log-likelihood	-657.7	-665.4	-585
Restricted log likelihood	-813.7	-960	-966.3
P (Chi²); DF	312.15; 9	589.15; 9	762.4; 9
Pseudo R^2 (const.only)§	0.189	0.1644	0.233
Radj (const. only)	0.185	0.159	0.229
Observations	764	764	754

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level.
§:Pseudo-R^2 (constant only) values between 0.16 and 0.23 correspond to R^2 values between 0.85 and 0.95 value in the linear model equivalent (Hensher et al. 2005: 338f). N: 300

In the Lake Arpi sample, all coefficients for trainings are significant: The bee-keeping training on a 5% level, cheese-production training on a 10% level and tour-guiding training on a 1% level. Tour-guiding has the highest coefficient of all trainings. The ban to collect plants has a negative coefficient on the 1% level. The coefficient of the summer pasture attribute is positive on the 1% level. The permission to collect wild plants is not significant. In Samtskhe-Javakheti the coefficient of the bee-keeping training is significant on the 10%, the coefficient of the cheese-production training on the 1% level. Cheese-production has the highest coefficient of trainings. The coefficient of the summer pasture attribute is significant on the 1% level. In Lagodekhi bee-keeping training and cheese-production training have a coefficient significant on the 1% level and are similar. The attribute of a permission to collect wild plants and timber has a positive coefficient on the 10% level. The coefficient of the summer pasture attribute is positive on the 1% level. Summer pasture and income change are the only attributes that are in all regions significant at the same level (1%). In this table already, specific preferences can be seen. As there could be different interactions concerning the animal keeping on the attributes Table IV-4 shows the results of these interactions importance of the summer pasture in the mean marginal WTP at a 95%

confidence interval and clarifies preferences. We tested the influence of number of animals send to the summer pastures and the hectare of grassland which is owned by households.

Table IV-4: The interaction ha and herd size owned and the mean marginal WTP as percentage

	Lake Arpi (ARM)	Samtskhe-Javakheti (GEO)	Lagodekhi (GEO)
Bee-Keeping Training	**12%**	**28%**	**12.6%**
*z-Animals send to pasture	**+6,2%**	**+12%**	**-29%**
Cheese-Production Training	**9%**	**32%**	**12.6%**
* z-Animals send to pasture	ns	ns	
* z-Ha owned		**+5.9%**	**+8.1%**
Tour-Guiding Training	**16%**	12%	4%
*z-Animals send to pasture	**+6,7%**	**+1.49%**	ns
Ban of Collection of Goods	**-26%**	-17%	-3%
*z-Animals send to pasture	**-7.8%**	ns	ns
*z-Ha owned	**-5.9%**		
Permission to Collect Goods	-0,6%	11,6%	**6.8%**
*z-Animals send to pastures	**-4.45%**	ns	**-21.5%**
*z-Ha owned	ns	**-12.7%**	
Access to Summer Pasture	**0,7%**	**2%**	**0.4%**
*z-Animals send to pastures	**+0.07%**	**+0,14%**	**+0.59**
*z-Ha owned	**-0.05%**		**-0.02%**
Costs	**0,038*****	**0,013*****	**0.042*****

Notes: ***Significant on the 1% level; **Significant on the 5% level; * Significant on the 10% level.
N:300; *z: Z-transform of private grassland owned by respondents and number of animals sent to pasturelands

Bee-keeping training would be worth respondents from Lagodekhi and Lake Arpi about 12% and in Samtskhe-Javakheti 28% of their income. Sending more animals to the summer pastures decreases WTP in Lagodekhi for the bee-keeping training about 29% for each standard deviation of the animal sent more and increases the WTP in Lake Arpi about 6% and in Samtskhe-Javakheti about 12%.

WTP for cheese-production training is the lowest in Lake Arpi (9%) and the highest in Samtskhe-Javakheti (32%). Sending more animals to the pasturelands increases the WTP in Samtskhe-Javakheti about 5.9% for each standard derivation of the animal sent more. Having more grassland on the other side increases WTP it in Lagodekhi about 8%.

Each standard derivation of the animals sent more to the summer pastures increases WTP for tour-guiding in Lake Arpi about 7% and in Samtskhe-Javakheti about 1.5%.

A ban to collect wild plants is just significant in Lake Arpi. It is a WTA of 26%, and decreases for each standard derivation of animals sent more to pastureland about 7.8% and with having more own land about 6%. WTP for a permission to collect decreases in Lake Arpi with sending more animals about 4.5% and in Lagodekhi about 21.5%. It decreases in Samtskhe-Javakheti with owning more land about 13%.

Access to summer pasture is significant in all regions. Respondents in Lagodekhi would pay for 1% more access 0.4%, in Lake Arpi 0.7% in Samtskhe-Javakheti 2% of their monthly income. Sending more animals to the pastures increases WTP in all three regions: In Lake Arpi about 0.07%, in Lagodekhi about 0.6% and in Samtskhe-Javakheti about 1.6% for each standard derivation of animals sent more to the pasturelands. Owning more land on the other side decreases the WTP in all regions: In Lake Arpi about 0.05%, in Samtskhe-Javakheti about 0.06% and in Lagodekhi about 0.02%.

5. Discussion

5.1 The willingness-to-pay for summer pasture area and influence of own land and animals

The results show, that access to summer pasture has high economic value (WTP). In Lagodekhi, the WTP is the lowest and in Samtskhe-Javakheti the highest. In Lake Arpi households own on average about 6 ha of grassland, but it is needed for winter fodder production. The more percentage of summer pasture households would lose access to, the higher the compensatory damages would have to be. If later NP planning would include summer pasture areas to the strictly protected zones, massive negative effects on animal husbandry can are likely.

Households in Samtskhe-Javakheti have less land in total, of which just 0.2 ha are used as grassland. If changes in demarcation of the NP would restrict access to communal pastures, there is no local compensation area. Equalization payments would be by comparison to the other two regions very high. Respondents in Lagodekhi own the lowest amount of grassland of all regions (0.18 ha). This situation is traced back by locals to the nature reserve. For households in Lagodekhi there is no space for investments into larger herds. On the other hand villages in Lagodekhi are faced with a NR which could enlarge into their direction.

Owning grassland decreases WTP for summer pasture access in all three regions even own land is quiet far away in the NPs of the Javakheti Plateau. Private land in all regions could be used if needed not only for fodder production but also for grazing. Having an opportunity to be a bit independent from communal pastureland therefore seems to decreases WTP. Sending larger herds to the pastures increases a WTP for access to summer pasture in all regions. We can identify households owning more private land as being wealthier, as households are less dependent from the resource pastureland (Mutanga et al. 2015).

Pastures in Armenia and Georgia are suffering from overgrazing and nutrition of livestock therefore is poor (Schuerholz 2009, Tumanian 2006). A rural development program in both regions could be the adequate seeding of the PA tradition use zones and in the surrounding zone in Lagodekhi. A better fodder supply of animals could

generate higher outcome of livestock productivity. Satisfy own needs easier due to higher agricultural outcome could decrease locals wish to invest in larger herds and WTP for access to summer pasture. Furthermore less own land had to be used for additional fodder production and could be realistic compensation areas for farmers as grazing area.

5.2 The influence on other national park resources

Access to wild plants is the mostly important in the region Lake Arpi. Subsistence income here is higher than cash income. On average, respondents of Lake Arpi have to be paid 25.7% of their monthly income to give up a collection for home consumption. There is no significant WTP or WTA for this attribute in the other regions. A WTP for permission to collect wild plants and fuel wood can be found in Lagodekhi. Overall income is very low and it would be helpful for people to collect firewood, from the NR region, which is absolutely prohibited, even in the managed reserve. As there is no other free wood source in the region people have to buy fire wood, even the NR administration shares little, not clarified, amount with villagers. Though a relaxation of existing regulations can only come into consideration if protective goals are not endangered by this.

The influences owning more private land show how important the communal resource land is in Lake Arpi: Owning more grassland decreases the WTA of the ban to collect wild plants. We suggest, that the land is not only used for grazing, but also important for locals to collect wild plants for home consumption, as 93 out of 100 household mention to collect wild plants for home consumption. Enlarging the existing core zone of Lake Arpi would therefore mean not only influencing the pasture situation, also the personal supply of people could suffer. Also sending more animals to the pastures reduces the WTA for a collection of wild plants in Lake Arpi.

It could be followed that more income from cattle breeding reduces the need of subsistence supply from nature, as households are able to afford to buy necessities (Mutanga et al. 2015) like firewood in Lagodekhi and wild plants in Lake Arpi. As most households have no connection to a gas system in rural areas in Georgia (Pearce 2011) and income is too low to afford firewood, wood is a competition between the NR and locals in Lagodekhi. Having larger herds that are using summer pasture decreases the WTP drastically which shows that if households have enough money to

afford firewood by themselves permission is no longer interesting and the resources not competitive. In Samtskhe-Javakheti this effect can be seen with owning more hectares of grassland. This means that own land is used for any wild plant collection if it exists. Or do not depend on collection. Overall influences on the attributes of other natural resources show an importance that these resources play in all regions for subsistence.

5.3 Trainings for alternative income sources

In all three regions, respondents are willing to pay for alternative income trainings. The WTP for these trainings differ. Bee-keeping training is significant in all regions, highest in Samtskhe-Javakheti. In Lagodekhi and in Lake Arpi, the value of bee-keeping training is positively influenced by the number of animals sent to the pastureland, while it decreases in Lake Arpi about 6% for each standard derivation of animals sent more to the pasturelands it decreases in Lagodekhi about 29%. However, herds in Lake Arpi are about 4 times larger than in Lagodekhi. Bee-keeping may be seen as an opportunity especially from families with less animals send to pastures. Honey is a very expensive good in both countries and easier to produce than livestock related goods.

Cheese-production training is also significant in all regions. The lowest WTP can be found in Lake Arpi, where a dairy factory exists in the buffer zone. Farmers have contracts with this factory and cheese and other dairy products can be bought on discount from the factory (*pers. observations* Kalatas 2012). In Samtskhe-Javakheti and Lagodekhi few factories exist in cities close to the buffer zones, but not directly at the PA zone. Farmers have contracts but due to bad experience no trust in companies. In addition, cheese is used in both regions as a product of bartering (*pers. observations* Kalatas 2012). Cheese production training would make respondents of these regions on one side more independent from factories and other side give them a possibility to produce a higher quality product better suited for bartering or even selling. Having more animals is increasing the WTP in Samtskhe-Javakheti as a result of generating more income from the livestock keeping or having better economies of scale. In Lagodekhi on the other hand, where private land is the fewest of all regions, respondents would be willing to pay more for cheese-production training, the more own grassland they have. We conclude that these respondents can create more

outcomes from livestock keeping than others and are therefore willing to pay more for this processing step in the milk production chain.

Tour-guiding training is just significant in Lake Arpi and WTP is even increasing when households send more animals to pastures. As households with larger herds can generate more income from livestock keeping training in a less monetary training can be assumed (Mutanga et al. 2015).

6. Conclusion

The area of private land that research area households hold influences their economic valuation of changes in access to summer pastures currently not owned. As the private land division in all project regions is high, households are dependent on communal land. Communal lands are bordering the strict core zones of all NPs, or like in Lake Arpi and Samtskhe-Javakheti are already located near the sanctuary zones of the NPs. More than only for grazing, summer pastures are used to collect plants for home consumption. Any enlargement of the NPs would lead to a lower access to the grazing areas and therefore to cuts of households subsistence and cash income.

Alternatives to intensive livestock keeping should be considered by PA managements. One way would be the improvement of the already existing pastureland, so that less land would be needed for livestock keeping. A second way would be the provision of additional income sources. Our CE has shown that households have interest in the provision of trainings for alternative and/or additional income sources. A real investment of rural households close to PAs in any of the introduced trainings however remains questionable. Income in fact is low and credits are, due to high interest rates, not an option for rural population in the South Caucasus. Anyway, trainings would be as a good compensation of less access to pastureland certainly conceivable.

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V Final Discussion and Conclusion

As the three chapters, written as research articles have already been discussed in detail, this chapter will only include a general conclusion of the research papers, major findings, problems and strength of the survey will be discussed and implications for national park management options in the South Caucasus will be given.

1. Overview South Caucasus situation

Biodiversity hotspot conservation became the world's largest nature conservation project since Myers et al. first introduced the approach in 1988. More than 750 million Dollars were already invested to protect the biodiversity of these 34 regions in 2003 (Myers 2003). Most of the regions are located in development or emergent countries. Scientific work about national park establishment and human living adjacent to the reserves is quiet common for these countries. Work about the Caucasus is rare. The Caucasus region is the only hotspot located in the former Soviet Union and human-nature relationship is different due to the change the transaction countries, especially in the South Caucasus are going through. An interest of conservation actions started primal in 2003 with the CEPF feasibility study for the region. However, the biodiversity hotspot Caucasus (Myers et al. 2000) is from several points of view worth to be protected. As the Caucasus has a history of settlement and human land use for more than two million years (Hoffecker 2005, King et al. 2003) integrating conservation acts in the rural regions is not always easy. Since the breakdown of the Soviet Union, especially in the study countries Armenia and Georgia, people became more dependent on agriculture (Lerman et al. 2003, Millns 2013), than they were before. Both countries suffer from poverty and there are less job opportunities left. About 32% of Armenia's population and 37% of Georgia's were officially unemployed in 2010 (Pearce 2011). The government of Georgia provided citizens with about 1.5 ha of private land after the breakdown and nowadays most farmers still own less land than 5 ha. In Armenia farms are, as in Georgia, small, but a household owns on average 1.4 – 3 ha of own private land (Millns 2013). Nearly no collectives are existing in these days and people are dependent on their subsistence farming. In both countries regions of higher mountain ranges and alpine zones are common for livestock keeping (Tumanian 2006, Kokhia et al. 2010). Livestock is usually sent to summer pastures, which are near by the villages and (i) owned by the communities or (ii) used without any regulation, as there were also non before the breakdown.

Establishing or enlarging a protected area (PA) in these settled mountain areas therefore often leads to a conflict of interest. Human needs in natural resources and the protection of biosphere are in direct competition to each other (Brandon & Wells 1992).

2. Main findings

We used a discrete choice experiment to analyse preferences of South Caucasian rural population living close to PAs for access to summer pasture, additional income sources and other natural resources and to investigate factors like socio-demographic variables, attitudes and private land division that influence those preferences. The objective was analysed in three scientific articles.

The first study "The choice experiment as a quantitative tool for socio-economically informed conservation planning in the South Caucasus: Design, administration, results" is, to the best of our knowledge, the first study that presents WTP/WTA estimates for people of buffer zones in the South Caucasus and that gives large household data for these regions. All regions are impoverished, with bad infrastructure, supply and dependent on land as resources for subsistence farming. A positive WTP for more access to summer pasture and additional income sources is found. In addition the WTP for this two attributes is influenced by socio-demographic variables. However those influences are not uniform and differ over the project regions. A WTA for a ban of collecting wild plants is only found in the region of Lake Arpi. The WTP for Samtskhe-Javakheti households to leave their current status quo is drastically high and confirms the bad living conditions shown from the household data.

The second study "Influence of attitudes towards newly established national parks in the South Caucasus on the WTP for summer pasture and additional income sources" is, as far as we know, the first study in which context effects regarding WTP/WTA of natural resources and Integrated Conservation and Development Programs and locals' attitudes were analysed, especially in the context of the South Caucasus. Attitudes are less influenced by socio-demographic variables as first suggested, even influences are found. These influences are not uniform and differ in the two project regions. Attitudes are more influenced by history of national park establishment. A more integrative approach leads to a more positive attitude regarding a NP establishment as exclusion.

A significant effect was found on the WTA of loss of access to communal summer pasture and WTP for alternative income sources. WTA for damage payments is decreasing with having a positive attitude, while WTP for biodiversity friendly income alternatives increases.

The third study "Restrictions in the access to summer pasture in the South Caucasus induce high monetary compensation demand by local small holder farmers" captures the bad division of private land in the South Caucasus countries. Dependence on communal land is shown. Owning more private land reduces WTP for additional summer pasture, while having larger herds increases it. If own compensation area exists people are more willing to relinquish usage of communal pasture. Influences on WTP for additional income sources are found but differ over the project areas.

3. Main problems and strength of the survey

Research always contains inherent strengths as well as emerging problems and limitations that can be handled in different ways. Therefore, this section's aim is to revaluate and résumé the quality of the project and survey of the doctoral thesis.

3.1 Problems and research limitations

The research team was confronted with two major problems, which made analyses and work in the South Caucasus more difficult as expected:

1. The aim of the project study was to include all three South Caucasus countries Armenia, Azerbaijan and Georgia on the same level to the project. Due to political issues team meetings were only possible in Georgia. But right from the beginning partners and researchers from Azerbaijan were invited and present at all meetings. The collaboration between all partners started fruitful, independent from ethnics or political opinions. When the pilot study in June 2012 was conducted the author was meeting the researcher group of Georgia and Azerbaijan for an intensive training of interviewing and the choice experiment. The groups met at the Georgian-Azerbaijani border in Lagodekhi, which is bordering the Azerbaijani project region. Already before the training started the project recruited an additional researcher for the Azerbaijani team as an earthquake in May 2012 made the situation for interviewing more difficult. All researchers practiced the survey among the groups and with volunteers from the region Lagodekhi. Due to political issues it was not

possible for the author to accompany the Azerbaijani team, as she did with the Georgian and Armenian groups. Anyway, after the training the author received the impression, that the survey will be realised properly. When the project leader first received the data from Azerbaijan, already inconsistencies were visible. Nevertheless, for the main study a second meeting with both teams at the border was scheduled. Changes in the choice experiment adjustments of the household survey were again practiced. After 3 days of training the author left to the Georgian-Armenian border. It took about seven months to receive the first Azerbaijani results. These were basically copied. At the last team meeting in October 2013 the 100 interviews were handed out to the project team. After accurate work through by the whole team it was clear, that the data was fake. This was of huge damage for the project, as (i) a collaboration failed at this stage and (ii) the Azerbaijani project area was of great interest. In the region transhumant shepherds are using high alpine pasturelands and are endangered by the specific national park. Also a comparison of old national parks and newly established ones was no longer adequately viable. If another project member could have accompanied the research, the results could have been usable. However, face-to-face interviews are expensive and time intensive. Due to the project budget it was not possible to do so.

2. The second main problem was the underestimation of the Lagodekhi household income. This can suggest a negative representative status. Reasons for underestimation have been discussed detailed in chapter II, anyway in future projects in the rural areas of the South Caucasus some issues should be integrated carefully to surveys:

    a) More detailed questions about the main whereabouts of all household members

    b) Questions about the garden usage, even focus is set more on agriculture.

The focus of the project was set on limitations that could occur due to establishments or enlargement for locals of the PAs. It was a main target to find out which different household usages of the natural resources exist. These differences are not visible within the regions. Households do not differ in the project regions that much from

each other. While in Lake Arpi and Samtskhe-Javakheti summer pasture usage is as important as assumed in H1, limitations in Lagodekhi exist through the nature reserve and usage is already restricted. The household survey should have been more adjusted to the regions specifications; even a comparison to the other project regions would have been more restricted.

3.2 Differences between real and hypothetical situations

In our survey, subjects were asked which socio-economic situation they would hypothetically prefer. Thus, the experiment had no real situation, expect the status quo. It is well known, that preferences in hypothetical situations often differ from real preferences. In literature, previous studies have shown with the "hypothetical bias" that hypothetical WTP is higher than real WTP (Neill et al. 1994). Therefore, it could be possible that the estimated results of WTP for access to summer pasture, additional income sources and other natural resources differ from real choice situations and are overestimated. Within subject data on hypothetical and real WTP in public good (if we see summer pasture as quasi-public, or semi-public good in the South Caucasus) valuation is rare (Getzner 2000, Johansson-Stenman & Svedsäter, 2007), however it is possible to speculate factors that would influence actual WTP. The WTP for leaving the status quo situation in Samtskhe-Javakheti for example is very high, higher than real yearly income. It can be assumed, that in real none of the respondents would pay this amount to leave their status quo. However, the bad living conditions and the uncertainty of the future concerning the NP could lead to an overestimation of the WTP. Same could be said for the high WTP for additional access to summer pasture. In all regions communal land is used and in Lake Arpi and Samtskhe-Javakheti areas are large, still WTP is high. This leads to the assumption that the fear of losing access to land due to the NPs reflects in a high WTP. To further investigate this issue, real purchase experiments should be carried out in future research. For example this could involve conducting a stated preference survey before an actual referendum is implemented. Hereby stated choices could be compared with real choices (Schlaepfer et al. 2005). Nevertheless, the research gives significant clues of the worth of natural resources and additional income sources for rural population living close to NPs. Even if the WTP is overrated, the data already shows the significant importance of the requested attributes for rural buffer zone population.

3.3 Strength of the survey

The survey was realised as random sampled face-to-face interviews. Therefore no wrong answer could have been given to age, gender, ethnics etc. Furthermore, the researchers could focus the subjects on the material. Nevertheless, it is a matter of common knowledge, that interviewer effects are a common problem in survey work, as respondents could be influenced by the interviewer. Research has shown that individuals may be influenced among others by gender (Groves & Fultz 1985), age (Norris & Hatcher 1994), race (Cotter et al. 1982) or interview language (Lee 2001). In our study in two of three project regions interviewers were male and female, in the age of an average head of household of the region, same race and able to communicate in the same language or accent as the respondents. Influences therefore were reduced to a minimum. The researchers were well trained and all of them were in the position to be attentive and following. Face-to-face interviews are always cost and time intensive. Furthermore, interviews in rural areas are connected with bad infrastructure and therefore transportation and night stop problems. Luckily the project budget could afford these expenses. None of the researcher was working for the Armenian or Georgian government and therefore a certain security could have been given to the respondents as they did not fear to answer. During the field trips in Georgia and Armenia a good connection towards the mayors, families and communities was constructed. Any further research in the three project areas therefore could be conducted easily.

Beyond that, the capacity building aspect of the project itself is strength. Researchers were able to work in an international team, could apply themselves and learned themes of socio-economic research. One example of the good cooperation is the wikiversity homepage of the project for future collaborations and projects in the South Caucasus. The homepage contains tools, methods and experiences and serves as a good guideline.

However, the main strength of the research is that it is the first detailed analyses of influences of PAs on rural population in the South Caucasus. As interest on nature conservation in the South Caucasus became more popular in the last years, due to the German Caucasus Initiative (BMZ 2005) and the feasibility study of the CEPF (Weizel 2010) the research is an important contribution. Most research is done in the field of species observation and conservation but the relationship of natural resources which

can be competitive in the frame of conservation and human use is neglected. The data is objective. In addition the research frame is objective, as it was done by an independent researcher group and not under the supervision of the respective national government. The research gives hints how relationships of humans living in the buffer zones and protected areas could be enhanced and how rural population could be integrated in the planning and the loss of resources could be compensated. In addition this information is important for any organisation working in the frame of PA establishment of the South Caucasus. Integrated Conservation and Development Programs are envisaged for new established parks, as we have seen for Lake Arpi and Samtskhe-Javakheti, issues of local population however seem to be neglected so far.

3. Suggestions for management options

Integrating locals to the management or planning of national park establishment or enlargement has resulted in a positive attitude towards the specific area. A positive attitude is important to accept the boundaries made by PA management. However, most people living in the buffer zones, independent from attitudes, fear use restrictions. Not only including locals is important, but also to understand the livelihood situation and difficulties rural population has to deal with. Utility grid support is inadequate. We have tested, if respondents would pay for an improvement and WTP would be high, measured by household income. Improving utility grid supply, infrastructure and market connections would increase the livelihood situation immense. These improvements could be used as potential compensations for use restrictions of the natural resource land.

Farmer of mountainous regions mostly are specialised in livestock keeping. Pastures are the main cornerstone of this agricultural production. Any restriction would destroy the only agricultural income source most households have. Even it is mostly needed for subsistence farming. The fear of use restrictions shows the dependency on the resource. If this dependence could be reduced, amounts of damage payments would increase. A way to reduce compensation payments would be to offer locals trainings for additional income sources. Fundamentally existing interest was shown in the present work. Interest in biological friendly and biodiversity supporting jobs is increasing with having a positive attitude towards a NP and therefore for biodiversity conservation.

Support of people living in the buffer zones of national parks in the South Caucasus would increase the attitude and interest in job opportunities outside the resource intensive livestock keeping sector. New job possibilities would create better living conditions and a respectful treatment of nature.

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Annex

Annex I:	Questionnaire in English
Annex II:	Choice Experiment Frame in English
Annex III:	Interview WWF Armenia 2012
Annex IV:	Interview NGO Meghvik 2012
Annex V:	Extracts of pers. observations Kalatas/ own memos 2012

Interview No. _____

(Please, put this number on top of every page)

Household questionnaire

Introduction

We are researchers from the Project "Socio-economic Tools for Integrated Conservation Planning in the Multi-Ethnic South Caucasus". The project is collaboration between the University of Goettingen from Germany and partners from Georgia (ICFER), Armenia (ICARE) and Azerbaijan (GABA). We want to find out how the nature here can be protected, and at the same time how the life of the people living here can be improved. .

We want to know more about your livelihood and particularly about your farm. Your answers are very important to improve future conservation and development projects in the region. There is no direct benefit, for example money, for participating in this survey for you. Your responses will be used strictly for research purposes, your name will deleted after the survey, and not be revealed to anyone including state authorities or private companies.

We respect all answers you give. There are no right or wrong answers. If you have any questions, please address them to the interviewer.

Date of interview (dd/mm/yy):_____/____/_____

Respondent is head of household yes no

Is your household involved in agriculture? yes no
(If no, please stop the interview here!)

Enumerator:

1. Location details

District: _____ Village:_____

Interview No. ____

2. Household data

2.1. Household composition (respondent: HH-head or most informed household member)

Note: Members of a household are all people, who usually eat at the same table and sleep under the same roof. Include also members who are absent for less than two months!

Id. code	2.1.2. Relation with head of household (code 1)	2.1.3 . Sex (m/f)	2.1.4. Age (in years)	2.1.6. Main occupation (code 2)	2.1.7. Since when is this your main occupation? (Year)	2.1.8 For how many years did you go to school? (Years)	2.1.7. Highest graduation? *Just one answer* (code 3)	2.1.8. Do you speak one of main languages fluently (code 4) *Also more than one answer!*	2.1.9 To which ethnic group do you belong? *Multiple answers possible.* (code5)	2.1.10 What is your religious denominati on? (code 6)
(Head) 1										
(Spouse)2										
(adults)3										
4										
5										
6										
7										
8										
9										
(children)10										
11										
12										
13										

If no answer is given at a question please note 99

Code 1: Relation with head of family
1. family head
2. husband/wife
3. father/mother
4. grandfather/-mother
5. child
6. grand-child
7. brother/sister
8. sister, brother in law
9. father/mother-in-law
10. cousin/cousine
11. uncle/aunt
12. daughter/son-in-law
13. nephew/nice
14. other relation with fam. head

Code 2: Main occupation
1. too young to w
2. farmer
3. livestock keeper
4. wage labourer in agriculture
5. wage labourer outside agriculture
6. trader
7. self-employed/own business (e.g. shop, garage)
8. housewife
9. student
10. unemployed
11. cannot work
12. other (specify)

Just has to filled in for adults (16 years and older)

Code 3: Education
1. No graduation
2. Primary school
3. Secondary school
4. Tertiary school
5. Apprenticeship
6. College/Technikum
7. University

Code 4: Language
1. Georgian
2. Armenian
3. Azerbaijani
4. Russian
5. Turkish
6. Other (specify)

Code 5: Ethnic group
1. Georgian
2. Armenian
3. Azeri
4. Russian
5. Turkish
6. Greek
7. Ossetians
8. Lezgian
9. Eurasian Avars
10. Kurdish
11. Other (specify)

Code 6: Religion
1. None
2. Christian orthodox
3. Armenian apostolic
4. Christian other
5. Shia Muslim
6. Muslim other
7. Jewish
8. Other (specify)

2.2. Access to facilities

Facility	2.2.1. How far is facility from your house? (km)	2.2.2. Do you or any of HH-member use **facility**?(Code 1)	2.2.3 If no, why don't you use **facility**? (Code 2)
	[redacted]	[redacted]	
Clinic			[redacted]
Bank			
Bus terminus			
Veterinary facility			
Veterinary services			
Police station		[redacted]	[redacted]
Market/opportunity to *sell* farm products			
Market/opportunity to *buy* things for the farm			

Code 1
1. Never
2. less than 1/year
3. 1/year to 1/month
4. 1/month to 1/week
5. More often than 1/week
6. Salesman/middleman etc. comes to farm

99. No answer

Code 2
1. Don't need to use
2. Too far away
3. Too expensive
4. Other (specify)
99. No answer

2.2.4 How would you, overall, rate the market supply with things for your farm? [ ]

1: very good, 2: good, 3: just acceptable, 4: problem for my farm, 5: serious problem for my farm.

Interview No.

2.3. Access to water, gas and electricity

Facility	2.3.1 Do you have direct access to a water connection at your HH?	2.3.2. Do you have direct access to a water connection for irrigation?	2.3.3. Do you have an electrical connection at your HH?	2.3.4 Do you have a gas connection for heating and/or electricity at your HH?
yes				
no				

2.4. Energy supply improvement

2.4.1 Do you wish have an improvement of energy supply ? (y/n)	2.4.2. If yes, what kind of improvement would you like to have?	2.4.3. What would you be willing to pay monthly for this improvement?

2.5. Sewage system

2.5.1 Do you have a direct connection to sewage system at you HH? (y/n)	2.5.2. If no, is there any connection to sewage system at your settlement? (y/n)

If no answer is given at a question please note 99

Interview No. ____

3. Wage employment

3.1. Has anyone of your HH worked as a wage labourer or employee (daily/weekly/monthly payment of money) in the last 12 months? (y/n)____

3.2. Has anyone of your HH worked as a contract labourer or professional (fixed payments for specific jobs) in the last 12 months?(y/n) ____

If 'yes' to 3.1.or 3.2. fill out the following table!

Id. Code	3.3.1. Wage / contract job (code 1)	3.3.2. How many hours per days are you used to work in occupation?	3.3.3. How many weeks in the last month are you used to work in occupation?	3.3.4. How much is your payment for wage?	
				3.3.4.1. (Gl)	3.3.4.2. What period of time did the payment cover? (1.Hour 2.Day 3.Week 4.Month)

Code 1: Occupation (wage employment)
1. Professional/technical expert
2. Academic
3. Managerial, administrative and decision making staff
4. Clerical
5. Sales worker
6. Service worker
7. Workers in agriculture and husbandry
8. Worker in forestry
9. Worker in fishing
10. Working in hunting
11. Production worker
12. Transportation operation worker
13. Soldier
14. Unskilled workers
15. Construction worker
16. Others (specify)
99. No answer

4. Non-agricultural self-employment/entrepreneurial work

4.1. In the last 12 months has your family earned income from non-agricultural self-employment, such as (read code 1)? (1=yes, 2=no).....

4.2. ID Code 1	4.3. Describe the business in words.	4.4. Which member of the household bears the main responsibility of the business? Member I.D.	4.5. When started? (year)	4.6. Sales value in the last 12 months? GEL	4.7. Expenses for the labour in the last 12 months?	4.8. Expenses for other inputs in the last 12 months?	4.9. In which months did your expenses occur?	4.10. For how many months during a year do you earn money with this business?	4.11. Hours worked last month? Member I.D.	4.12. Hours worked last month? Member I.D

Code 1: Self-employment
1. Small shop
2. Home production (cloth, craft, food)
3. Driver (Marschrutka, Taxi)
4. Trader
5. Other self-employment (please specify)
99. No answer

Interview No. ____

5. Crop production

5.1. Owned and cultivated land *(all plots cultivate/used and/or owned should be listed here)*

Plot No.	5.1.1. 'Name' of plot	5.1.2. Kind of land (code 1)	5.1.3. Time to get to the plot from house (min)	5.1.4. Estimated area			5.1.6. Crops cultivated (last summer)		5.1.7. Slope (code 3)	5.1.8. Tenure status (code 4)	5.1.9. Do any land use restrictions exist? (Code 5)	5.1.10. Mode of irrigation on plot (code 6)	5.1.11 How many month do you have irrigation per year? (month)
				5.1.4.1. Area cultivated	5.1.4.2. Other	*5.1.4.3. Units 1. ha 2. m*m 3. other*	5.1.6.1. Main crop (code 2)	5.1.6.2. 'Intercropping' with 2nd crop (code 2)					
1													
2													
3													
4													
5													
6													
7													
8													
9													

Code 1: Kind of land
1. Annual crops
2. Tree crop land
3. Fallow
4. Pasture/grassland
5. Garden
6. Swamp
7. Water surface
8. Other (specify)
99. No answer

Code 2: crop
1. Wheat
2. Barley
3. Corn
4. Potatoes
5. Cabbage
6. Squash
7. Vegetables
8. beans
9. Other annual crop
10. Apples
11. Hazelnut
12. Perennial crop (specify)
99. No answer

Code 3: land types
1. Flat land
2. Slight slope
3. Moderate slope
4. Steep slope
99. No answer

Code 4: Tenure status
1. Fully owned
2. rented-in
3. rented-out
4. Share cropped
5. Communal
6. Government land
7. Other (specify)
99. No answer

Code 5: Land use restrictions
1. No
2. Yes.(Which?)
3. Yes, other (specify)
99. No answer

Code 6: Mode of irrigation
1. Not irrigated
2. Tubewell
3. Ditch/canal
4. Pond/tank
5. River
6. Spring
7. Mixed
8. Other (specify)
99. No answer

Interview No.

5.2. Plot specific output and input data for crops

Note: The next questions concern all plots cultivated (annual and tree crops), and refer to the cropping season 2012. The input use refers to the same time period than the output.

Code of plot	Crops grown Code 1	Area planted ha	When did you harvest? month/week	Quantity harvested?	Unit Code 2	Machinery costs for harvesting? GI	Amount sold?	Value received	Marketing costs	How do you prepare your land? Code 3	Machinery costs for land preparation? GI	Amount of seeds used kg	Costs for seeds GL	When did you plant? month/week	Machinery costs for sowing? GI
.....															
.....															
.....															
.....															
.....															

Code 2: crop
1. Wheat
2. Barley
3. Corn
4. Potatoes
5. Cabbage
6. Squash
7. Vegetables
8. beans
9. Other annual crop
10. Apples
11. Hazelnut
12. Perennial crop (specify)
99. No answer

Code 2
1. kg
2. deci tons
3. metric tons
4. Other (specify)
99. No answer

Code 3
1. Tractor
2. Draft animal
3. Manual
4. Other (specify)
99. No answer

Interview No. [ ]

5.2. Plot specific output and input data for crops (continued)

Code of plot	fertilizer use: Type (code 1)	Quan-tity kg	Price per bag Gl /bag	Type Code 1	Quan-tity kg	Price per bag Gl /bag	Machinery costs for fertiliser application? Gl	Expenses for irrigation Gl	Expenses for pesticides Gl	Machinery costs for pesticide application? Gl	Processing costs Gl
.							-				
..							-				
..											
.....											
.....											
.....											
.....											

Code 1
1. Superphosphate
2. Ammonium nitrate
3. TSP
4. KCL
5. Organic
6. Other (specify)
99. No answer

5.2. Plot specific output and input data for annual crops (continued)

Code of plot	Workload (days) Total	Family labour	Friends	Paid labour	How much did you pay for labour? G1
.....					
.....					
.....					
.....					
.....					
.....					
.....					

Interview No.

6. Livestock section

6.1. Possession of livestock

6.1.1. During the last 12 month, has any member of HH raised any **animal**?		6.1.2. How many **animals** are owned by your HH today?	6.1.3. If you sell one of these **animals** today, how much money could you get for it?	6.1.4. How many of your **animals** did you sell in the last 12 month?	6.1.5. How much money did you get for **animal**?	6.1.6. How many of your **animals** did you eat in the last 12 month?	6.1.7. How many **animals** died, got lost, were stolen during the last 12 month?	6.1.8. How many of your **animals** did your HH gave away (gifts) during the last 12 month?	6.1.9. How many **animals** did your HH purchase during the last 12 month?		6.1.10. How many **animals** did you received as a gift during the last 12 month?	6.1.11. How much did you spend for vaccination, vet services and fodder during the last 12 month?	6.1.12. Workload to raise **animal** in total during the last 12 months?	6.1.13. How many people are needed to raise the animals?)?				
Animal	1. yes 2. no	Number	Gl	Number	Gl	Number	Number	Number	Number	Gl	Number	Gl	Days	Total	HH	Paid	Costs (Gl)	Family/ friends
Cow																		
Horse																		
Pig																		
Goat																		
Sheep																		
Chicken																		
Chick																		
Duck																		
Calf																		

6.1.14 Where do you keep your animals during the summer?	6.1.15 Who is taking care of your animals in summer?	6.1.16. Where do you keep your animals during the winter?	6.1.17. What is your source of fodder during the winter time?

6.2. Products from livestock

6.2.1. During the last 12 month did you produce any **product**?		6.2.2. How many month do you produce **product**?	6.2.3. What is the average monthly amount of **product**?	6.2.4. Quantity of **product** sold in the last month? (in kg, Litre, Number)		6.2.5. Price of unit in the last 12 month? (Gl)	6.2.6. Workload of processing/ selling of **product** (days)?
Eggs							
Milk							
Skins							
Other							

If no answer is given at a question please note 99

Interview No. _____

6.3. Collection of goods

Good collected	How often do you collect/ it? (code 1)	Do you also sell these products? 1=yes 2=no	If 1 (yes): Percentage sold? (%)	If 1 (yes): Value received (Gl.) In last 12 months	If 1 (yes): Value received (Gl.) In last 5 years
Fuel Wood		.....	.....	.....	
Wood for construction (timber)	.....	....	.....		.....
Mushrooms	...	..	.....	.....	
Fruits	.....	.....	.....	.....	
Herbs	.....	.....	-	-	-
Wild flowers					

Code 1
1. Twice a week
2. Weekly
3. Fortnightly
4. Monthly
5. Every year
6. Less frequent than a year
7. Never
8. Is not allowed to take, but I know that some people from neighboring villages do it
99. No answer

6.5. Other income sources

6.5.1. Has anybody of your household benefited from some kind of public/NGO transfer, development or conservation program (daily/weekly/monthly) in the last 12 months? (1=yes, 2=no) _____

If 1 (yes) fill out the table 6.5.2. If 2 (no) skip to question 6.6

Type of program (code 1)	Who is providing the program? (code 2)	What kinds of assistance to you receive by the program? (code 3)	Estimated Value/Amount Gl
.....	.....	.....	
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Table 6.5.2: Please answer the following questions about program:

Code 1	**Code 2**	**Code 3**
1. Pensions	1. Local government	1. Cash
2. Education subsidies	2. Federal government	2. Clothes
3. Health care benefits	3. NGO	3. Agr. Inputs
4. Other	4. Other	4. Other
99. No answer	99. No answer	99. No answer

Interview No. [ ]

6.6. Did your household receive any kind of private transfers/remittances in the last month? (1=yes, 2=no) .....

If 1 (yes) fill out Table 6.4.4. If 2 (no) skip to question 7

Table 6.6.: Please answer the following questions about remittances:

Relation with head (code 1)	Sort of Remittance (code 2)	Code: 1=received 2=sent	Estimated Value/Amount Gl
...			
.....			
.....			

Code 1
1. Son or daughter
2. Father or mother
3. Grandchild
4. Other
99. No answer

Code 2
1. Cash
2. Food
3. Clothes
4. Other
99. No answer

Interview No. [ ]

7. Farming Equipment

7.1. Does your HH own any farm **equipment** such as tractor, plows, threshes pumps? 1. yes 2. no [ ] *If no, please go to 8.!*	**Equipment**	7.2. During the last 12 month has any member of HH owned **equipment**? (y/n)	7.3. Since when do you own **equipment**? (Year)	7.4. Estimate the current value of your **equipment**? Gl
	Tractor			
	Machine pulled plow or harrower			
	Animal pulled plow			
	Mechanical water pump			
	Motorized thresher			
	Other (please specify)			

8. Agriculture extension

8.1. Is there an extension worker in your village?	Yes	No
8.2. Did the extension worker offer any kind of meeting with the farmers during the last 12 months?	Yes	No
8.3. Did you or a member of your HH participate in an extension meeting during the last 12 months?	Yes	No

If no answer is given at a question please note 99

Interview No. ____

9. Establishment of protected areas

9.1. Have you ever heard about the establishment of a protected area, a national part, or a state nature reserve here? (y/n)____

If no, skip to 9.3.

9.2. Sources and content of information

Source of information	Information obtained
Other family member	
Relative	
Friend	
Government representative	
PA rappresentative	
NGO rappresentative	
Other persons	

9.3. Would you like to be actively involved making rules for the national park/protected area? (y/n) ____

9.4. If yes, how would you like to take part in? _____

9.5. Have the activities of your household already been affected by the protected area in your region? (y/n) ____

9.6. If yes, how has your household been affected? _____

9.7. If no, what kind of effects do you expect in future? _____

9.8. Do you think there will be (further) use restrictions at the national park area during the next years? (y/n) ____

9.9. *Read out*: Now I would like to show you some cards. These cards depict how your life may change in the future.
Explanation of attributes and start with choice experiment.

If no answer is given at a question please note 99

Additional:

Would you be willing to indicate your name and phone number for eventual queries? Yes:___ No:___

Name: _____
Phone Number:_____

Annex II – Choice Experiment Frame

The Caucasus is a special place in the world because there are many species of plants and animals which do not live anywhere else. There are a number of protected areas in the Caucasus to conserve these species. During the last few years a number of protected areas were added and older protected areas have been enlarged. National parks, for example, are protected areas. Oftentimes, a protected area consists of a strictly protected core zone, where nearly everything is forbidden, and a buffer zone around it. In the buffer zone, pasturing sheep or cattle or the collection of fuel wood, mushrooms or berries is sometimes allowed.

We investigate for examples of protected areas in three South Caucasus countries: Lake Arpi National Park in Armenia, Samtskhe-Javakheti National Park in Georgia, Lagodekhi National Park in Georgia and Zaqatala National Park in Azerbaijan.

We are neither for nor against these protected areas. However, we are interested in the opinion of you – it is of the people who live around the protected areas.

When a protected area is established or if it is enlarged these days, local people affected by the protected areas sometimes get extra support by the protected area staff, the government or an NGO.

Aspects of your live that could be affected by changes to the local protected area may be:

- Changes in the access to summer pastures by cattle or sheep
- Changes to the collection of plants, mushrooms etc.
- Additional offerings of training opportunities for non-farm income

I will now tell something about these changes in more detail.

Many farmers need summer pasture for their sheep and cattle. The local protected area and the land around it have land that can be used as summer pasture. If the management of the protected area changes, access to the summer pastures may change.

CE 1.1. Do you have cattle/sheep that uses summer pastures in or close to the local protected area? __

CE 1.2. How many are sent there in summer? _____

CE 1.3. Who is taking care of the animals during the summer? _____

CE 1.4. Would you like to send more animals to the local summer pastures? _____

CE 1.5. If so, why is this not possible? _____

If the management of the protected area becomes stricter, less of your sheep or cattle may be able to use the summer pasture. (Show card attribute 1) The same is true if the national park is enlarged. If the management becomes less strict, more of your cattle or sheep may use the summer pasture. The same was true of the protected area would become smaller.

The rules how mushrooms, berries, herbs, wild flowers etc. can be collected for home consumption or selling can differ among protected areas. Often it does differ between the buffer zone and the strictly protected core zone of the protected area.

CE 2.1. How is the use of these plants or plant parts organized here? _____

CE 2.2. What about fuel wood and timber? _____

(Show card attribute 2) CE 2.3. So, which of these possibilities is closest to your situation?

No usage ____ Usage for home consumption ____

Usage for home consumption and selling ____

Also, an additional village development funds may be made available to your village. As a result, additional trainings could be offered to you. (Show card attribute 3) This could be a workshop on bee-keeping and honey production, manufacture and marketing of cheese, manufacture and marketing of wool and fabric, a training for room letting ("bed and breakfast"), training to become a tour guide, or a training course for the production and marketing of leather and leather products.

CE 3.1.Which of these courses has already taken place at your village? (more than 1 answer possible)

Bee-keeping and honey production _____

Production and marketing of cheese _____

Training to become a tour guide _____

Other courses:

_____

None of it _____

CE 3.2. Which of these courses would be interesting for you? (more than 1 answers possible)

Bee-keeping and honey production _____

Production and marketing of cheese _____

Training for tour guiding _____

Other courses:

_____

None of it _____

Independent from changes to the management of the local protected area, the government can change the amount of taxes you pay, or of subsidies you receive. For example, the taxes or subsidies may change from 10 to 30 % per month. (Show card attribute 5)

Annex III – Interview WWF Armenia 2012

22.03.2012; Start: 14:00 o'clock; Duration: 47:36 min. Yerevan
Interviewed persons: Karen Manvelyan, Director of WWF Armenia [KM], Karen Karapetyan Project Coordinator of WWF Armenia [KK]
Interviewer: Johanna Schott [JS]
Present and Additional: Susanna Hakobyan [SH] Talin Kalatas [TK]

[KM]: Karen is the Lake Arpi Project Coordinator, so he can tell you more detailed Information. So we started this Project actually from 2008, it should have been a three years project, but still it is continued, because of long process of coordination with the ministry, with the KfW and our colleagues. Anyway, Lake Arpi National Park was established in April 2009 by the governmental decision. Now we have completed the management plan, and it's approved at the end of the last year. Now this management plan is under the translation, hopefully in a month we have an English version as well. We started as well the development of infrastructure in the Lake Arpi region, a visitor center, garages house, this is a main infrastructure, we should start equipping and furnishing all this things. Unfortunately the government provided very few money for prediction costs of the park, it is till around 10 Million Drams, so around 20000 Euro. And 20000 Euro will be co-financed by Caucasus Nature Found, it will allow the national Park, to have minimum staff, I mean that started from director, deputies and deputy directors, and scientists of protection and heads of each districts, there are 14 districts, we can give you maps, you can take a part of the information afterwards. And of course the head of the visitor center, this is the minimal staff, what we, not we but the park can have at the moment and hopefully after the elections the government will promise to increase the funds from the state. Let's see. So the park officially is established, infrastructure development is in progress, hopefully we complete it until June, the staff till may will be recruited and we should train the staff in different aspects, starting from protection up to recreation programs. Meantime we are implementing this community development program, which was also developed, a little project, there are 18 communities, located in the support zone, or the near called buffer zone, of lake Arpi national park, you know that social-economic conditions, that area is quite poor, the same situation is in Georgian part, as I guess you will do the same survey in the Georgian part..

[JS]: Samtskhe-Javakheti-

[KM]: Ja. So God forgotten corners of our countries. Of course climate conditions, also are quite strong, and about 5-6 months, there is winter time in that area. It also prevents us to implement projects in that time, because if we do nothing in winter time, roads are closed etc. etc. So, in the community development project, we started in some the last years. One is the establishment of community managed touristic center in Mets Sepasar community, it will be the first managed touristic center and we hope they will develop tourism in that area and using the winter time and the summer time. Because there are quite qualified specialists on cross country skiing and hopefully this people will be involved and they could develop winter time tourism. So the second – we also helped the communities to establish a community development center, so called "development and educational centers" based on their municipalities ..
[KK]: In three communities ..
[KM]: In three communities ja: We started and this year will complete the furnishing and equipping this development centers, in the three communities and the same at the touristic center. We also started a project on energy sufficiency villages. There is a village at the lake, called Shaghik – Susanna maybe knows – it is a very small village, and we provided this local people households with modern, or let's say such kind of windows and doors, which are more energy sufficient and they must have been constructed by themselves in the prepart of the houses, to keep energy inside the houses ..
[KK]: Let's say [….]
[JS]: Sorry….
[KK] The enter rooms –
[KM]: Yes, the enter rooms, ja. Also what we have done anything I haven't told now?

[KK]: The same rooms have been built in the municipality building. All doors and windows were changed, and also the construction materials were provided for the construction in the municipality buildings. Also the financing organization was involved in this part of the project. UNDP, global ecological foundations, yes, also to provide finances for showers, for the summer season and a few solar heating batteries. That's it.

[KM]: Ja, using solar heating –

[JS]: Ah using solar heating –

[KM]: In Shaghik village, all in the same village – for this shower, okay?

[JS]: Ah for the shower?

[KM]: Also we hope that we can use solar heating for normal heating in some parts of the park, for example for the schools.

[KK]: At the end of our project a few schools will be renovated, also.

[KM]: This is co financing. It is not our project, but it is part of the whole project. And the main investment to communities, we expect this year – it is related to the improvement of water supply, in 12 communities. 12 communities, ja?

[KK]: 12 communities, ja.

[KM]: 12 communities, because water supply systems are in very bad conditions, and they lose a lot of water, and not all households get water, so should help to prove this to the quality and quantity of water supply in these 12 communities. Hopefully it will be started in May. The second big community problem is related to the improvement of cattle breeding in the area, because the land is mostly used by the local people for cattle breeding. And we did this project - we established a slaughterhouse, artificial insemination station, we made a good partnership with CARD, which was established by USDA in Armenia. CARD is a center for agribusiness and –

[JS]: I know, Vardan Urutyan from ICAR –

[KM]: Okay, okay. They will help us with all this aspects related to animal breeding and the management of the slaughterhouse, and the insemination station. And of course wet care, all this portfolio, is related to the improvement of cattle breeding in that area. And the third one is related to the improvement of bee keeping in the area. And this part of it is co financed by GEF group program which is part of the UNDP Armenia. And the project will be implemented by a local NGO called Meghvik. Meghvik in Armenian means like a bear, a small bear … bee, bee. Small bee *(Laughing)*

[KM]: Still we are waiting of the approval of KfW, for this project, I mean for the cattle breeding improvement and the bee keeping. Hopefully we will get this confirmation of KfW, or some comments until April and then we can start the implementation process. The same with water improvement.

[KK]: The project part of water improvement is just considering at the ministry of nature protection. All this projects and all of our documentations, before starting the implementation should pass the ministry of nature protection and the organizations of financing. Here KfW the Bank of Germany.

[KM]: So, we did to development this two main documents of support zone program and management plan of the national park, we did several surveys, on social-economic aspects, on biological and other aspects, we have this all information, if you need we can show you –
[JS]: Oh that would be great –
[KM]: Ja no problem. Of course there were some changes, during the implementation. In the beginning there were only 14 communities involved, than some changes took place and now more communities are involved in the support zone, because some of them provided land to the national park, so we have to involve them and to do some community projects in these villages. So if you need – as far as I know, I sent you the document of support zone, which is the general plan for community development and contains some information of social-economical aspects and the situation in the area.
[SH]: Yes, you sent me this.
[KM]: So, if you need more detailed, we should look, because we have another office in the area of the national park, in Gyumri town. It was part of our establishment to open an office in that area. It is not a big office, we keep one room for one person now, because of lacks of funds, and we try to do the management of the project from here. Only we have one representative, our translator and administrative – she is in Gyumri, she lives in Gyumri -
[KK]: She is native, ja? Just living there and work in that office.
[SH]: And the administration of the national park is in Ghazanchi?

[KM]: No, it should be in Berdashen where there is restored a building. Now it is not, they are here in Yerevan. Infrastructure is not working yet. There was also a problem of heating at this building. Now from May, they will start their work in the area. There is just the director, the counter (?) and the driver. That's all. But they can have one staff more now. Just today I made the calculations, what they would cost, what the salaries are and it works.

[KK]: One big problem is in fact, that the budget was cut 5-times approximately –

[KM]: Not 5-times. 8-times. In the process of the management plan, we wrote for the full operation at the national park, they need 84 Million Armenian Dram, and the government provided only about 10 Million. Than we asked CNF to support and give an emergency grant to the national park. Otherwise, how we can complete this work? How we can train people without anything. So hopefully the government will help, and add more. Let's see. It will be clear, after the elections.

[JS]: When are the elections?

[KM]: 8th of May. Of course we thought if the government provides this 84 Million Drams, it will be okay for more or less proper management of the park, and they say they can provide about 50% of the same amount, can you imagine?! In this case it would be much better, the salaries of the people etc etc. but unfortunately we have what we have. It's not on our hands. Of course we tried to influence, we wrote different letters to the ministry, to the government, but it didn't help. What we could do? Just ask CNF to provide additional funds, otherwise –

[JS]: I have a question - the CNF –

[KM]: Caucasus Nature Fund. CNF supports protected areas and the WWF was involved in the foundation of this CNF from the beginning at 2003. Now it is working and it has given in Armenia already 5 grants this year, last year I mean. To 5 protected areas - […]. And it will be continued. They find some interests, and the interests fund projects. So CNF give the biggest part of amount, CIN conservation international put 3 Million as far as I remember, WWF Germany, and now GEF - but you don't need this details I think. So anyway CNF is a good financial way to support protected areas in the Caucasus, because others are too small –

Also our protected areas have a great lack of governmental funding. What else?

[JS]: I have one question. You said, that when the park was implemented, that 40 communities were involved?

[KM]: One four, ja.

[JS]: And then you said; now there are 80-

[KM]: 18 ..[JS]: Ah 18. Okay

(Laughing)

[KK]: In Armenia there around 1000 communities.

[KM]: 1000 villages. Some villages are unified in 1 community, in Lake Arpi for example there are 2 villages now unified into one. Around 5000 people live in this

area. Especially in eastern part of the park, there are around 4000 people and in the western part around 1000. It's not so heavy populated. But of course, local people have a lot of livestock, especially in the eastern part; there are 2 communities, where there is an overgrazing. Obviously, can be seen even in these meadows. One community is Bavra, one community is I don't remember, in the eastern part. In western part it is a better situation, but many people outside the region bring their livestock in the summer. Summer pasture. This is another issue. And it will be of course somehow regulated. As to the park impact to local people, we tried to avoid any kind of restrictions, for land use because, you know, that lands are used by own by the communities. Of course there are several types of landownership's. This is state land, community land and private land. But all lands are distributed among community's boundaries, like in the boundary of communities for example, if the community has for example 10000 hectares of its territories, it can serve ownership of that. Land mostly of course is state land or private land in our region. And when we were planning this national park it was the first case in Armenia, where the planning of protected area was done with a large involvement of the local people. This participate planning process was implemented by us and all community members – not all – but their representatives, they worked in working groups, during our working process where were 9 working groups, on different aspects, starting from boundaries, ending by management of the lake itself, or etc etc. so they were quite very involved, and quite well informed about the project and finally the communities provided this land, donated this land. This is the process, it means, we should donate the land, people give a piece of their land of their ownership to the government and then the government creates this land as a national park. This is the process … And now the park owns 21000 something – 300 hectares. As to the impact during the working progress, by government and the people it was asked to avoid any kind of impact on their grazing land. That is why they can still do the grazing, but not such a number, of livestock at the economic zone of the park. The same will be in the support zone and the buffer zone. We tried to and actually we did it, to put into the court zone (?) the parts of the area which are important for biodiversity, but also important at the point of view on the impact of – that these areas are not used by the communities. It's mostly the western part areas, behind the fence of the Armenian and turkey. It is a quite huge area and it is out of use. And the second area is in Javakheti mountain region, it is also not used by communities. It is a very rocky area, but it is a habitat of Vipera darevski

for example and it is the only habitat for this. And of course some breeding areas of the birds and wetlands. Only one place where we have domestic place for cranes they can use for hay making, but in autumn in September they do this process, when birds a quite big and they can fly. So there is no impact from the communities.

[JS]: Is hay making done by hand?

[KM]: No they have machineries in some small places maybe by hands. But mostly machineries. If you look through this support zone document, you see that there were also some suggestions to have a machinery center, for the communities, but because of the lack of funds we couldn't create it. We did what we have in our budget. I mean around 1 Million Euro went to the communities and 1 Million to –

[KK]: To the infrastructure -

[KM]: Of the national park. 50/50, we try to keep balance between the national park and the people.

[JS]: That means that the machines were provided by these funds? Or they had before?

[KM]: No-no, we didn't. We invest only on this small community projects. You know, when we developed the support zone plan, afterwards we went to the communities to discuss this, primarily times the activities and they proposed this what I mentioned: first one is water supply, improvement of cattle breeding and also it was their suggestion to create this slaughterhouse, in the area, because they lose a lot of money, you know why. And these small projects, this is what they wanted and what they need most. And so they were interested in the park.

[JS]: So it was from the beginning a participatory process which involved the communities and people who could be affected?

[KM]: Yes, specially we did different kind of workshops, first general workshops, with representatives and several workshops of the working groups. It was a quite long and quite interesting process. And we were surprised with the results, when the working groups reported back to us. With their findings and recommendations. And we co operated all this recommendations into the management plan of the park. It was the case of planning a protected area like this in Armenia. For sure we can say that.

[JS]: So it was a bottom up process.

[KM]: Yes, a bottom up process. All suggestions, all what the area can be involved, court zone, etc. all this came from the communities, also the projects.

[JS]: And how do you estimate now the results?

[KM]: Of course now you can see some results, but still it is an ongoing process. For example when we have this water supply project then it will be more obviously, when you open the water and have water you see it. This is one. The second is the beekeeping, the slaughterhouse and the insemination station. It will be visible in a couple of years. The livestock and breed they will be implement for the insemination station by local cows and bulls, other breeds.
[JS]: They will bring some high performance breeds?
[KM]: Ja, ja. There is some Holstein-
[Js]: Holstein-Friesian, that's from the part where I am from in Germany, Northern Germany, it is full of this black and white cows.
[KM]: Ha-ha. This process will be done by CARD. Because they have experiences.
[JS]: And if they have a slaughterhouse, they will slaughter directly on the place and the meat is than distributed to where?
[KM]: You know, what happens in this area, in the most parts of Armenia, local people have their cows or whatever, and they slaughter in their house or in their garden, and somebody from Yerevan comes and pays less than it would cost in Yerevan, for example the price of meat of I don't know, beef for example ja, is around 10 Dollar per kilo, than they pay around 7 or 6 Dollar per kilo, at that place to the people. They bring this meat from the farmers here and sell by double price approximately –
[JS]: Ah there is a kind of middleman?
[KM]: Ja, a middleman. That is why it was a suggestion of the communities to have a center for slaughter, and livestock, they will get more money. To take this middleman out.
[JS]: So that means, they directly sell or can supply to Yerevan, the market?

[KM]: They will supply to the slaughterhouse, they will get money, ore than they will get from this middle guys of course, then it was the suggestion of card, that the slaughterhouse will not directly slaughter this animals, the most of them. They will keep for feeding, one or two months to bring them into a better condition and then slaughter and provide to the market, to Yerevan and Gyumri mostly. And of course the insemination station will help for this. At the beginning there were some suggestions to bring some bulls of limousine, some cows to have some stock of these animals to breed but then we came to the conclusion that it would be better to have artificial insemination because you just never know. It is sustainable. And by the way

there will be another project. It is not ours. It is CARDs in partnership with Heifer foundation in Georgia. They will do this wet care improvement in the transboundary areas between Armenia and Georgia. This project as far as I remember is related to the improvement of animal health. Veterinary issues. So it seems that we will have a more ended circle of cattle breeding which is very good.

[JS]: And then you can have milk the whole year not only a few months, because of the artificial insemination cows can give birth the whole year.
[KM]: Yes of course, there are a lot of positive results.
[JS]: And also a problem with these European bulls is that they need special veterinarian supervision special food and so one.
[KM]: But you know limousines for example are going very good in that area. I don't know from what country of Europe they brought them. A very skilled farmer brought them and they are very good adopted. But anyway, this farmer gives very good foods and he has very good vets and he is a very rich farmer, so his case of course can't be the case of the other farmers. They are poorer and have an amount of 5 to 10 cows, maybe some more.
[JS]: And what about milk production? Is there any?
[KM]: Yes they produce milk, there are couples of companies who go to the area and collect and buy this milk from the farmers, for example this Ashtara-kat company, but there are others. When we began our project in 2008, the price of one liter milk was 78 Drams, to small, and farmers were not so happy with this, but now it is much more, nearly the double price.
[JS]: They are going to each farmer or is there a collection point?

[KM]: In some villages there are collection points, in the village Dzorakert we have a collection point, but in other villages they collect one by one. At anyway at the Soviet times there were some state companies producing cheese and everything and then it was forgotten and after the Soviet Union collapse, everything was damaged and now there are no operations. So they bring this milk to Yerevan for production. There were some suggestions from the communities, but our feasibility studies showed, that it is unrealistic, because there were couple of such kind of centers, and they didn't work. In Dzorakert for example the collection point was established by one other company.

So this kind of activities can be done also in other communities, if there is an interested and market etc.

[JS]: But how do they get the milk in winter time?
[KM]: Oh, winter time, I think, they go maybe one per week, when the roads are okay. In the eastern part it is easier, because this road is very seldom closed.
[KK]: Dzorakert is reachable in the wintertime
[KM]: Ja, nearly all of these eastern part villages are accessible. It can be closed for a couple of hours or one day, but when the western part is closed, it is not reachable anyway.
[KK]: For 5 month in the year the western part of the park is absolutely isolated from the rest of the world.

[KM]: Also we provide some machinery to one of the villages to Lorasar. It was the last village that donated their land to the national park and we had a lot of fights with them. There is a river goat, very nice and beautiful place and we have the propus demula (?), it is the only place in Armenia where it grows. And from that point of view biodiversity is also high, there can be some roar deer in that court, so it was important to include this part to the national park. But the community was not happy with this. Actually there was a forest, but in the cadastre this was mentioned as a grazing land, and the communities were not so happy so we negotiated with them and finally after 5 or 6 meetings we came to the conclusion, that the donated 50 hectares of their forest, and nothing of grazing land –
[KK]: Of the 21000 hectares only these 50 hectares forest were problematic …

[KM]: Other communities gave 3000 hectares - we needed from them only this 50 hectares forest. Anyway they couldn't use it for grazing; this is what we tried to tell them. Now we have a very good relationship with this last community. And a tractor will be provided, we will do that. They didn't even have machineries to clean the roads in wintertime.

[KK]: We will also built a small camper house for the municipality of the village, also the technique and the furniture.

[KM]: This is a very tricky issue, these community development problems, ja? You should invest in all villages the same, if you put more in one village than to another, they can be very unhappy; we try to keep a balance. More or less. 2000 or 3000 less or more, but generally the investment in each village is about the same. Excluding these big investments, of water supply systems, the slaughterhouse and so on, which covers all the villages.

[JS]: And how do you calculate the balance? According to the inhabitants? Or?
[KM]: No, no the same amount approximately. Eastern part villages have the same amount and western also. Otherwise local people are very well communicated to each other, they would claim "why they put in this village more…." Better to work in a balance. Sooo… it is not so easy to implement such a project, but it is very interesting, I enjoy to talk to the local people, you can see their happiness. When we started two years ago, with these workshops, they became more tired and they started to not believe in us and our project "you are only planning meetings, workshops, nothing else", and then the constructions started and they understood, that we are working. Because it depends on the ministry. This procedure is not in our hand. Starting from report, everything we should communicate to the ministry and get a comment to improve it again and several time it can come back and go, takes a lot of times

[JS]: When did you start actually?
[KM]: We started in the end of 2007.
[JS]: Than it is quite quick I think.

[KM]: Ja, as far as I know, the same project in Azerbaijan is not so fast going on as I know. And there is also a delay in the Georgian part as well, as I know. Because of some problems with the ministry and so on.
[KK]: Bureaucracy
[JS]: Oh yes. I know quite well what you mean [….]
[KM]: You see our hair is becoming grey from this bureaucracy. Lake Arpi is not our only implementation or work; we have to work with ministry and so on all the time. And it is not easy to work here, of course it is never easy, but specially in this part of the world. No interest of local people, of I don't know the oligarchs, the different state agencies, you have to be very diplomatic to push your ideas, or otherwise you would

fail. 4% of Armenia was established as new protected areas, thanks to our work and support.

[JS]: So I think you gave us very much and valuable information. I thank you a lot for you time and the very nice talk.

[KK]: We thank you for your interest in our work.

[KM]: And we always welcome 3 beautiful ladies to our office

(Laughing)

Annex IV – Interview NGO Meghvik 2012

23.03.2012; Start: 20:30 o'clock; Duration: 52:12 min.; Gyumri
Interviewed persons: Vehanush Hovhannisian, head of NGO Meghvik [VH]
Interviewer: Johanna Schott [JS]
Interpreter: Susanna Hakobyan [SH] and Zaruhi Babajanyan [ZB]
Present and Additional: Talin Kalatas [TK]

[JS]: First of all, could you tell us about your work at your Organization?
[ZB]: […] all translations of the first part of this interview are done by Zaruhi Babajanyan. The second part is translated by Susanna Hakobyan

[VH]: Since 24 years, since the earthquake we educate children and teach them what is important in life. There is a group of teachers and educators working here in the organization for teaching. These people prepare textbooks and also teach disciplines taught which cannot be found at normal schools. Ecology, Logics, Journalism, Agriculture, Handiwork etc. The children learn to prepare these kinds of things by themselves.
(shows handmade jewellery)
The children also learn to do felt works. The children are doing these kind of works for themselves; it is like a scheduling for an independent work. A lot of the works the children do here are right now at an exhibition, including for example shoes made of felt … Nowadays wool is very cheap; you can buy it for a very small amount like for 500 Dram and then you produce your own work and sell it.

[JS]: So it is not a big investment.
[VH]: Yes exactly. I have an idea .. In the region of Lake Arpi exist a lot of sheep and I have the idea to produce such a work exactly in this region. I mean I want to show the children of this region how this work can be done by themselves.
[ZB]: How much is one kilo of wool?
[VH]: 500 Dram
([VH] shows woven products and explains how hand-woven carpets are produced by the children of the organization)

[VH]: We have specific time in the week when the children can come to us and can learn all this handiwork. I would like to teach all this traditional work also in the villages of our region. There is a lot of wool and it is not used. It is high quality wool and an additional way to make money for the families …
[VH]: On my computer I have some pictures of the exhibition of the produced products. For things like this our organization has an internet magazine …
You know, when the government is not going to support us in the plan to distribute this traditional handiwork back to the villages, I will do it alone. I have participated at a lot of meetings and even told the National Council that children are not "expensive" for us. Children are important resources of our country. When you teach children the right things, you get a kind of "profit" out of them. Children are learning and adapt new competences and then they can give everything back to the new generations. I have been to the Czech Republic and I noticed that children are much more respected and appreciated there then in Armenia. Children are producing some products themselves and the government buys it for a price ten-times higher than the normal price and sells them to the tourists. In this way children can earn their own money and become independent from poverty. The goal is that children and young people can earn their own money, become independent and get away from the street and bad company. You know you can "use" the knowledge of children. The will be the new teacher and good examples for new generations. I told at different places that I want to establish this project in our region, but I got no support of the government. So at the end we opened all this vocational schools, which were closed after the breakdown of the Soviet Union, by ourselves …
Nowadays we even have an Internet market where the children can sell all their products to Armenians all over the world.

[SH]: Because this is not only a NGO, it is also a foundation, so she can not only work, she can also sell everything. For example, my NGO we can't do such things, no beneficial. But since she has a foundation she can sell.
[VH]: A short while ago we had an exhibition in partnership with the University of Brussels, where all this handimad products were shown and also could be sold. The children were selling their products by themselves. This was taking place at the theater of Gyumri. The children were so happy and keen to sell everything by themselves and very proud to see that their work is appreciated. And they learnt the feeling to get

money for your effort. The children are working day and night, just to make some money and be independent …

The villages of this region are in very bad conditions … In these villages the people should learn the traditional handiwork to get some money and to stop all this migration.

[ZB]: Your organization looks after how many children right now?

[VH]: 300.

[JS]: And where do all this children live?

([VH] shows drawn pictures made by the children and also frames which were bought for the exhibition)

[VH]: Back then when the children had no parents [after the earthquake of 1988?] or other family members, they lived at the orphanage. Today in our organization we don't take care just about orphans, we also mentor children from normal or even rich families. The name of this organization is for a good reason Meghvik -

[ZB]: This means little bee.

[VH]: It is because in our organization we see every child as a little bee. After the earthquake all this children were shocked and unhinged and in the last 24 years we created out of this shocked children new well educated, solved, good humans. We gave them education and got good humans. Good painter, good musicians, doesn't matter, at least good people. They are not shocked anymore; they have a good character and can work for themselves. We worked here day and night, it didn't matter if we had the money for all this, we did it. I didn't matter if other organizations or the ministers were helping us; we were working for the children.

([VH] shows pictures of the exhibition)

[SH]: Me and Vehanush, we worked now so many years in same projects and know each other since the 1990s.

[JS]: So shall I introduce myself?

[SH]: Yes, yes ..

[JS]: My name is Johanna, this is Talin *(shows at Talin)* and Zara *(shows at Zaruhi)* and of course Susanna and we are from a German-Caucasian Research Group. We are from the University of Goettingen in Germany.

[VH]: Very nice.

[JS]: And we are interested in the living conditions here in the region of the national park. That is why we are asking some NGOs, farmers and local administration. And if you are ready, I would like to ask some questions.
[VH]: Yes of course.
[JS]: Thank you very much. The first question is. Were you involved in the planning of the protected area?
[VH]: Yes.
[JS]: And in what area? How were you involved?
[VH]: As a member of a regional organization. When the representatives of the KfW and WWF came to this area and implemented their research work for the establishment. We as an organization which has for many many years implemented and realized different kind of projects in those villages. So this organizations KfW and WWF were also taking in account the result of our projects and our knowledge about the area and the people here, they were also asking us questions about this. These organizations were thinking that it is very important to work with local organizations and we are one representative of them. As a result of these activities we have now a project, which is financed by GEF, WWF and KfW on the establishment of beekeeping in these villages of the national park. This is a complex project, which is concerning also a development of business and also we will establish a beekeeper association, we are supposed to protect biodiversity on this area, because there is a lot of. When we presented these beehives to the villagers, we made an agreement with them. That next year the new family of this bees will be passed to the neighbors and each year it will be distributed. So first the person has one family and the next year 2, and he gives one to another person inn another village. It is sustainable and a long-term project and it is also nature protection because in the soviet time there was a very serious pressure on the nature, there was overgrazing and big farms and many species of plants, which are now in the red book of Armenia are there. And we hope that as a result of this project these plants will be restored. So I think that this project is very important.
[JS]: So the local people are convinced now or not?
[VH]: In a few month, when the roads will be opened we will start. We already prepared these small brochures *(shows brochures)* of beekeeping and we will give that to the farmers of the national park area. This is information for beginner beekeepers, who are just starting to do this. And at the end of the year we will fill the honey. The

people, they cooperate, of course they don't know everything yet, but they are ready for a cooperation of beekeeping. It is a better way of development like this.
[JS]: And do they have a brand?
[VH]: Of course we will have a brand; maybe in the future the Armenian diaspora can buy this honey as organic, clean honey on the internet platform
[JS]: And Meghvik will train the farmers how to keep the bees?
[VH]: Yes, we invited specialists of beekeeping not only from Yerevan, also from foreign countries. This project will start this year and after a theoretical part the farmers will start to keep the bees by themselves.
[JS]: And can the bees survive this cold winter?
[VH]: In the winter the bees will not be in an open place, the will be all together, like in a house, there it will be an adequate temperature or the villagers will keep them in their houses. Close to this Lake Arpi area spring will start very late, so we start the project from a lower part and from there, when it will be warmer at Lake Arpi we will go there. I already feel like a specialist of this. Everybody is laughing because of our name and say you can work with bees and now we do. Lake Arpi is Ramsar site and a global important side, not only for Armenia.

[SH]: Normally if some wetlands are in the list of Ramsar site it means that this area is international important. This is special for waterfalls.
[…]
[JS]: Do you know, if there were some kind of conflicts of interests?
[VH]: No, I don't feel that there were any kinds of conflicts. Maybe there have been, but then so few that I didn't notice.
[JS]: And are you working together with some other NGOs?
[VH]: In general or at Lake Arpi?
[JS]: At Lake Arpi?
[VH]: Yergink (?), Biosophia, Orhus Center. The first one is a youth organization and they train the youth, the others are for nature protection. In the frame of the project of beekeeping we will work alone. No other NGO will work with us, but we would work with them on other projects there.
[…]

We are also working with Heifer international. Just in March we finished a work with them for education of young people. The name is “future of the villages, educated youth”. In Tsaghkut village, which is part of the national park we built 7 youth clubs. For example a business club, a club for nature protection, for agriculture, a journalist club. Each club has a special work focus.

[JS]: And this is funded by Heifer international?
[VH]: *(Yes. […] shows from Meghvik produced text books for these youth clubs)*
It is very difficult to tell just in one hour the work of so many years. So do you like our organizations? How do you find our work here?
[JS]: Yes, it is very good and important.
[VH]: *([…]personal talk about Vehanushs phD about informal education)*
A lot of information in so less time, but I am never tired of my work. … We also do Puppet Theater here in Gyumri. Just a short time ago I made a stage play out of one of Tumanyans fairytales and added some songs into it. The children learnt this and also played this at a theater play.
([…] personal talk about some works of Vehanush)
[JS]: So, thank you very much.

Annex V – Extracts of pers. observations Kalatas/ own memos in 2012

(i) Meeting with Tamaz Karapetian (WWF Georgia), representative of the NP Samtkhse-Javakheti. Akhakalaki, June 2012.

- Borders of the NP not clear at this time. Core zone is clear, villages of the buffer zone are known:
- It is not planned to include other villages to the "buffer zone", even there are additional near villages. Especially at the east part (Armenian border)
- Villagers are ethnic Armenians. Where are they from? Karabagh, east Turkey
    - Not able to communicate in Georgian (most of them)
    - Excluded from politics
    - Armenian University in Akhakalaki
    - Armenian is "state language" of the region
- top-down approach
    - Development Programms planned
    - Guest houses planned
    - Infrastructure? Not planned yet
    - Gas pipeline is going through the region to Europe(?)
- Free vaccination in Georgia
    - One time a year
    - How do they reach the region?
    - 2 vet. Docs in the buffer zone villages (where?)
- All use Pasturelands
    - Communal land
    - Not organized (no rents)
    - Cows come back in evening by themselves
    - Rotation system (families rotate in the villages each year who brings cows to the pastures and back)
    - Winter fodder has to be bought (from where?)
- Bartering with Cheese (visible in villages)
    - Change into fruits, clothes, things needed in household
    - Bad infrastructure (no water, gas, streets, no cars (mostly), no busses)

(ii) Meeting with "Shakro" (most involved farmer of the region), Ardenis, Lake Arpi. June 2012.

- Friend of Karen Manvelyan (head WWF Armenia)
    - Forced WWF to establish NP
    - Has one of the conservation areas in his backyard (pond)
- Is connection of NGO and all villages of the buffer zone
    - People are proud to be "worth protecting"
    - Love their region, even bad conditions (no water, gas, jobs, in winter no connection to Gyumri, Schools, hospitals etc.)

    - Better living conditions with NP
        - Infrastructure, jobs, tourists
        - Meetings with NP administration, WWF, Acopian Center about NP issues (men were taking part)
- Dairy factory in the zone, villages sell milk to them, can buy cheese cheaper
- Meat buyers (Kurdish) come from the cities, buy directly at the field (seen it!)
- Cheese for home consumption (less because of factory), bartering (fruits, clothes!)
- Bad Infrastructure – no way to get to Gyumri in Winter (no hospital,school at this time)
- No cars
- Rotation system for pastureland (families rotate in the villages who is taking care of the animals) → ask respondents how many of animals are own animals and not from other family members

(iii) Interview Meeting with Mkrtich Petrosyan, major of the viallage Bavra (Lake Arpi), March 2012

- Village lost land due to NP process/border declarations of Georgia
- Is excluded from the support zone
    - Why? Major doesn't know
    - WWF doesn't know the reason

(iv) Meeting with A. Badlidze. Local administration of region Lagodekhi/Managed Reserve, June 2012

- No real buffer zone
    - Villages bordering the managed reserve
        - Managed reserve as strip between nature and humans
        - Matsimi, Shroma, Kavshiri, Ganatieba, Khizabavra, Zemo Khiza, Ninigori, Gurgeniani, Zemo Mskhalgori, Rachisubani
        - Zemo = upper, Kvemo =downer (no Kvemos?)
- Managed reserve for vacation, bbq (special places), hiking etc.
    - No land use (agricultural)
    - No collection of fire wood (fruits etc. is okay) is allowed
    - Small amount of wood is shared with population
        - How much? (no answer, small)