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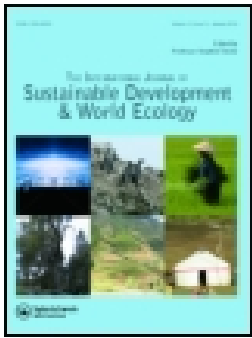
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Mountain environment and population in Georgia: case study of Upper Svaneti

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ABSTRACT

The purpose of the presented research is to identify local community opinions toward ecological problems in one of the mountainous region of Georgia (Upper Svaneti), to analyze how population 'perceive, experience, and interpret' the social, and ecological issues.

The paper is based on the results of Upper Svanet ipopulation's survey which was carried out by the authors of presented paper during the August of 2015 and 2016. The questionnaire was elaborated taking into account the peculiarities of the region. Stratified-cluster selection method was used for selection of respondents and database compilation. For statistical analysis of polling data the SPSS package was used.

Based on the statistical analysis of survey results, the following issues have been studied: the most important ecological problems, environmental problems with respect to socio-economic ones, information sources on ecological problems, people's trust in environmental issues, awareness level of the population on environmental policy, their personal contribution in environmental protection, ways to solve ecological problems, implemented environmental measures.

The obtained results are important to foster mountain population's active participation in processes that contribute to decision-making processes, planning and implementing programs for sustainable development.

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Introduction

About 10% of the world's population depends on mountain resources (UN 1992). Mountain regions are essential for sustainable development (UNGA 2012). Mountain ecosystems play a crucial role in providing water resources to a large portion of the world's population (UNGA 2012). The significance of mountain environment and people and the need for sustainable development in mountain regions has increasingly been recognized by global agendas, international conventions, and action plans (Gleeson et al. 2016). Mountain systems are essential building blocks for long-term sustainable global development, poverty alleviation and the transition in green economy, and play a crucial role in climate change adaptation and mitigation (FAO 2011). Mountains are highly vulnerable to human and natural ecological imbalance (UN 1992). Moreover, these are 'the areas most sensitive to all climatic changes in the atmosphere' (UN 1992). Most global mountain areas are experiencing environmental degradation. Hence, the proper management of mountain resources and socio-economic development of the people deserves immediate action (UN 1992). Mountain livelihoods

lose their resilience and become increasingly vulnerable to external economic shocks (FAO 2011). Mountain communities need to be empowered and their livelihoods improved, to enable them to take responsibility for the preservation of natural resources and to fulfill their role as mountain stewards (FAO 2011).

Most mountain regions share a long history of political marginalization (FAO 2011). Mountain people have limited access to policy- and decision-making beyond the local and district levels, and their development is often externally driven. In many countries, mountain people lack political clout and voice (FAO 2011). The resolution adopted by the United Nations General Assembly on 27 July 2012 recognizes 'that opportunities for people to influence their lives and future, participate in decision-making and voice their concerns are fundamental for sustainable development' (UNGA 2012). It is essential to 'recognize the local knowledge and local capacities that need to be engaged and strengthened (Imperiale and Vanclay 2016a) and 'encourage their active participation, as appropriate, in processes that contribute to decision-making, planning and implementation of policies and

programs for sustainable development' (UNGA 2012). Participatory governance started to become popular over 40 years ago when it heat the 'development mainstream' (Cornwall 2008). There had been adopted useful mechanisms 'to improve the knowledge and decision-making of policymakers, planners, and local community about socio-economic aspects of a specific planned development project (Sairinen and Kumpulainen 2006).

The purpose of presented research was to find out and understand local community opinions on ecological problems in one of the mountainous regions of Georgia (Upper Svaneti), to analyze how population 'perceive, experience, and interpret' (Imperiale and Vanclay 2016) the social, and ecological issues.

Georgia is located in the north-western part of the South Caucasus. To the west it is bordered by the Black Sea, to the North by Russian Federation, to the south by Turkey, and Armenia, to the south-east by Azerbaijan. The total area comprises 69,700 km². Georgian population amounts 3.75 million people (NSOG 2015). Georgia is known as one of multi-national, multi-cultural and multi-religious country in the South Caucasus region – according official records only 80% of citizens represent ethical Georgian population, and the rest are of other national origins (including Russians, Azeri, Armenians, Greeks, Ukrainians and many others). Georgia is the poorest former Soviet Union country. According to official statistics, 31 per cent of the population lives below poverty line, but according to civil-society group's estimation almost half of the population lives below it. Nearly half of Georgia's 3.75 million inhabitants live in rural areas (Bondyrev et al. 2015).

The complexity of Georgian territory's orographic structure, along with other physical -geographical factors cause wide variety of climate and landscape types. There are mountains, valleys, plains, lowlands, glaciers, wetlands, arid lands, lakes, rivers and even geysers. Mountains cover significant part of the territory 54% of them is located at 1,000 m elevation. In addition to Great Caucasus Ridge, there are several other mountain ridges in Georgia. The most important is Likhi Ridge, ranging from the north to south and dividing country into east and west parts. There are almost all climate types observed on the Globe, from high mountains eternal snow and glaciers to steppe continental climate of eastern Georgia and the Black Sea coastal subtropical humid climate (Elizbarashvili et al. 2017). During last decades, Georgia was facing multiple challenges at the social, economic, political and environmental realms (Keggenhoff et al. 2015). These problems are most acute in mountainous regions, where the unplanned development of natural ecosystems had drastic consequences (Bondyrev et al. 2015). After the collapse of the Soviet Union, the country had been experiencing wars with Russia,

loss of territories, the coup, civil and ethnic conflicts, poverty, unemployment, inflation, corruption, environmental degradation and many others. Despite of wide amplitude of obstacles, Georgia continued to empower democratic processes by adopting several legislative acts, *inter alia*, environmental legislation. However, they still require further improvement and 'consideration of appropriate mechanisms' (UN 1992), to ensure 'access to information, public participation and access to justice in environmental matters' (UNGA 2012). Mountain communities are amongst the most vulnerable citizens, who 'live far from the centers of commerce and power' (FAO 2011). We believe, that 'broad public participation and access to information and judicial and administrative proceedings are essential to the promotion of sustainable development' (UNGA 2012). This research will foster meaningful civil-society participation in decision-making processes for sustainable development (Sherbinin et al. 2007). To achieve political, economic and social integration, mountain people's voices have to be heard and mountain communities be recognized as equal partners in policy- and decision-making (FAO 2011).

Study area

The study area – one of the highest mountainous regions of Georgia, Upper Svaneti (43°2'0.69"N; 42°41'22.14"E) is located in the north-western part of Georgia, in Samegrelo-Upper Svaneti region, bordered by the Great Caucasus Ridge and Russian Federation (The Kabardino-Balkar Republic) in the north (Figure 1). In the east, south and west it is surrounded by following Georgian administrative regions: Lentekhi, Tsalenjikha, Chkhorotsqu municipalities and Autonomous Republic of Abkhazia (Georgian occupied territory). Total area of study region is 3,045 km², In Upper Svaneti (Mestia) the average area of parcels operated by agricultural holdings constitutes 0.32 ha (NSOG 2014). In its turn, forests occupy roughly 46% of -the region.

The great part of Upper Svaneti (frequently mentioned as Mestia or Zemo Svaneti) is high mountainous. Its hypsometric altitude varies from 450 m (Jvari water reservoir) to 5201 m (Shkhara-the highest peak). Population density approximately amounts 5 people/km², which is 13-times lower than average index in countrywide (67 people/km²).

Upper Svaneti occupies upstream area of the river Enguri. The length of the river is 213 km, while basin area equals to 4060 km². The river plays important role in Georgian energy production. In 1988 the Enguri Dam was built. It is the largest construction in Caucasus region.

The Upper Svaneti region is listed in the UNESCO World Heritage List for being an 'exceptional example of mountain scenery with medieval-type villages

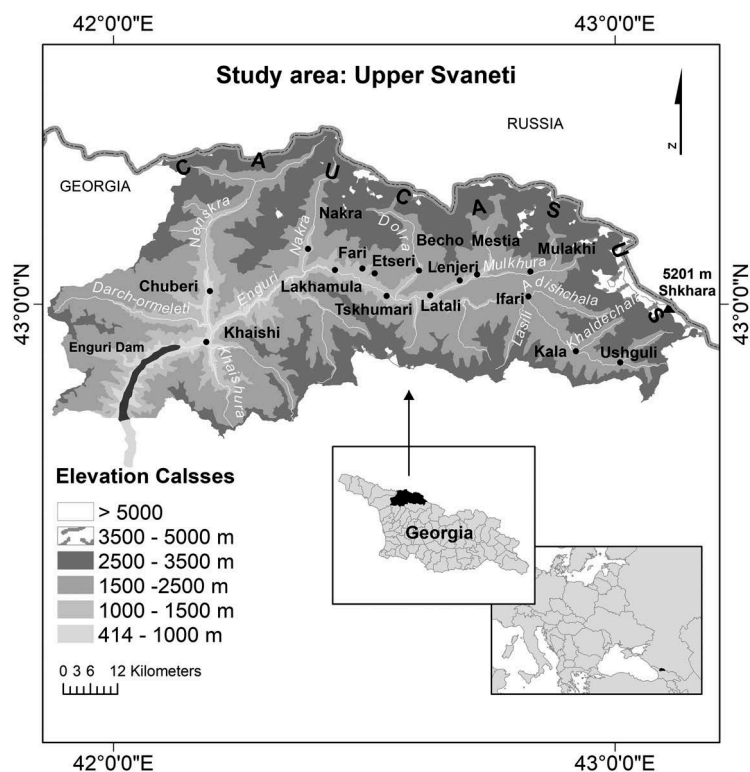


Figure 1. The study area. Map was compiled by Tamar Khardziani.

and tower-houses' (UNESCO 1996). Since, the adoption of free market economic model in Georgia, Upper Svaneti became the central focus for many development projects, programs and plans, which poses threats to the ecosystems, humans and cultural heritage. In many cases, local community is not actively engaged in decision-making processes and 'their voices often go unheard' (FAO 2011).

Material and methods

The paper is based on the results of Upper Svaneti population's survey which was carried out by the authors of this paper during the August of 2015 and 2016, and the project: 'Public attitudes toward environmental problems (Case study Mestia Municipality)', 2015, financed by the Faculty of Exact and Natural Sciences of Ivane Javakhishvili Tbilisi State University. The questionnaire was elaborated taking into account peculiarities of the region. While preparing the questionnaire, our main principle from one hand was to maximize the problems that characterize mountain regions in general, and on the other hand, the specific problems based on the geographical and climatic features of study region. We also obtained list of actual problems identified by the local municipality of region which was taken into consideration while developing the questionnaire. We compiled questionnaire in a way to be simple and easy for local population understanding.

The last Parliamentary elections electoral database and joint Stratified-cluster selection method was used for the respondents selection and database compilation. Stratified selection implies population division into strata according the following characteristic (age, gender, dwelling, social class) and creation of respondents' group by random selection from each stratum with the purpose of improvement of selection's representativeness. Cluster selection forms groups under study from kindred unity (group) – clusters and less address to random selection. As Upper Svaneti is divided into communities then in our case stratification variable is represented by Upper Svaneti communities, while cluster is introduced by district.

In general, stratified selection reduces the selection error and cluster selection is faster and cheaper. Thus the use of joint stratified -cluster sampling method in the research was reasonable in financial and sampling error terms.

During stratified-cluster selection the error was calculated according to following equation:

$$\Delta_{\text{strat+clsr}} \leq \frac{1}{\sqrt{n}} \times 100\%$$

Where 'n' is the number of interrogated respondents.

Sampling error implies 95% range of validity. Number and error of interrogated respondents were determined both for Upper Svaneti as a whole and for each community. For Upper Svaneti the number of respondents amounts 895 and error – 3, 3.

To conduct statistical analysis of polling data the SPSS package was used, which currently is widely used for statistical analysis worldwide (Landau and Everitt 2004).

Results and discussion

Significant ecological problems for upper Svaneti population

Based on the statistical analysis of the survey results, the most important ecological problems have been identified considered by the population of Upper Svaneti. The most significant ecological problem of the surveyed population is the landslide -mudflow

processes; then the absence/failure of sewage system; And further – climate change, extreme weather and climate events, floods (Figure 2). Thus, most of population is focused on catastrophic processes and sanitary norms (Khardziani et al. 2017). Their opinions are compatible with reality, as Upper Svaneti is characterized by floods, landslides, mudflows, avalanches, and washout of rivers and erosion (CATRD2006). Landslide processes threaten not only housing, but also arable land and public infrastructure, damage internal roads and bridges, power lines, water supply system (Figure 3).

As for the sewage system, indeed except Mestia district there is no such system in Upper Svaneti nowadays, this problem is particularly acute in the

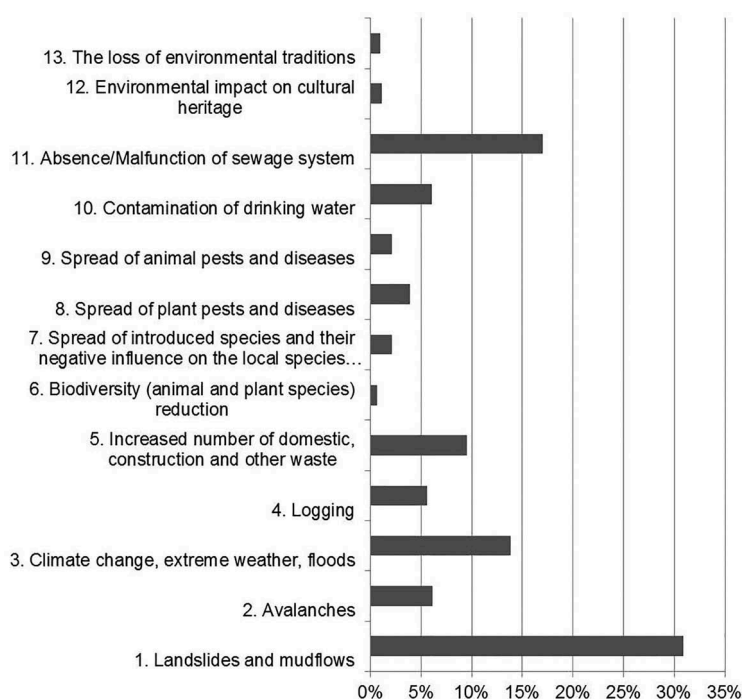


Figure 2. The most important ecological problems of Upper Svaneti population.



Figure 3. Landslide and mudflow processes and the empty village, Mulakhi, Upper Svaneti. Photo by Tamar Khardziani (2013).

background of growing tourism in the region, which is well recognized by population. Upper Svaneti population names drinking water contamination among the important problems. Despite the abundance of water resources, there is still a problem the access of clean drinking water in mountainous regions.

The goal 6th, in Agenda 2030 for Sustainable Development, adopted by the UN, in September 2015 underlines the importance of 'availability and sustainable management of water and sanitation for all' (UN 2015). Water availability will be determined by how we care about the world's water towers – mountains (Muvunankiko and Alweny 2017).

Although climate change as a problem was named by relatively small percentage of population, so it should not be interpreted as the climate change is not perceived by the local population. The activation of landslide processes and avalanches is the result of climate change.

'Data presented in the adaptation strategy for Upper Svaneti indicate that the mean annual temperature in Mestia, located at 1441m. elevation (m.a.s.l), has increased by 0.3°C during 1961–1985 and 1986–2010 periods' (UNDP 2014). In the west, the mountain zone of Svaneti and the mountain area of Adjara have both seen increases of about 14 per cent in precipitation (MoENRP 2015). 'The temperatures in the mountainous areas of the northwest of Georgia, such as Mestia (Upper Svaneti) and Ambrolauri, are predicted to be among areas with the greatest temperature increased by the end of the century' (UNEP 2016). As in other mountain regions, the Upper Svaneti example shows that 'High mountain areas are early warning systems of climate change, and lessons learnt might be applied at lower altitudes' (Palomo 2017).

Environmental problems with respect to socio-economic ones

44.5% of respondents believe that ecological problems affect daily life, 38.4% believe that partially affect, 10.3% consider that ecological problems do not affect their daily activities and 8% does not have any answer. Thus, the population adequately appreciates the importance of ecological problems, but this attitude has been partially outweighed by social and economical problems, which in reality especially hardened daily live and thus the environmental problems are less important for them. Indeed while selecting the most important issue/problem 37% of respondents named unemployment, 24% health care, 9% poverty and 8% absence/malfunctioning of communications (road/internet/mail, etc.), 7% emptying of villages, 6% absence/luck of market, only 3% environmental protection, and other 6%.

Table 1. Results of population survey.

A) What sources of information do you use in environmental problems?	
1 TV	64%
2 Internet	16%
3 Conversations with family members, friends, neighbors, colleagues	13%
4 Newspaper	2%
5 Conference, exhibition, festival	1%
6 Other	4%
B) To whom do you trust most in the environmental issues?	
1 Scientists, universities	32%
2 Church	32%
3 NGO	14%
4 Family, neighbors, friends	6%
5 TV	5%
6 Regional/Local Authorities	5%
7 Political parties	1%
8 Other	5%
C) You can personally contribute to environmental protection?	
1 Yes	64.2%
2 Partly	21.8%
3 No	7.6%
4 I don't know	6.4%

Information sources for population of upper Svaneti

According to Table 1(a) -majority of respondents receive information on environmental issues mostly from TV and later from Internet, also from friends, neighbors, etc. This means that estimations and opinions of other people are important for population and they pay attention on this in environmental issues. The majority of respondents after television named internet as the source of information, which is becoming more and more actual in the region and is likely to be created as the independent source in understanding of environmental issues.

Nowadays, periodical newspaper of local self-governance bodies of Mestia municipality publishes environmental cognitive articles to raise public awareness. But the printed media has been nominated as the source of information by a very small number of respondents, but in the past it was an important source of information.

People's trust in environmental issues

As it is evident from Table 1(b) Church and scientific sector have the highest trust degree in environmental issues. Television, which is the main source of information, has a very small percentage of confidence in surveyed population, as well as a small percentage of surveyed population trust in the local, regional authorities, non-governmental organizations have a bit more confidence. As for political parties, their trust level is uniquely low and among other categories are on the lower ranks. High distrust in political parties indicates on a weak and inappropriate environmental vision of political forces and insufficient coverage of environmental issues in the election program.

Scientific-educational institutions and churches, which are derived from the centuries-old traditions of the region has been deserved trust of population toward environmental problems. It should be noted that in the IV century, Christianity was declared a state religion.

According to the State Agency of Religious Issues (<http://religion.geo.gov.ge/geo/home>), the following main religious groups created the current religious diversity of Georgia: Orthodox-83.9%, Muslim – 9.9%, Armenian Apocalypse – 3.9%, Catholics – 0.8%, Jewish – 0.1%, other – 0.8%, none – 0.6%. In spite of such diversity in whole Georgia, the inhabitants of Upper Svaneti are almost Orthodox Christians and only the Orthodox Churches exist historically on its territory. The Orthodox Church traditionally has the mission of Culture, Knowledge and Education Center in Georgia. We consider that the attitude of population of the mountainous regions has been preserved in particular toward the church, which in the Soviet period was not only to endure persecution against religion, but became more sustainable. It is noteworthy that in the mountainous regions of Georgia there are a number of environmental traditions associated with the church, the attitude toward the environment and it does not welcome abusing environmental destruction and resources policy that characterize Bolshevism and neoliberal transition economics.

The population put science exactly at the same church trust level in the reliability of ecological information, indicating that the population understands and recognizes that science has the important role while solving of ecological problems. The development and implementation of environmental policies should be based on scientific research, analysis and information provided by science.

Decision-makers should be guided by the results of scientific research. Unfortunately, for today the role of science and scientific research in Georgia is diminished. Solutions, elaboration and implementation of the development plan are often carried out without proper scientific scrutiny, which we consider is significantly impeding sustainable development.

Thus, the population expresses confidence in the scientific and traditional religious institutions, but the participation of these institutions is very low in decision making and environmental policies or actions. Instead, those who make decisions on elaborating, planning and implementing of environmental policies are less trustworthy.

Awareness level of population on environmental policy

The inhabitants of Upper Svaneti think that they are mean informed about the environmental policy of Georgia. In fact, only 9% of respondents said they

have been informed, 35% answered that partially informed, 24% said that they haven't been informed and 32% had no information at all.

Thus the population expresses the neediness for more information about environmental policy from the reliable information sources for them.

That is why we believe that in this respect, more projects should be implemented where local authorities as well as scientists and church representatives will be involved.

The personal contribution of population in environmental protection

64.2% of respondents eager to contribute to environmental protection, 21.8% think that they are able to contribute partially. 7.6% and 6.4% think that they aren't able to and they don't know. Thus the attitude of the local population is reflected in the fact that they want to participate in environmental activities, thus improving their living environment and region, they are active citizens and is interested in improvement of ecological condition of their residence.

Although most of the population thinks that they can contribute to environmental protection, instead interviews have shown that they mainly expect outside initiatives. In our opinion, this circumstance has been motivated by historical context. Since the Soviet Union, the centralized system of decision making is still in action by inertia, where the involvement and initiatives of the local population play minor role.

The ways of solving ecological problems, implemented environmental measures

In order to search methods to solve ecological problems and analyze implemented environmental measures we interviewed population and collected information on the implemented activities. According to Mestia Municipality information during 2014–2015 years in the Upper Svaneti region by the initiative and financial support of local authorities and various non-governmental organizations several environmental clean-ups, a number of clean-up activities involving local population, foreign students have been conducted. As well to manage landslides in one of the settlements stream (which previously had been used as a garbage dump) with the involvement of the National Environmental Agency and the Swiss Agency for Development the modern type protective water-courses have been built.

Despite the above-mentioned conducted measures, the population thinks that implemented environmental measures in 2014 and 2015 were insufficient. Indeed only 17.6% of respondents think that environmental protection measure has been carried out in Upper Svaneti in last year, 57.9% think that

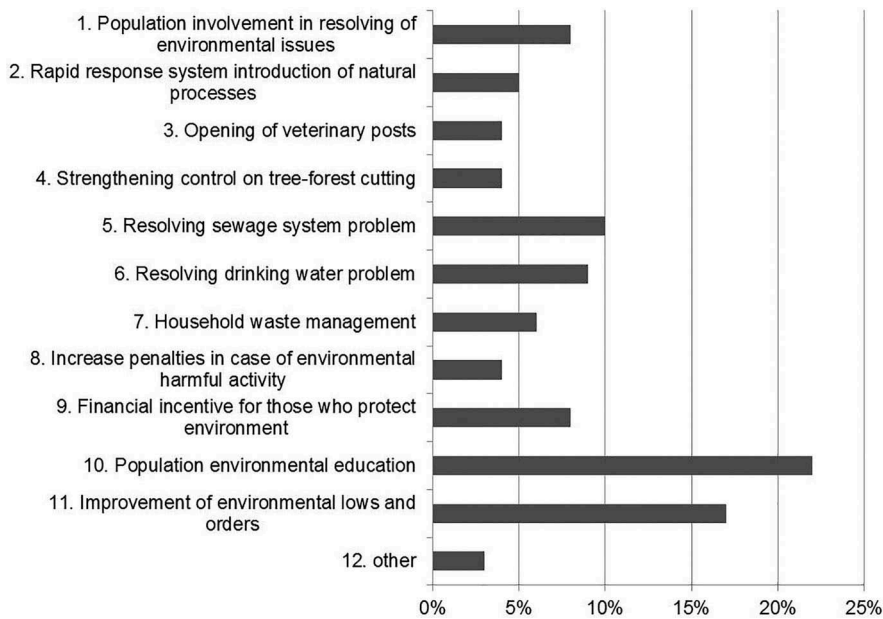


Figure 4. Effective actions to solve environmental problems according to the population.

no measures were carried out and 24.5% do not know. To our view such population attitude is related on that they have lack of information on these events and also, they suppose that other ecological problems instead of cleaning must have sufficient attention. Indeed, in interviews, if any of the environmental measures were taken by the respondents, all were related to the cleaning action. The population is focusing in other direction while discussing the ways to solve ecological problems.

Figure 4 shows that the most effective way to solve ecological problems according to majority of surveyed population is ecological and environmental education, and also the improvement of environmental legislation and solving sewage system problem, financial incentives (tax privileges, etc.) for those who protect environment, resolve drinking water problem, and involvement of local community in solving environmental issues have been considered as significant.

Thus, population believe that ecological education which is the most significant measure to solve environmental problem has been devoted less attention and such type event haven't been conducted at all in the region except the fact that in periodic newspaper of the local authorities of Mestia municipality the environmental educational articles have been published but they have almost no impact as the printed media itself does not represent a source of information for them. The opinion of population is also to improve the environmental laws and regulations, and in this direction the local authorities have received certain resolutions and decrees in 2014 and 2015, however, it only concerns constricted issues, namely contamination of environment with waste. Therefore it is necessary to expand the work in this direction

and we can discuss the creation of a protected area in the region. Nowadays there is no protected area in Upper Svaneti, so we can assume that setting up of protected area in Upper Svaneti and creation of relevant legislative framework will help to deal with the environmental problems in the region such as environmental pollution, forest cutting. Although only 5–6% of the surveyed population identified forest cutting as ecological problem, we believe that this problem should be completely eradicated in the region which is important in the context of global climate change.

While creating and planning of protected areas it is important to note that Upper Svaneti is a specific historical-geographical region. Local resident population by agricultural activity is traditionally related with nature. Therefore, if you plan to arrange any type of protected area, it should be done based on the complex, in-depth review and a delicate approach. It is necessary to develop a management system where local residents will have central role in protecting and preserving nature and culture. At the same time, they will give them a dignified life and bring prosperity. At this stage, we cannot name the specific type of protected area that is ideally suited to Upper Svaneti without proper research. We believe that this issue requires complex and thorough research.

Also the local authorities have not taken any measures to improve the sewage system in 2014, 2015 years although population assumes that it is important to resolve this issue.

Therefore we can conclude that insufficient environmental measures have been conducted in the region. The fact is that population involvement in environmental issues on the background of improvement and enhancement of legislation and the

neediness to give more attention to ecological education are important, indicating their high civic consciousness and future visions.

Conclusions

Thus, it can be concluded that Upper Svaneti's population actually experiences, understands and recognizes existed ecological problems, -adequately implement them. However, the importance of ecological problems has been largely covered by such problems as unemployment, health care, and absence/malfunctioning of communications (way/internet/mail, etc.).

By expressing high confidence toward scientific institutions the population agree to take into consideration the results of scientific research in the course of the decision making process. There is also people's desire to be involved in the discussion or settlement of ecological issues, as the majority of respondents think that they can contribute significantly in environmental protection. In connection with ecological problems population's low confidence in local authorities and political parties on the one hand and high confidence in scientific institutions on the other hand, put forward the necessity to schedule various measures, dialogues, including development plan and implementation of social impact assessment as a prerequisite for sustainable development and the well-being of population and would uniquely and significantly increase population's confidence in local government in relation with environmental problems.

Against this backdrop it is important that ecological education is the most effective way to solve ecological problems, improve environmental laws and regulations. This legislation is enhanced by the legislative body – parliament and political parties, in respect of which population's confidence on ecological issues is too low. Thus, participatory practices are necessary to be taken at the legislative level as the obligatory action in case of any project elaboration or implementation.

Thus, we can conclude that the large part of local population supports the mechanism of environmental protection and public participation. They demand to be involved in decision-making process and in solving of ecological problems together with scientific community, local authorities, legislative bodies, political parties, NGOs and other stakeholders. At the same time, people consider themselves to be not just passive viewers but also as active participants while solving ecological problems. They are well aware that equipment with proper ecological knowledge is very important factor in dealing with ecological problems and actively engaging in this process. With the importance of modern knowledge and scientific approach, there exists strong historical experience in population

consciousness. Church in Georgia traditionally has had Culture, Knowledge and Education Center mission and today people have great confidence in church with respect to environmental issues, which is tantamount to trust in science. Such dependence puts knowledge (sciences) and belief into one plane, which in our view is particularly distinct and characteristic for the study region.

In conclusion, it is necessary to conduct similar survey for other regions considering variety of natural/landscape, climatic/conditions, traditions, lifestyles, ethnic composition, religious, economic, social and other features which will contribute to the political, economic, social integration and sustainable development.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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