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Forests, Livelihoods, and Poverty Linkages in the Forest Communities of Georgia

Evidence and recommendations from a 2016 household survey

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Unofficial translation

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List of Acronyms

CEA	Country Environmental Assessment
CENN	Caucasus Environmental NGO Network
ENPI-FLEG	European Neighbourhood Policy Instrument – Forest Law Enforcement and Governance (Program)
EU	European Union
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GEL	Georgian lari
GIS	Geographic Information System
HBS	Household Budget Survey
HF-HH	High Forest Cover and High Natural Hazard Frequency Stratum
HF-LH	High Forest Cover and Low Natural Hazard Frequency Stratum
HH or hh	Household(s)
IHS	Integrated Household Survey
IUCN	International Union for the Conservation of Nature
LF-HH	Low Forest Cover and High Natural Hazard Frequency Stratum
LF-LH	Low Forest Cover and Low Natural Hazard Frequency Stratum
MENRP	Ministry of Environment and Natural Resources Protection (ex-)
NFA	National Forest Agency
NFI	National Forest Inventory
NTFP	Non-Timber Forest Products
P.R.I.M.E.	Productivity, Rights, Investments, Markets, Ecosystem
PEFC	Programme for the Endorsement of Forest Certification
PROFOR	Program on Forests
SSR	Soviet Socialist Republic
SWIFT	Survey of Well-being via Frequent Tracking
TSA	Targeted Social Assistance

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Executive Summary

A. INTRODUCTION

i. Georgia is a lower-middle-income country with a population of just below 4 million. The country has seen an approximate 25% decline in population since the country regained independence in 1991. Georgia's demographic challenges have major implications for its poverty reduction and economic development. Sustained poverty reduction over the past decade shows that the poor have benefited considerably from the government's social policies as well as from new economic opportunities. However, development has had its toll on the environment and progress has not resulted in improved environmental governance or better management of natural resources. Forest degradation, air pollution and other, often 'hidden,' environmental costs remain a drain in the national economy having cost approximately 7.4% of GDP in 2012.

ii. Forest coverage in Georgia is estimated at 2.82 million hectares (ha) accounting for about 40% of the land area. The forests are predominately state-owned and most of them are not currently under efficient, systematic management. The current forest cover is not fully known because the national forest inventory (NFI) has not been updated since the early 1990s. Despite the lack of precise statistics, forest and land degradation are believed to be a serious problem. The forests in Georgia are highly diverse with more than 400 tree species. Further, forests are generally located in steep and inaccessible terrain. The forest sector's contribution to GDP is small at about 0.4%, but the true value is likely higher due to the large size of non-market fuelwood production, other unreported forest extraction, and non-monetized environmental services.

iii. The Georgian government has recently made significant progress in developing a series of forest sector policy initiatives that develop an integrated approach to address the major problems that concern rural development, land use, and sustainable management of forest resources. The National Forest Concept was developed in 2013. It aims to establish a sustainable forest management system to improve the social and environmental function of the forests. The new policy emphasizes the role of local communities in forest management and aims at improved coordination across sectors including energy, tourism, and agriculture/livestock production. The policy also emphasizes market access and private sector involvement in forest production and conservation.

B. SURVEY ON SOCIO-ECONOMIC CONDITIONS AND FOREST USE IN RURAL GEORGIA

iv. Making forests an effective tool for economic and social development in rural areas requires a thorough understanding and data on both the people and communities using forests as well as on the forests themselves. In 2016, the World Bank conducted a large-scale household survey in Georgia with a particular focus on better understanding the significant of forests for rural households. This survey was the first one in the country that was focused on collecting data on forest use, income from forests, and the role of forests in people's daily lives. The survey results are representative of villages located near forested areas across different levels of forest coverage and across zones of different natural disaster risks. This new data source fills an acknowledged information gap about rural populations living in remote and mountainous communities. These communities have often been omitted as distinct strata in the sampling frame of routinely conducted nationally representative household surveys.

v. Based on the household participation rate, collection of forest products is the most prevalent income source with roughly 45% of sampled households deriving income from forest products either by market sales or subsistence consumption. The next important sources of income are pensions (43%), wage income (26%), social assistance programs (19%). Livestock products (12%), agriculture (11%), and self-employment income (12%) are less prevalent sources of income.

vi. Georgia is vulnerable to natural disasters. The level of exposure varies across regions with higher concentration of natural disaster risks in the mountainous and forested regions. Exposure has been made worse by unsustainable forest management practices and by the increased frequency of extreme weather events caused by climate change. Both livestock and agricultural incomes in low hazard villages are almost twice those in villages experiencing a high frequency of natural disasters. This indicates that disaster risk is significantly correlated with income, in particular with agricultural and livestock income that is more vulnerable to natural disasters. There may also be other reasons behind the correlation. For example, areas with low hazard may also have better market access.

C. ECONOMIC DIVERSIFICATION IN VILLAGES

vii. Economic diversification indicators measure households' capabilities to expand opportunities to improve their livelihoods beyond the forest as well as their resilience to shocks if one income source fails. Rural households living near forested areas have limited income diversification with 59% and 31% of households engaged in only one and two income generating activities respectively. The highest concentration of single-income households (20%) derive their livelihoods solely from forest-related. Pension (17%) and wage employment (9%) are the second and third highest concentrations of single-source livelihoods. One in three households generated income from two sources, but very few, less than 2% of all households supplemented forest income with income from other sources. Most households who depend on the forest as their primary income source are not able to supplement low forest incomes either with pension or social assistance.

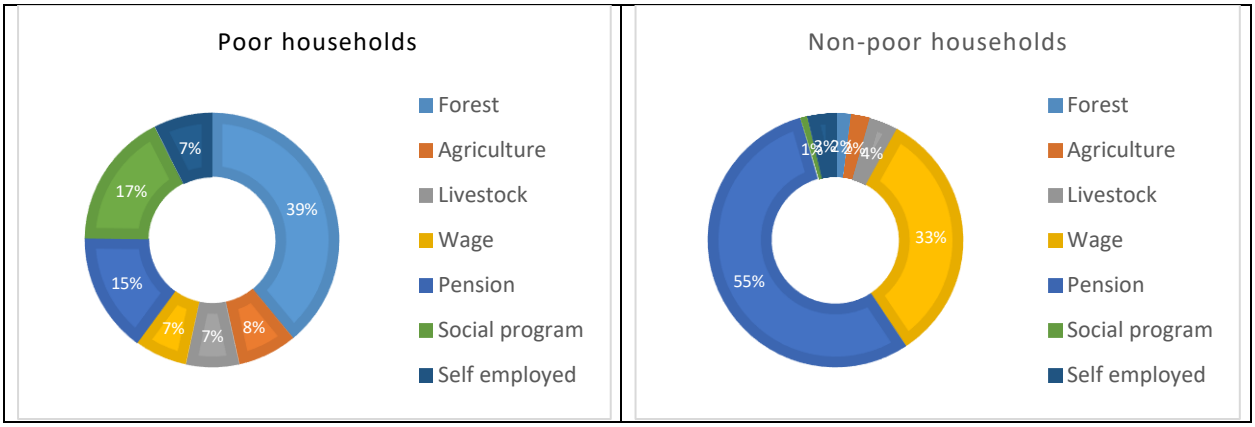
D. POVERTY, FOREST DEPENDECY AND THEIR LINKAGES

viii. Using the national poverty line, defined at GEL 130/per equivalent adult per month, the poverty rate among forest villages is about 46%, which is significantly higher than in other studies. Regional poverty incidence reveals a large spatial variation in poverty across forest villages. It is important to recognize that the majority of poor households living in forest communities are likely underrepresented in routinely-collected national household surveys that are designed to monitor poverty and inform the targeting of antipoverty social assistance programs. Policy-makers need to pay particular attention to *intra-region* inequality in rural areas while paying particular attention to pockets of high poverty in rural areas.

ix. Understanding how the poor and non-poor differ in socio-economic conditions and forest dependence provides important insights into the underlying factors associated with poverty. Poor households have distinct socio-demographic characteristics compared to non-poor ones. Poor households have larger household sizes, higher dependency ratios, and on average the household head is younger, has lower education attainment, and is more likely in unpaid or informal jobs compared with their non-poor counterparts. No significant differences exist in the gender status of the household head. The poor own fewer assets and less high value livestock (such as cattle) with more less productive livestock (e.g. sheep and poultry).

x. Poor households have a much higher dependence on forests with forest income accounting for about 39% of their total income. In contrast, better-off households depend more on high return income sources such as wage employment and pension with forest income representing only 2% of their total income. The poor are also more dependent on agriculture and livestock, which account for 15% of total income compared with the non-poor at 5%. The income sources for the non-poor are more stable with over 80% of households getting their income from wages and pensions combined, For the poor these stable sources accounted for about 20%. The poor have limited capacity to diversify their income generating activities. A larger proportion of poor households (76%) receive income from a single source with the three dominant sources being forest-related activities, social assistance, and pension. In contrast, about 45% of the non-poor receive income from a single, but high return income source including wage employment and pension.

Income share comparison



xi. The results show that a higher proportion of non-poor households were negatively affected by shocks such as droughts/floods, crop disease, and severe water shortages than poor households.[1] On the other hand, the poor are more exposed shocks related to food price than the non-poor. This may also indicate that poor simply have fewer assets that are adversely impacted by shocks. In general, the differences between the two groups were relatively small and households had been by shocks in similar way.

E. FOREST ACCESS, USE AND FUELWOOD

xii. Poor households depend on wood for household energy more than other households. At the same time, the poor are disadvantaged in fuelwood access. Despite their high forest dependency, the poor lived further away from the forest. About half of the poor collect fuelwood from public land, compared with 30% of the non-poor. The poor also bear a larger financial cost for fuelwood purchase. About 49% of poor households mostly purchase fuelwood from markets compared with 45% among the non-poor. This is reversed when assessing the access to the National Forest Agency (NFA) voucher program. Only 41% of the poor households had access to the program. For the non-poor the rate of access was higher at 44%.

[1] The survey counted only whether a household had experience a negative effect. The survey did not measure the depth and severity of the reported shock.

F. INCOME DETERMINATION ANALYSIS

xiii. While education attainment of the household head or spouse has no impact on income, the results show a significant gender bias in favor of male headed households across most income sources. All other factors being the same, the income level of a male-headed household is, on average, about 50% higher than in female-headed households. Male-headed households also have 30% higher pension and 85% higher self-employment incomes.

xiv. Empirically, it is challenging to establish an exact causal relationship between the level and source of income due to fact that income level and its determinants or source are often closely linked. This creates a model identification problem. However, some general findings can be made. First, the results show that internet access is the only statistically significant factor for forest income. Households with computer and internet access have 35% higher income, all other factors being the same. Further studies are needed to uncover the causality, if any, between computer and internet use and forest income. Village size also matters to household income. Households living in medium size villages are more able to generate forest income than their peers in smaller villages. The results for agricultural income show that ownership of cattle is correlated with both livestock and agricultural income. This confirms the complementarity between agriculture and livestock actives found in other studies.

xv. Turning to the total income, regression analysis shows that five variables have a significant correlation with household total income. These variables include computers/internet access, gas/electric stoves, car ownership, pasture land access, and cattle ownership.

G. DISTRIBUTIONAL IMPACT ANALYSIS

xvi. While it is difficult to fully quantify the impact of forest sector policies, reforms, and public investment proposals, a policy simulation exercise can illustrate the distributional impact of different program proposals. One policy simulation focuses on the distributional impact in the event that forest sector reforms in Georgia were able to enhance forest revenues by 20%, which could lead to an increase in forest income among households currently engaged in forest activities. The analysis shows that the impact would be progressive with poor households benefiting disproportionately. The poorest two quintiles[2] would benefit the most, with income increase by 65% and 33%, respectively, compared with 3% increase among the top two quintiles. This result is not surprising given that the survey showed that the poor concentered around low-return forest activities while the non-poor depend on wages and pension income.

H. CONCLUSIONS AND RECOMMENDATIONS

xvii. The findings from this survey and a large body of global evidence on the linkages between poverty reduction and forest resources converge on a similar conclusion. Relying on forest resource extraction *only* and *in isolation from other* changes is unlikely to be an adequate option to lift forest-dependent communities out of poverty. However, forest income can make significant additional contribution if the conditions are right.

[2] Any of five equal groups into which a population is divided according to the income distribution.

Conclusions from the survey

xviii. The survey was able to capture a vast diversity of data on rural households' incomes and their use of forest assets. This survey was the first of its kind in Georgia and was conducted during a period when the country was implementing an ambitious reform agenda in its forest sector. As it was the first of its kind, this survey does not provide time series information on how things have changed over time and provides only a snapshot of a situation in rural Georgia in 2016.

Policy question 1. Are forest resources important to household income generation and could they provide a path out of poverty for forest-dependent households?

xix. Forests and forest products were found to play an important role for household income when analyzed through *imputed* income. Almost half of the surveyed households participated in collecting or selling forest produce. The most common use was collecting fuelwood and non-timber forest products for consumption. Commercial, monetized activities were much less common and few households were involved in the trade of forest produce. However, this is a topic where the survey has not been able to capture the full extent of the issue: a relatively large proportion of households mentioned that they had procured fuelwood from others. This would indicate that supplies of wood products are traded. For some reason this did not appear clearly in the survey.

xx. The contribution of forest services to total income was clearly much higher for poor households than for non-poor ones. For the former, forest-generated income contributed roughly a third while for non-poor the share of forest income was only 2%. The main sources of total income among non-poor were wage income and pensions, while poorer people did not have access to as many income sources and their main income was forest produce and government transfer payments. In summary, forest income appears to be much more important for the poorest households than for the better-off. Does that mean that forests and forest income are poverty traps and that people are not able to escape dependency from forests? A superficial interpretation would be that forest incomes have become a safety net for households that have little other income. The public social programs have been able to soften the blow, but still they provide only less than 20% of poor households' income.

Policy question 2. Does forest income reduce income inequality; i.e. is forest use 'pro poor'?

xxi. The dynamic impacts of consumption shocks and changes in income equality would require long time series and panel data. There is a notable difference between poor and non-poor households on the importance of forest income. Therefore, it is difficult to estimate if increasing non-forest incomes – e.g. through social transfers – would lead to actual increase in real income level or only income substitution (buying rather than collecting forest products).

xxii. The policy simulation gives some indication as to how forest policies and development interventions could influence income distribution. In general, promoting improved forest management and sustainable forest use would have a pro-poor distributional impact. The survey gives a one-off snapshot and therefore dynamic policy simulations should be treated with caution. With this limitation in mind, it can be assumed that increasing forest-based incomes would be particularly pro-poor. For the poorest households, a 20% increase in forest income would increase total income by 65%

Policy question 3. What is the level of commercialization? Is the forest sector a source of informality?

xxiii. From the survey material, it is clear that formal commercial forest activities play only a marginal role in rural Georgia. This is also reflected in the low contribution that forests provide to formal GDP as well as their meager contribution to employment. Only a small number of household members had received any wage income from forest-related activities and well below 10% of households reported any sales revenue from forest products and even then the net revenue was often relatively low.

A vision for a transformational change: the way forward

xxiv. The current productive use of forests is low or is not properly captured by statistics. This may imply that production volumes and the related employment are actually low or that much of the use is illegal or informal. Georgia does not have an updated forest inventory, which would give more reliable information on the resource base. However, forests cover 40% of land area. Even though Georgia's forests effectively all are located in poorly accessible, mountainous areas, there may be the potential for sustainable production forestry. Since forests cover such a large part of the country, it is plausible that by having better information and with enabling investments, forestry production could be expanded in a sustainable way. If production forestry were to have potential into which Georgia could tap, it would require both a conducive regulatory environment and investments in many areas like forest information (incl. inventory), vocational training, and improving accessibility (incl. forest roads).

xxv. Currently forests provide essential elements for the livelihoods of rural poor. However, they have not become – nor are they likely to become – elements for economic diversification that strengthen rural economies. One could argue that the current pattern of use is a "low level equilibrium," where low value, subsistence use does not provide adequate incentives for investments in more profitable value chains, economic activities, and job creation. The P.R.I.M.E framework developed by the World Bank, provides a generic framework for identifying interventions that would help in creating the right conditions for forest-based economic development. Despite the abundance of forests in Georgia, it is highly unlikely that these alone would be adequate to eliminate rural poverty, but they could be part of wider economic diversification. Below are the key elements of the Productivity, Rights, Investments, Markets, Ecosystem (P.R.I.M.E) framework that can contribute to sustainable forest use and improved incomes for the forest-dependent poor in Georgia.

- **Productivity** is the basis for economically sustainable forest use. Many factors contribute to productivity. Some factors are dependent on choices by market actors including smallholders and private entrepreneurs while others are dependent state action. Businesses themselves must invest in production technology, but the level of this investment is dependent on political and economic stability, secure rights, and access to finance. Public interventions can help improved productivity through training and education.
- The National Forest Concept promotes decentralization of forest management and local communities' **rights** to use and access the forests. Forest tenure is globally recognized as a key element in sustainable forestry, but it is a complex issue with no clear one-size-fits-all rules of best practice.
- **Investments** in economic activities and reforming the whole forest sector require resources from both the public and private sectors. Georgian forest management systems are going through a transformational change that will require increased knowledge on the resources themselves (e.g. an updated national forest inventory) and the capacity to manage information as well as the human and technical capacity to manage the forests in a new way. Building these capacities require public investment. Improving access to mountainous regions will require investments in the forest road

networks to bring down the high wood costs for the industry. Tourism and various forest management activities (incl. forest fire management) would also benefit from an improved road network.

- There is a need for functioning **markets** if forests are to become a source for vibrant economic activity beyond sole subsistence use. Functioning markets are also a precondition for attracting private capital in the sector. The current wood product markets are relatively underdeveloped and focus on the low quality, low price product segment. Further, low demand for wood in construction, undeveloped international trade, and uncompetitive industry also hamper market development.
- **Ecosystem** services and their maintenance require appropriate regulation. The National Forest Concept emphasizes sustainability and environmental services. These can also be linked to market driven instruments. For example, certification of sustainable forest management would help both market development and environmental sustainability. In the long term, various payments for environmental services (e.g. carbon payments or compensation for watershed protection) could serve to monetize good environmental management.

xxvi. This survey on forests and poverty in Georgia was the first of its kind and therefore has some limitations. The survey does not provide time series or panel data and is not able to detect *change* over time. At the same time, it provides an interesting snapshot on the situation and a baseline for follow-up surveys. Therefore, it is important that the survey be repeated over time to get a deeper understanding on the forest use and how it changes over time. The systematic collection and the availability of data is a precondition for well-designed policies. This applies to both biophysical data on the resource itself (e.g. forest inventory data) and socioeconomic data (e.g. household surveys and market information on production and prices). Systematic data collection will enable policy makers to make informed choices and allow for proper impacts assessment. Forests and forest-dependent livelihoods will also be affected by climate change. Recognizing the potential for climate-related changes early on from quality data also helps to identify the appropriate measures for mitigation and adaptation.

1. FORESTS AND THE GEORGIAN DEVELOPMENT CHALLENGE [3]

1. **Georgia is a lower-middle-income country with a population of 3.7 million people[4]. Like several countries in the region, Georgia has seen a decline in population of about 25% since the country regained independence in 1991**. This demographic decline is set to continue until 2050 when the country is projected to have a population of only 3.2 million people. Georgia's demographic challenge has significant implications for its poverty reduction and economic development. In recent years, most of the decline in population has taken place in rural areas where about 50% of the population live. Between 2002 and 2014 – when Georgia lost 16% of its population – urban and rural areas shrank by 6% and 24% respectively.

2. **Over the past decade, Georgia has made strides in economic development. The economy has been growing robustly at an average annual rate of 5 percent** despite the repercussions from the global financial crisis a decade ago and other external shocks. While poverty in Georgia is particularly severe in rural areas, Georgia had seen sustained poverty reduction in both rural and urban areas. From 2010–2015, the rural poverty rate declined from about 41% to 25%, and while the urban poverty rate (exempting Tbilisi) dropped from 36% % to about 20%.[5] **Sustained poverty reduction over the past decade shows that the poor have benefited considerably from both new economic opportunities as well as from the government's social policies. However, the government's expanded social programs targeting poverty reduction have also become an added fiscal burden to the national budget**. While inequality remains high compared with other countries in the region, it has been declining in recent years with improved welfare among the bottom 40%. However, while Georgia is a strong reformer, many challenges remain. Growth has declined in the past two years to just 2.7% in 2016. Jobs are still lacking and unemployment is high at close to 30%. According to the 2015 World Bank Country Environment Assessment (CEA), **Georgia's development progress did not fully result in improved environmental governance or better management of natural resources. Forest degradation, air pollution and other, often 'hidden,' environmental costs remain a drain in the national economy having cost approximately 7.4% of GDP in 2012.[6]**

[3] The discussion on general development trends in Georgia is – unless otherwise stated – based on World Bank. 2018.

[4] 4 million including Abkhazia and South Ossetia

[5] As defined by the national poverty line at $2.5/day 2005 PPP. World Bank. 2016.

[6] World Bank. 2015

3. **While overall development has been positive, notable challenges in equality persists and rural people and rural communities have not been able to catch up. Poverty rates in rural areas are higher and inequality of opportunity between urban and rural areas remain. Forest resources are considered an important resource for the rural economy. They also provide environmental services at local, regional, and global levels.** The forest sector's contribution to the formal GDP is small at about 0.4%. However, the true value is likely higher due to large non-market production (fuelwood), unreported forest extraction, and non-monetized environmental services. Forest cover in Georgia is estimated at 2.82 million ha accounting for about 40% of the land area of 6.95 million ha. **The key question for bridging the geographic disparity in development outcomes and opportunity is as follows: what is the role and potential of forests to contribute to poverty reduction and to enhance social and human wellbeing in a sustainable manner**?

4. **Making forests an effective tool in economic and social development in rural areas requires a thorough understanding as well as data on both the people, communities, and forests themselves. In 2016, the World Bank[7] conducted a large-scale household survey in Georgia to better understand the role of forests for rural households. This survey was the first one in the country that collected data on forest use, forest-related incomes, and the role of forests in people's daily lives.** The survey results are representative of villages located near forested areas with different levels of forest coverage and across zones of different natural disaster risks. This new data source fills a recognized information gap about rural population living in remote and mountainous communities. These communities are easily omitted as distinct strata in the sampling frame of routinely conducted, nationally representative household surveys such as the Georgian Integrated Household Survey (IHS).[8]

5. **The survey collected the first data on the socio-economic and demographic conditions of the target population, their income sources, forest access and use, and coverage of social assistance programs including pensions, targeted social assistance, and the fuelwood subsidy programs**. The survey presents a comprehensive understanding of the socio-economic conditions, forest dependency, and livelihood strategies of these households as well as insights into how forest-smart public investment and programs could potentially put poor households onto a path towards prosperity.

[7] With financing from the World Bank Program on Forests – PROFOR (Program on Forests, https://www.profor.info/)

[8] This is the first time the survey was conducted in Georgia and therefore it still does not provide longitudinal data. Understanding poverty-forest dynamics fully would require long-term time series data including repeated surveys. See discussion on page 48.

6. **The forests in Georgia are highly diverse with more than 400 tree species. The forests are generally located in steep and inaccessible terrain. Despite Georgia's relatively high forest cover** (for example, it has four times that of Armenia or Azerbaijan), **it is a net importer of primary and secondary forest products. The forests are predominately state-owned and most of them are not currently under efficient, systematic management. The current forest cover estimate of 40% is not an exact assessment of forest resources because no national forest inventory (NFI) has been conducted since the early 1990s.**[9] On one hand, the forest area may have increased due to natural regeneration in abandoned farms in mountainous areas. On the other hand, illegal logging and other illegal activities may have led to considerable forest degradation. Despite of lack of national official statistics, land degradation is believed to be a serious problem.[10] Degradation causes a decline in the protective functions of forests and their self-restoration ability leading to irreversible deterioration of the forest ecosystems. The suspected major drivers of forest degradation are unsustainable harvesting of timber and other forest resources for both commercial and subsistence uses and high dependency on wood fuel as household energy source. About 80% rural households use firewood for heating and cooking throughout the year.

7. **This study examines the relationship between forests, livelihoods, and poverty** using the data from the household survey. It **proposes forest-based pathways to prosperity for forest-dependent rural population while also assessing the distributional impact of forest-smart public investment and policy reforms.** In summary, the analysis seeks to address three key analytical questions:

i. Are forests important to household income generation and could they provide a path out of poverty?
ii. Do forest incomes reduce income inequality and is forest use generally 'pro-poor'? and
iii. What is the level of commercialization in forest use or is forest use characterized by informality.

The poorest people in Georgia are highly dependent on forests when subsistence use is taken into account. Households at higher income levels have more diverse sources of income and are much less dependent on forests. Using the survey findings, the paper will demonstrate that forests indeed are important to rural people and their wellbeing in Georgia. It is widely known from various studies conducted during the European Neighbourhood Policy Instrument – Forest Law Enforcement and Governance (ENPI-FLEG) Programs[11] that wood plays an important role in rural energy supply and that formal employment and production in the forest sector is small. The survey was able to provide additional evidence on the level of dependency and how it differs between income groups.

[9] A new NFI is planned for 2018–19.

[10] World Bank. 2015

[11] The European Neighborhood and Partnership Instrument East Forest Law Enforcement and Governance Programs (ENPI-FLEG phases I and II, 2008–2017) were financed by the European Commission and the Government of Austria. The Program aimed to improve forest law enforcement and governance in seven countries: Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, and Ukraine. For additional information, see http://www.enpi-fleg.org/activities/georgia/

8. **The survey also looked at the commercial services and monetary income forests provide. This contribution was found to be small. Relatively few people were formally employed in the forest sector or got monetary income from the sale of forest produce[12].** Most households benefited from forests only through subsistence use. While large forest areas may be inaccessible, the low level of commercial use may demonstrate that wood and forest products markets in Georgia are underdeveloped and there is the potential to use forests more efficiently and sustainably for economic activities. This would require the right combination of public investments and policy reforms.

9. **The Georgian government has recently made significant progress in developing a series of forest sector policy initiatives to develop an integrated approach addressing the major concerns in rural development, land use, and the sustainable management of forests. The survey results provide additional information that allows for better estimates on the distributional impact of the policy changes.** A new national forest policy, the National Forest Concept, was developed in 2013[13]. It was followed by a draft of the new Forest Code. These new policy documents aim to improve sustainable management system that support social and environmental benefits from Georgia's forests.

10. **The new policies emphasize the mobilization of local communities in forest management to enhance forest protection** (addressing illegal logging, forest fires, and pest management) **and to improved coordination across sectors** including energy (reducing wood fuel dependence and improving household access to modern energy sources), tourism, agriculture/livestock production and market access, and private sector involvement. The most fundamental changes are the increased focus on developing sustainable forest management systems and decentralization of forest management.[14]

11. **The findings from the survey and other studies indicate that the current use of forests in Georgia is widespread, but low level. The situation resembles a "low level equilibrium" where low actual incomes from forests prevent or discourage investment that would be needed to improve forest services.** This leads to the fundamental question of how to promote forest-smart public investments and interventions to catalyze transformational changes. Changes in forest policy should have a positive impact on income distribution. They should also lead to sustainable, productive use of forest resources and services. Global experience shows that forest-smart public investments should be multi-sectoral and integrated with wider institutional developments. Experience also points to three key areas that are particularly important: (i) developing the institutional capacity and human capital required for modernizing forest management systems and practices; (ii) integrating forest development with other sectors including agriculture, energy, infrastructure, water, and disaster risk management to reinforce synergies; and (iii) unleashing the power of technology including new methods of forest resource measurement (GIS, earth observation etc.), expanding households access sustainable energy sources to reduce fuelwood dependence, and improving connectivity using technologies like the Internet and mobile devices.

[12] This may also be caused by non-reporting of informal sale of forest products. A large number of households reported that they had *purchased* forest produce, particularly fuelwood, from others. However, the survey data did not show comparable *supply* or *sale* of produce.

[13] Ministry of Environment and Natural Resources Protection of Georgia & CENN. 2014

[14] ENPI-FLEG. 2017.

12. **The survey improves our understanding of how the rural population is dependent on forests both for income and subsistence as well as of how forest areas are accessed for pasture and fodder.** Designing and targeting forest-smart policies and public investment requires a good understanding on the linkages between forests, livelihoods, and poverty and on how better management of forest resources and services could be a route to achieve poverty alleviation and economic development in rural areas. In addition, many rural areas in Georgia are prone to natural hazards (floods, flash floods, landslides, mudflows, and avalanches) and these disaster risks are further aggravated by unsustainable natural resource management and improper agricultural practices. Although hard to quantify, the economic cost of the natural disasters is significant with estimates ranging from USD$90 million by the World Bank (2009) to USD$4 billion by Pusch (2004). Agriculture and livestock activities were particularly vulnerable to disaster risks.[15]

13. The survey provides information on the current use of forests. Current forest use resembles a "low level equilibrium" and unleashing the potential of the forest sector would require transformational changes. The survey findings help identify a roadmap on how Georgia's forests could make a strong contribution to economic and social development. This contribution can be achieved by using the Productivity, Rights, Investments, Markets, Ecosystem (P.R.I.M.E.) - Pathways Toward Prosperity framework developed by the World Bank in 2017.[16] This framework was based on a review of global experience, evidence from recent projects, and investments by the World Bank and other development partners in recent decades. The framework disaggregates development potential and options into five interlinked areas: (i) improvements in productivity (P) of land and labor; (ii) strengthened community, household, and women's rights (R) over forests, trees and land; (iii) complementary investments (I) in institutions and public services that are integral to any effort toward economic development; (iv) increased access to markets (M), whether they be for timber or non-timber forest products (NTFPs); and (v) strengthened mechanisms for valuing the ecosystem (E) services provided by forests and ensuring benefits accrue to the poor. **The central message in the framework is that poverty reduction in forested landscapes will depend on how well public or private investments enable households use better the resources that they have and upon which they depend (i.e. labor, land, and forests).**

14. The main audiences for this paper are decision makers in the Georgian forest sector and advocates of social development and sustainable natural resource use in rural Georgia. The findings will support Georgian authorities – mainly the Ministry of Environmental Protection and Agriculture[17], and National Forestry Agency (NFA) in particular – in ongoing sector reforms. Some particular focal areas that need to be considered in the reforms are: (i) how to promote rural economic diversification and strengthen forest-based economic activities; (ii) how to align sustainable forest management with social benefits derived from forests; and (iii) how to reduce the vulnerability of rural communities.

[15] World Bank. 2013.

[16] See http://www.profor.info/content/prime-pathways-toward-prosperity

[17] In early 2018, it was announced that the environmental administration in Georgia is being restructured and forest issues would be reassigned to the restructured Ministry of Environmental Protection and Agriculture. The details of the reorganization were not known at the time of writing (March 2018) and therefore the text still refers to the previous Ministry of Environment and Natural Resources Protection (MENRP) and its subordinate bodies.

15. The study is structured as follows. After an introduction in Chapter 1, the report summarizes background information on the forest sector and forest policy development in the country (Chapter 2). The household survey is described briefly in Chapter 3 with more details on the methodology provided in Annex 1. Chapter 4 presents findings on poverty profiles while Chapter 5 outlines forest resource access, particularly for fuelwood. The role of forests in poverty reduction and income distribution is detailed in Chapter 6. Finally, Chapter 7 concludes the paper to answer some key policy questions and provides recommendations. Chapter 7.1 looks at the current forest use structure while Chapter 7.2 provides a vision for a changed Georgian forest sector.

2. FORESTS IN GEORGIA[18]

16. **Georgia's forests are a vitally important environmental and economic resource. They cover 2.8 million ha or 40% of the land area**. **The state owns nearly all forests. The National Forestry Agency (NFA) manages about 1.9 million ha. However, there has not been a recent national forest inventory and therefore the data may be inaccurate.** Forests provide valuable environmental services such as biodiversity, soil erosion prevention, water recharge, natural disasters mitigation, and climate change mitigation and adaptation. The Georgian forests are mostly in mountainous areas and have regionally and globally important biodiversity values. About 98% of forests are natural, mostly located on steep slopes of the mountains of the Greater and Lesser Caucasus. Beech, oak, hornbeam, chestnut, ash, maple, birch, spruce, fir, yew, and pine are typical forest tree species. Of these, broadleaves represent about 80% of the total forest cover. The scale of planted forests is small – about 60,000 ha in total – accounting for about 2.3% of the total forest area and consists mainly of pine[19]. Virtually all intact forests with high conservation value have been preserved in Georgia[20]. The Agency of Protected Areas oversees over 450,000 ha of forests mainly located within strict nature reserves, national parks, and managed reserves. The Forestry Agency of the Autonomous Republic of Ajara (located in the south-west of Georgia) manages nearly 140,000 ha. Private logging companies currently manage about 170,000 ha of state-owned forests through long-term (up to 20 years) wood harvesting licenses. The Georgian Orthodox Church and municipalities own and manage the remaining forests.

17. **After regaining independence in 1991, Georgia went through a number of attempts to revise its forest policy.** In 1995, the Parliament of Georgia adopted the Law of the Republic of Georgia on Changes and Amendments to the Forest Code of the Georgian SSR and thus approved the first Forest Code for an independent Georgia. The code stated that forests in the country are state property and managed by the Forestry Department. However, until 1999, the old style of management was still in force with one administrative body performing all management and economic functions with financing from the state budget.

[18] Unless otherwise stated, the general data on the forest sector in Georgia is largely based on Ministry of Environment and Natural Resources Protection & CENN. 2014 and Garforth et al. 2016.

[19] FAO. 2016

[20] Butkhuzi. 2009

18. In 1999, a new law governing the forest sector – the new Forest Code of Georgia – was adopted. This new Code regulated legal issues related to the maintenance of the forest resources, forest protection, restoration, and use. The principles of forest protection and sustainable use are based on the Georgian Constitution, the "Rio Forest Principles" (1992),[21] and Article 5 of the Law of Georgia on Environmental Protection (1996). The latter embraces several significant principles including the conservation of biodiversity, the mitigation of threats, and sustainability. According to the 1999 Code, one of the purposes of the protection of Georgia's forests is to retain the uniqueness of untouched forests and to protect endemic and valuable species. Privatization and decentralization of forests in the State Forest Fund was allowed subject to the adoption of special legislation. However, no practical steps were taken in either direction and forests remain mainly state owned and managed. Logging remains the main form of forest use.

19. Constitutional amendments in 2004 led to structural changes in the executive branch. The Ministry of Environment Protection and Natural Resources was transformed into the Ministry of Environment and Natural Resources Protection (MENRP). The old State Department of Forestry was subordinated to MENRP. The State Department of Nature Reserves, Protected Areas and Game Farms was transformed into the Department (later Agency) of Protected Areas and was also subordinated to MENRP. During the restructuring, the Central Administration of Ecological Police under the Ministry of Interior was abolished. The new Environmental Inspection – one of the divisions of MENRP – was tasked with monitoring the environmental status of the forests. An Investigatory Department was established within MENRP and the department was entrusted with preliminary investigation of environmental crimes while the Department of Licenses and Environmental Permits was tasked with forest use licenses. As a result, all state functions regarding management of biodiversity and forests were concentrated in MENRP.[22]

20. **Georgia has been developing a new institutional framework for the forest sector in the past few years. A key document is the National Forest Concept[23] approved by the Parliament in 2013 after a multi-year participatory process.** The concept embraces issues, objectives, and indicators regarding forests and other related sectors and seeks to act as an overall sustainable environmental strategy for Georgia. The concept describes the problems of the forest and related sectors as well as proposes ways solutions to these problems. The **overall objective is to introduce sustainable forest management across all forests** in the country. Forest management should also be localized. As for institutional reform, policy development, management, and supervision functions are to be separated. The concept defines the overall approach to the sector including all different values and services derived from forests. While most forests remain state owned, the policy applies to all forests in the country irrespective of ownership. Some of the challenges identified in the concept include a weak legal framework, a lack of proper consideration of forest values and functions in the decision-making process, rural poverty, insufficient awareness, and inadequate financing. A new forest code has been prepared to implement the principles identified in the Forest Concept. The draft Code has been consulted upon widely with stakeholders. It is expected that the Parliament will finalize the Code in 2018.

[21] The Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation, and Sustainable Development of All Types of Forests adopted during the Earth Summit in Rio de Janeiro, Brazil in 1992

[22] For the most recent changes on forest administration, see fn. 17 on page 5.

[23] Decree of the Georgian Parliament, N1742-IS, 11.12.2013; Ministry of Environment and Natural Resources Protection of Georgia & CENN (2014)

21. The overall goal of the Forest Concept is stated as follows:

"For the purpose of solving existing problems in the forestry sector, facilitating poverty alleviation and well-being of the population and promoting sustainable development of the country the goal of the Concept shall be establishing a system of sustainable forest management which will ensure: improvement of quantitative and qualitative characteristics of the Georgian forests, protection of biological diversity, effective use of the economic potential of forests taking into account their ecological values, public participation in forest management related issues and fair distribution of derived benefits.

To achieve this goal the Georgian forests shall be used in a way, and at a rate, that ensures maintenance of ecological wealth and use of their socio-economic potential."

22. The Concept introduces the following general principles to achieve its goals:

- *Sustainable management of forests*: all forests shall be sustainably managed to maintain the protective functions of forests and their ecological balance;
- *Participation and decentralization*: all forests are local;
- *Institutional reform*: separation of forest policy, management, and supervision functions;
- *Cross-sectoral linkages*: forests are an integral part of the sustainable development of the country.

3. SURVEY ON SOCIO-ECONOMIC CONDITIONS AND FOREST USE IN RURAL GEORGIA

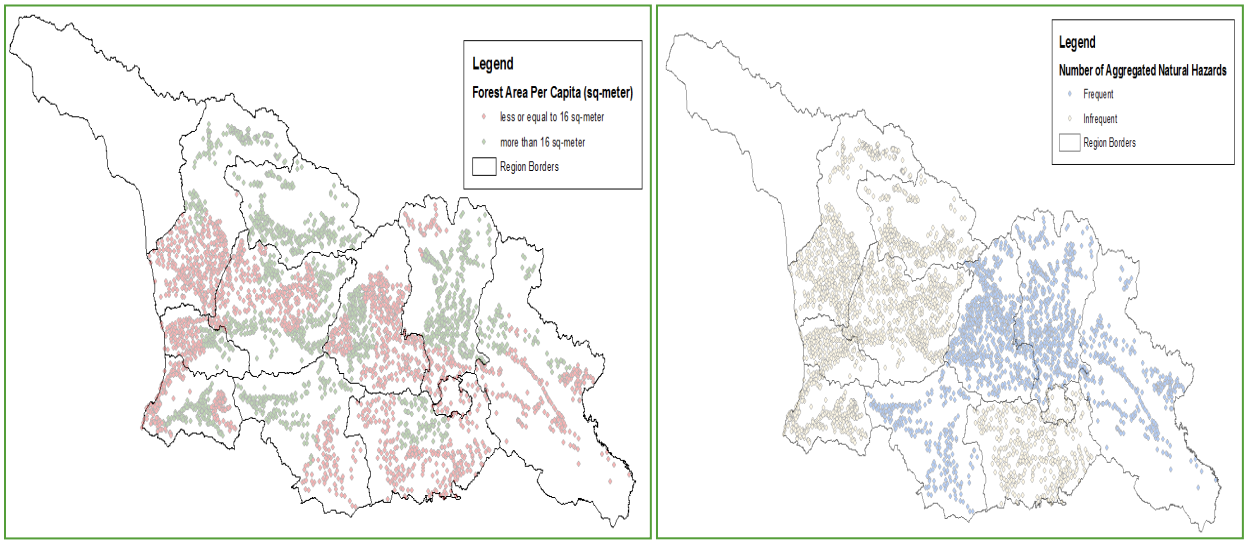
23. **The 2016 forest user survey is the first large scale collection of household level data (950 households in total) compiling across regions with different forest cover and different exposures to natural hazards.** The importance of Georgia's forest resources as economic and environmental assets has been widely documented in various reports.[24] However, knowledge of the socio-economic conditions, forest dependency, and the extent of poverty of households living in and near forest areas has been inadequate due to the lack of a customized household survey. These households, often located in remote and mountainous areas, are not studied in detail in the routinely conducted, nationally representative household surveys such as the Integrated Household Survey (HIS), which are the principal data sources for monitoring poverty at the national level. Some case studies that exist are informative only of limited local situations[25].

3.1 Survey design and implementation

24. The survey was conducted from October to November 2016. The selection of villages in the sample was based on two indicators: i) forest cover and ii) frequency of natural hazards. The objective was to capture the large spatial variation in forest concentration and frequency of natural disasters as shown in Figure 3.1. The households in the survey were chosen using a two-stage stratification method leading to a framework of four strata:

- Stratum 1: High Forest cover[26] and High natural Hazard frequency (HF-HH)
- Stratum 2: High Forest cover and Low natural Hazard frequency (HF-LH)
- Stratum 3: Low Forest cover and High natural Hazard frequency (LF-HH)
- Stratum 4: Low Forest cover and Low natural Hazard frequency (LF-LH)

Figure 3.1 Forest Concentration and Frequency of Natural Disasters



[24] E.g. World Bank. 2015. and the Ministry of Environment and Natural Resources Protection & CENN. 2014

[25] E.g. ENPI-FLEG. 2014.

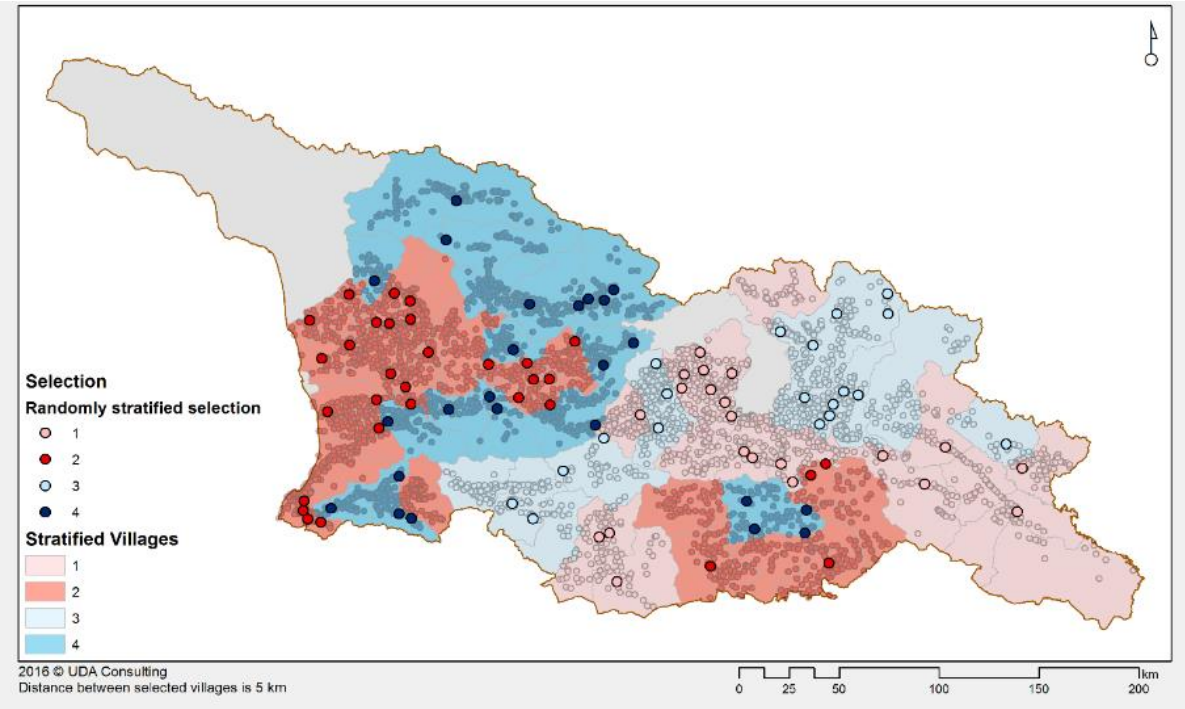
[26] Threshold for high forest cover was 1.6 ha/person. See Annex 1.

25. The survey focused on collecting household data and it provides information on socio-demographic information, income generating activities (in particular forest-related income),access to forest resources, and access to social assistance programs was as social insurance programs, income from social assistance, and firewood voucher programs by the National Forest Agency. Table 3.1 below presents a summary of sampling design and sample size. The spatial distribution of households is presented in Figure 3.2. The detailed methodology and detailed survey data have been published in a separate report[27]. For more information on the survey design and questionnaire, see Annex 1.

Table 3.1 Population and Sample Size by Stratum

Population and Sample Values	Stratum 1 HF-HH	Stratum 2 HF-LH	Stratum 3 LF-HH	Stratum 4 LF-LH	Total
Total number of villages in the country (N)	827	1207	748	948	3730
Selected number of sample villages (n)	21	31	19	24	95
Selected number of sample households (h)	210	310	190	240	950
Number of people in sampled households (m)	671	1013	598	716	2998

Figure 3.2 Location of Sample Villages



[27] UDA Consulting, 2017

3.2 Socio-demographic indicators, employment conditions, and income sources

26. **The data show that the demographic challenges Georgia currently faces in rural communities are visible. The population is aging and not involved in wage labor. While the different strata are similar in many aspects, there are also differences.** The dependency ratio in the surveyed villages (61%–75%) is much higher than the national average of 46% suggesting a relative labor shortage.[28] On average, women are more educated than men except for in LF-HH villages. Among the working age population, only 41% were engaged in paid employment, about one third were unemployed, and one third worked in unpaid jobs over the past 12 months. The LF-LH villages seem to have more job opportunities with about 46% of working age population in paid jobs. The population in LF-HH villages has worse job prospects with unemployed and unpaid work combined accounting for almost 70% of the working age population.

27. **The private sector is also more developed in LF-LH areas as reflected by the large share of private sector job opportunities. This suggests that location and related disaster risks have a significant impact on socio-economic outcomes.** LF-LH villages are likely to be closer to markets, have better access to infrastructure, are less disrupted by disaster risks, and, consequently, have more economic activities and job opportunities. Table 3.2 below presents a summary of socio-demographic and employment conditions of the forest village population by stratum.

Table 3.2 Key Socio-Demographic Data by Stratum

	Stratum				
	LF-HH	LF-LH	HF-HH	HF-LH	Total
			– % –		
a) Age					
0–15	17	17	19	14	17
16–64	63	65	60	64	63
over 65	20	17	21	22	20
Dependency ratio	61	63	75	60	66
b) Education (high school or above)					
Men	90.1	88.1	81.5	87.6	87.0
Women	84.6	92.1	86.4	90.0	88.8
c) Employment status					
Paid job	31.2	46.0	43.1	38.7	41.0
Unpaid job	29.5	29.2	24.4	30.9	28.7
Unemployed	39.3	24.8	32.5	30.4	30.3
Private sector	50.7	66.1	41.2	49.1	54.2
Public sector	49.3	33.9	58.8	50.9	45.8

Note: Education attainment is estimated among those aged 15 and over
Employment status is estimated among those in the labor force

[28] Dependency ratio: ratio of people below 16 yr. or over 65 yrs./people 16–65 yr.

28. **Half of the population gets its income – monetary or subsistence – from the forest making it the most common income source. The population in rural villages is also older than the population on average and pensions are the second most important revenue source.** Table 3.3 below summarizes both the income sources from a variety of economic activities[29] and household participation rates for these activities. The ranking of the importance of different income sources is assessed using both participation rates (i.e. the proportion of households receiving income from each source) and income. Based on the household participation rate, the collection of forest products is the most important income source. After that and pensions, the next most important sources of income are wage income (26%), income from social assistance programs (19%), livestock products (12%), agriculture (11%), and self-employment income (12%). Ranking income sources based on the value of median income, wage employment is the most important source (GEL 6000 per household over the past 12 months), followed by pensions (GEL 2232), self-employment (GEL 1500), livestock (GEL 1000), agriculture (GEL 750), forest income (GEL 750), and social assistance income (GEL 150).

29. When forest incomes are analyzed by strata, it is surprising to observe that while the average forest income is identical across all strata, regardless of forest coverage, the participation rate of forest-related income activities is lower in high forest coverage villages (around 20%), than villages with low coverage areas (30% and 41%). See Table 3.4 below.

Table 3.3 Household Income by Source and Participation (past 12 months)

Income source	Mean	Median (p50)	Share of total income	Households (earn income)	Households (collect)	Participation rate
	– lari (GEL) –		– % –	– no.–		– % –
Forest income	875	750	23	277	452	47
timber	655	655	n/a	2	25	
fuelwood	35	35	n/a	1	340	
NTFP	1459	400	n/a	58	452	
medical plants	183	100	n/a	15	104	
Agriculture	1540	750	5	106		11
Livestock	1636	1000	5	114		12
Wages	6787	6000	20	247		26
Pension	2850	2232	33	405		43
Social programs	243	150	7	178		19
Self -employment	2256	1500	7	117		12
Total HH income	3926	2250				
Per capita income	1759	1000				

Note: Given that many households collect multiple forest products, the number of households that collect forest products is defined by the product (timber, fuelwood, NWFP and medical plans) that produces the largest income .

[29] Both mean and median are presented because when the mean is highly skewed by several large values (which is the case in the survey), the median is a more appropriate measure of the average income of households. Data is based on the past 12 months. The income for each activity is estimated using only participant households. Therefore it measures the importance for households that are active in the specific activity, not the rural population in general.

30. **Georgia is vulnerable to natural disasters. The level of exposure varies across regions with a higher concentration of natural disaster risks in the mountainous and forest regions of the country. This risk has been exasperated partially by deforestation and partially by the increased frequency of extreme weather events caused by climate change. It is, therefore, important to assess the impact of forest coverage and the risks of natural disasters on income sources among forest households.** Table 3.4 presents a summary of income sources and participations rate by stratum. An interesting observation emerges from the data. Both livestock and agricultural incomes in low hazard villages, regardless of forest cover, are almost twice that in villages classified as high frequency of natural disasters. This suggests that the disaster risk is indeed significantly correlated with income. This correlation is particularly relevant for agricultural and livestock incomes that are more vulnerable to natural disasters. There may also be other reasons behind the correlation. For example, areas with low hazard frequency may also have better market access.

Table 3.4 Median Income and Participation Rate by Source by Stratum

Stratum	LF-HH		LF-LH		HF-HH		HF-LH	
Income source	Median	Rate	Median	Rate	Median	Pate	Median	Pate
	– GEL –	– % –	– GEL –	– % –	– GEL –	– % –	– GEL –	– % –
Forest income	750	30	750	41	750	19	750	20
Agriculture	450	10	1000	11	500	11	1150	13
Livestock	700	7	1500	9	600	20	1200	14
Wage employment	5300	20	6000	27	4800	27	6000	29
Pension	2020	41	2160	32	2115	48	2592	53
Social programs	140	20	205	12	120	21	114	24
Self-employment	1500	13	1500	14	1500	12	1500	10
Total household income	2035	100	1800	100	2240	100	3000	100
Per capita	740	-	750	-	1137	-	1747	-

Note: Participation rate is estimated using households with positive income.

3.3 Economic diversification

31. **Rural households living near forested areas have limited income diversification with 59% and 31% of households engaged in only one and two activities, respectively, for income generation (see Figure 3.3.). Economic diversification captures an important aspect of household welfare. It measures households' capabilities to expand opportunities to improve their livelihoods beyond forest income as well as their resilience to shocks if one income source fails.** This information is valuable for guiding policies to target poor households in helping them move out of poverty by enhancing productivity and income diversification. Economic diversification is measured by the portfolio of economic activities captured by the number and combination of activities as summarized in Table 3.5. The highest concentration is forest-related activities, with about 20% of households deriving income only from this source. This is followed by pension (17%) and wage employment (9%). One in three households generated income from two sources. The two most frequent income combinations are wage and pension (7%), and pension and social assistance (7%). Less than 2% of households supplement forest income with income from other sources.

32. **Most households who depend on forests as their primary income sources are not able to supplement low forest income either with pension or social assistance. The high share of households that get income only from forests indicates that forest incomes substitute, rather than complement, incomes from the formal sector.** This indicates that social transfer programs could be effective instruments to address rural poverty among forest-dependent population. The survey data indicates that currently households that do not have access to social programs depend on forests for their income.

Figure 3.3 Income Diversification: Distribution of Number of Income Sources

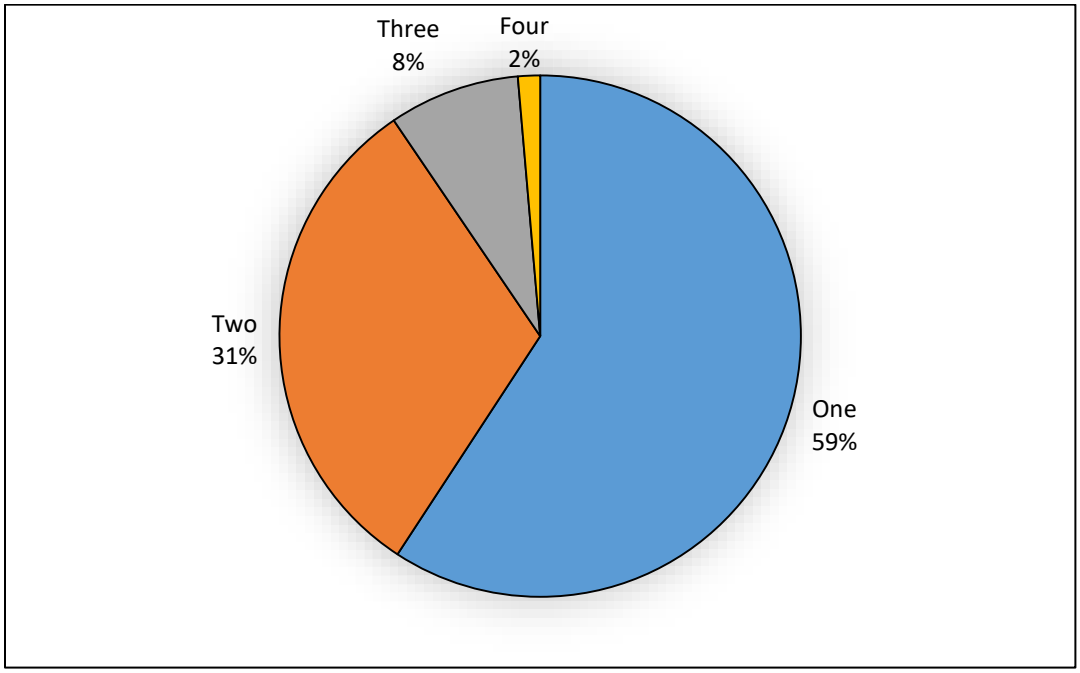


Table 3.5 Income Diversification: Distribution of Income Sources

Single source	– % of households –	Multiple sources	– % of households –
Forest	20.4	Agriculture and livestock	0.6
Agriculture	2.1	Forest and agric. and/or livestock	0.7
Livestock	2.1	Forest and wages	0.4
Wages	8.8	Forest and pensions	0.5
Pensions	17.2	Wages and pensions	6.8
Social program	5.2	Wages and social programs	0.9
Self-employment	3.4	Wages and self-employment	0.4
		Self-employment and social programs	0.6
		Pensions and social programs	7.2
		Other combination	22.5
Total	59.2	total	40.8

4. POVERTY, FOREST DEPENDECY AND THEIR LINKAGES

33. **Georgia has made significant progress in poverty reduction since 2010 with the national poverty rate having fallen by 15 percentage points from 2010 to 2015[30]. Poverty continues to be higher in rural areas in Georgia and rural poverty reduction lagged poverty reduction in urban areas. The forest household survey presents the first opportunity to analyze the extent of poverty among forest village households.** The level of poverty in forest communities is widely estimated to be higher than the rest of rural areas. No official estimates were previously available due to a lack of targeted household surveys that would have been representative of rural households living in and near forested areas. This chapter estimates the level of poverty among forest communities in comparison with the rest of rural population in Georgia. The chapter also assesses how poverty rates vary across forest villages and how the poor and non-poor differ in socio-demographic characteristics, employment status, and asset ownership.

4.1 Poverty incidence and spatial variation

34. **Poverty in survey communities is estimated to be higher than in rural areas generally, though comparison between different surveys is indicative at best.** Using the national rural poverty line, defined at GEL 130/per equivalent adult per month when using the 2016 IHS[31], the poverty rate among forest villages is about 46%, which is significantly higher than the average rural poverty rate estimated at 24% based on the consumption aggregate using the IHS data.[32] The survey's poverty analysis is based on a welfare measure defined as income per adult equivalent due to lack of consumption data collected in this survey[33]. The assessment of regional poverty across forest communities was carried out using a *relative poverty line* to give a more complete picture of poverty across all households in the survey. The relative poverty line is defined at 60% of median per capita income of households covered in this survey (the median monthly per capita income is 83 GEL and relative poverty thus becomes GEL 50). The regional poverty rate presented in Table 4.1 below reveals a large spatial variation in poverty across forest villages. The poverty rate is over one half in four regions: Samtskhe-Javakhe (76%), Imereti (74%), Kakheti (66%) and Shida Kartli (57%) while the poverty rate is comparatively low in Ajara, Guria, Mtskheta-Mtianet and Racha-Lechkhum. The poverty rate in each of the latter is about approximately 20% or less.

[30] World Bank. 2017a

[31] See http://geostat.ge/index.php?action=page&&p_id=176&lang=eng

[32] World Bank, 2017a. It should be noted that the rural poverty rate at 24% is estimated based on the welfare measures using consumption, not income. Therefore, caution should be taken when making comparisons across these poverty rate estimates.

[33] There is a long-standing debate about whether income or consumption is the better measure of a standard of living, see e.g. Deaton and Grosh. 2000

Table 4.1 Poverty Incidence by Region (relative poverty line, %)

Region	
	– % of households –
Samtskhe-Javakhe	76.2
Imereti	74.8
Kakheti	66.1
Shida Kartli	57.3
Samegrelo-Zemo S	42.9
Kvemo Kartli	26.8
Ajara	21.2
Guria	20.0
Mtskheta-Mtianet	17.5
Racha-Lechkhum K	11.5
Total	45.7

Note: The poverty incidence estimation using the 2016 survey is based on the relative poverty line, defined as 60% of median household per cap income, which is GEL 50 per capita per month with the median income at GEL 83 per capita per month.

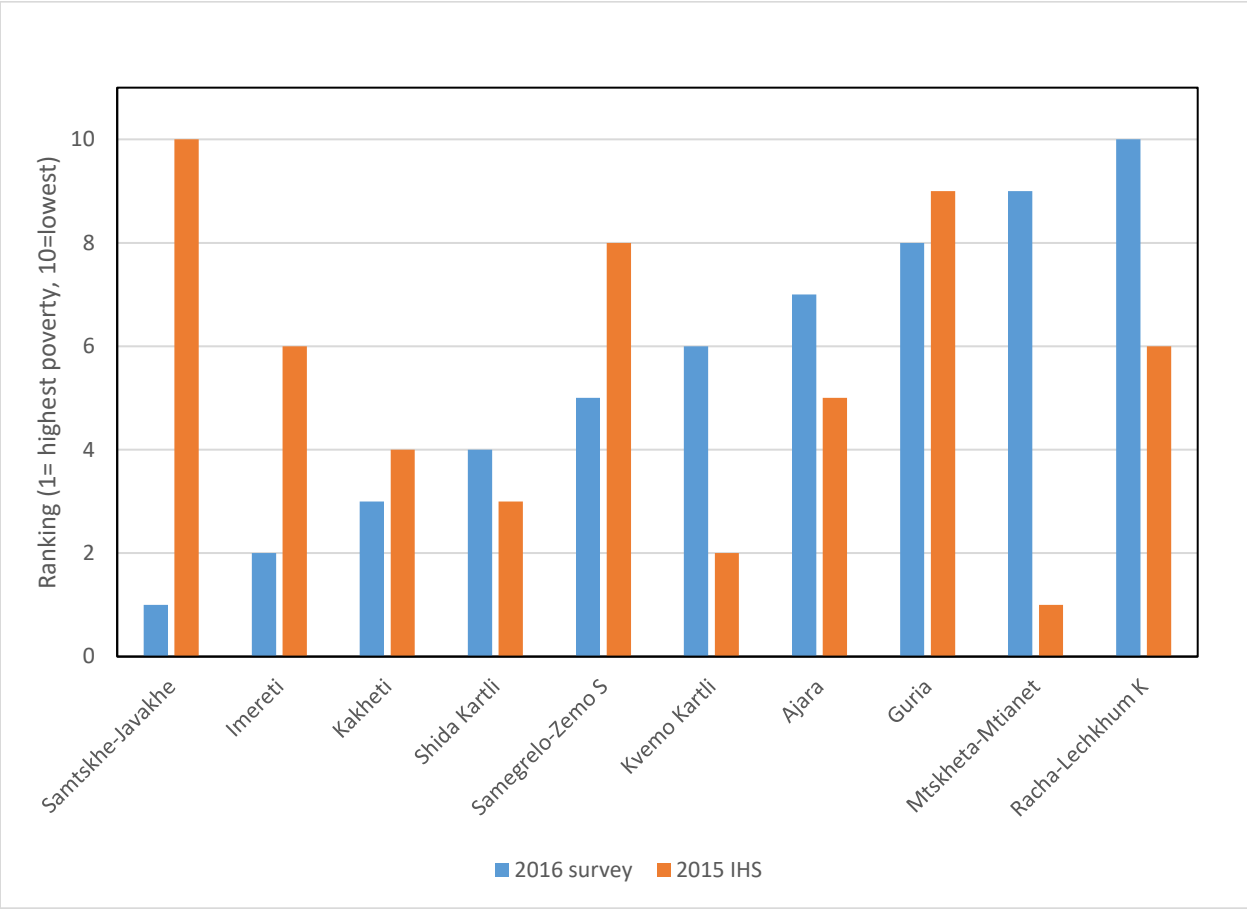
35. **Policy-makers need to pay particular attention to *intra-region* inequality in rural areas in particular in pockets of high poverty in rural areas.** The majority of poor households living in forest communities are likely underrepresented in routinely-collected national household surveys that are designed to monitor poverty and inform the targeting of antipoverty social assistance programs. It is useful to illustrate the importance of intra-region inequality in rural areas by comparing the ranking of regional poverty incidence using the two data sets: this survey and the 2016 IHS that is representative of the rural population, but likely under representative of forest-dependent population.[34]

36. **The regional ranking of poverty is different using the two sets of data.** Regions ranked relatively better off – such as Samtskhe-Javakhe – using the 2015 IHS can harbor high levels of poverty among forest communities. Conversely, regions ranked poorest – such as Mtskheta-Mtianet - do not necessarily have relatively deep pockets of poverty. This finding is not dissimilar to that from the 2016 Turkey forest village survey[35]. Household-specific surveys should be carried periodically to track poverty at the local level and to evaluate the impact of development programs that aim to address poverty in the forested areas while promoting sustainable forest management and other resource use. (Figure 4.1)

[34] Poverty estimates from the two data sources or surveys are most often not directly comparable. For example, in Georgia, the IHS uses consumption aggregate as welfare measure while this 2016 survey uses income data.

[35] World Bank. 2017b

Figure 4.1 Comparison of Poverty Ranking Using Two Surveys (2016 forest survey and 2015 Integrated Household Survey (IHS)-based data)



4.2 The poverty profile of forest village households

37. **Understanding how the poor and non-poor[36] differ in socio-economic conditions and forest dependence provides important insights into the underlying factors associated with poverty. Poor households have distinct socio-demographic characteristics compared to the non-poor households. They are larger and have a higher dependency ratio. On average, the household head is younger, has a lower level of educational attainment, and is more likely to work in unpaid jobs compared with his/her non-poor counterpart.** In establishing the poverty profile, the following section presents a comparison between poor and non-poor households in three areas where data is available: (i) socio-economic characteristics, (ii) income sources and diversification, and (iii) access and use of forest resources. The average household size and the dependency ratio among the poor is 3.6 and 0.5 compared with the non-poor at 1.9 and 0.4, respectively. There exist no significant differences in the gender status of the household head. As expected, the poor own fewer assets such as access to internet and computer, water pump, chainsaw, and/or car. Further, poor households have less high value livestock (such as cattle) and more less productive livestock such as sheep and poultry (Table 4.2).

[36] The non-poor households are defined to be in the top 30% of the income distribution while the poor are those below the relative poverty line as defined in the above section.

Table 4.2 Poor and Better-off Household Comparison: Socio-demographics and Assets

	Poor	Non-poor	Total*
i) Socio-Demographic characteristics			
household size	3.9	2.1	3.2
of which			
d) 0–15 yrs.	0.8	0.2	0.5
e) 16–64 yrs.	2.6	1.1	2.0
f) over 65 yrs.	0.5	0.9	0.6
Dependency ratio	0.5	0.4	0.5
Head of household, age (yrs.)	58.8	63.2	60.1
Head of household gender (female, %)	28.6	28.6	28.9
ii) Education			
Head of household, only high school (%)	53.7	32.9	44.2
Head of household, tertiary (%)	26.0	39.6	32.0
iii) Employment			
Head of household, with paid job (%)	7.7	12.1	10.8
Head of household, with unpaid job (%)	48.6	20.4	35.3
iv) Asset ownership (%)			
Smartphone	11.1	12.9	11.9
Computer	18.6	22.1	21.9
Internet access	13.7	15.1	13.6
Water pump	8.3	13.6	9.5
Gas/electric stove	43.4	45.7	48.3
Chainsaw	22.0	29.3	27.2
Car	28.9	33.2	30.6
v) Livestock (ownership and numbers)			
Own cattle (%)	56.6	55.0	58.0
Number of cattle	1.7	2.3	1.9
Own sheep (%)	8.3	4.3	6.1
Number of sheep	1.1	0.5	0.8
Own pig (%)	22.9	17.9	22.4
Number of pig	0.5	0.6	0.6
Own poultry (%)	66.0	61.4	65.8

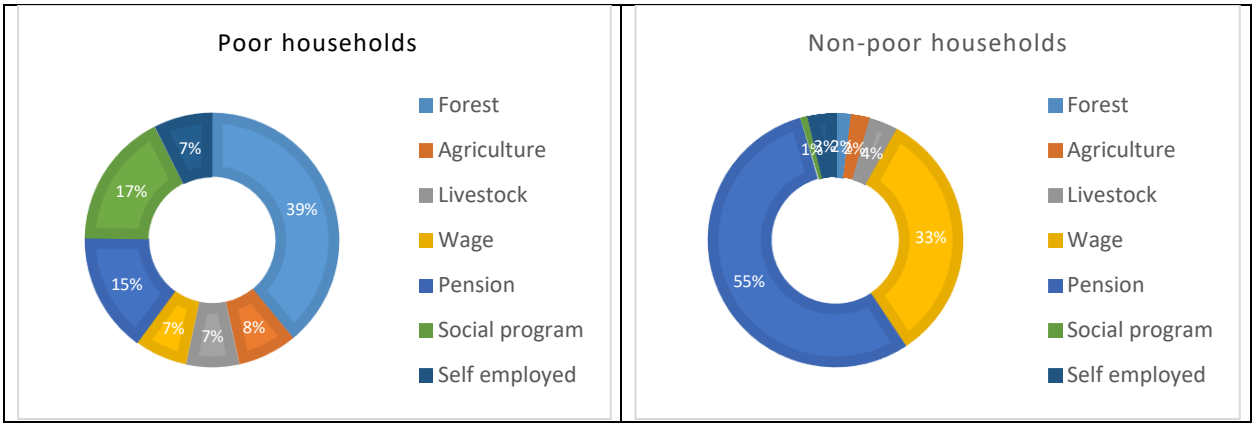
* Total includes households below the poverty line (poor), 30% highest income households (non-poor) as well as households that are above the poverty line, but not among the non-poor. Therefore, the *Total* is not a weighted average of the two categories.

4.3 Linkages between forest dependency, livelihoods, and poverty

38. **Poor households have a much higher dependence on forests with forest income accounting for about 39% of their total income** (Figure 4.2 and Table 4.3). This is much higher than in Turkey (29%) or other low-income countries (average 28% estimated from 24 developing countries among the bottom two income groups)[37]. In contrast, better-off households depend more on such high return income sources as wage employment and pension with forest income representing only 2% of their total income. In addition, the poor are also more depended on agriculture and livestock, which accounts for 15% of total income compared with the non-poor at 5%. In general, the income sources for the non-poor are more stable with over 80% of households getting their income from wages and pensions combined. For the poor these stable sources accounted for about 20%.

39. **A larger proportion of poor households (76%) receive income from a single source with the three dominant sources being forest-related activities (37%), income from social assistance (14%), and pension (7%).** Turning to income diversification comparison, the survey data show that the poor have limited capacity to diversify their income generating activities. In contrast, about 45% of the non-poor receive income from a single but high return income source such as wage employment (14%) and pension (29%). The non-poor also are better able to supplement wage income with pensions. About 13% of the non-poor have these two income sources compared with less than 1% among the poor.

Figure 4.2 Income Share Comparison



[37] Angelsen et al. 2014; World Bank. 2017b

Table 4.3 Income Source Diversification

	Poor	Non-poor
Single source		
Forest	37.1	0.4
Agriculture	4.3	0.4
Livestock	4.3	0.4
Wages	4.0	13.6
Pensions	7.4	29.3
Social program	13.7	0.0
Self-employment	4.9	1.8
Sub-total	***75.7***	***45.7***
Multiple sources		
Agriculture and/or livestock	1.4	0.4
Forest + (ag and/or livestock)	0.6	0.4
Wage and pension	0.6	13.2
Wage and social program	1.1	0.7
Wage & self-employment	0.3	0.7
Self-employment and social program	1.1	0.0
Pension and social program	4.9	13.2
All other combinations	24.3	9.3
Sub-total	***34.3***	***54.3***
Grand total	**100.0**	**100.0**

Figures do not add up to 100% due to rounding

40. **A higher proportion of non-poor households were negatively affected by shocks such as droughts/floods, crop disease, and severe water shortage than poor households[38]. On the other hand, the poor are more exposed to shocks related to food price than the non-poor** (Table 4.4). This may also indicate that poor simply have fewer assets that could be adversely impacted by shocks. In general, the differences between the two groups were relatively small and households were affected by shocks in similar ways. However, the impact of natural disaster risks on household income, in particular agriculture and livestock income, is significant. Given the high dependence of agriculture and livestock income among the poor, this indicates that the poor in forest villages are economically more vulnerable than the non-poor. While the 2016 survey is limited in providing insights into poverty dynamics, the above evidence on household income sources and the negative impact of disasters on agriculture and livestock income could indicate that the poor are more vulnerable as a result of their limited capacity to diversify into high return and more secure income sources.

[38] The survey collected answers only to a binary, "yes" or "no" question. It did not attempt to measure the *depth* of the impact.

Table 4.4 Proportion of Households Negatively Affected by Shocks

Events during past 12 months	Households negatively affected by the event (%)		
	Poor	Non-poor	Total*
drought/floods	31.4	34.3	31.8
crop disease	29.4	32.9	32.6
livestock died/stolen	8.6	6.8	9.2
large fall of crop prices	18.9	15.0	17.7
large rise of food prices	64.9	56.8	65.7
severe water shortage	15.4	19.3	17.7
illness of household member	16.9	18.2	17.3

* Total includes households below the poverty line (poor), 30% highest income households (non-poor) and households that are above the poverty line, but not among the non-poor. Therefore, the *Total* is not a weighted average of the two categories.

41. **One aspect of inequality is access to pastures. Proportionally, a higher number (28%) of better-off households used pasture land for grazing cattle compared with the poor (19%) and about one third of better off households stated that pasture land access was easy compared with 18% among the poor.** Table 4.5 shows the difference in access and use of pasture land between the poor and the non-poor. The non-poor have also higher incomes from livestock than poor households with the average livestock monthly income among the better off households at about GEL 382. This is more than five times the average of the poor households' 70 GEL per household. The survey data do not breakdown income by the type of livestock such as cattle, sheep, or pigs, but other sources show that cattle grazing in pasture/forest land ranks as the most important livestock activity in Georgia[39]. Additionally, as discussed on page 18, poor households have on average less productive household animals than better-off households.

Table 4.5 Pasture Use and Access

	Poor	Non-poor	Total*
		– % –	
Pasture land use and access			
Grazing cattle	18.9	27.9	22.9
Easy access to pasture land	17.7	27.9	22.2

* Total includes households below the poverty line (poor), 30% highest income households (non-poor) and households that are above the poverty line, but not among the non-poor. Therefore, the *Total* is not a (weighted) average of the two categories.

[39] ENPI-FLEG. 2014

5. FOREST ACCESS, USE, AND FUELWOOD

42. **The 2016 survey collected information on household access and use of forests, pasture land, and energy. The survey shows that the majority of households use forests for their energy needs, while harvesting for other uses like health benefits (e.g. medicinal plants) or construction is less common.** Table 5.1 below presents a summary of forest use for energy. The most important energy source used for cooking, heating, and boiling water among rural households is fuelwood followed by electricity and natural gas. The survey shows that fuelwood is the most frequently used energy source throughout the year with about 68% households used it for cooking, 80% for heating, and 56% for boiling water.

43. **Poor households depend on wood fuel for cooking and boiling water more than better off populations possibly due to the relatively high cost of alternative sources such as electricity**. It is interesting to observe that more poor households (35%) reported to use gas as the energy source than the non-poor (22%). The following section presents an in-depth analysis on fuelwood including fuelwood access and the targeting performance of fuelwood subsidy program.

Table 5.1 Fuelwood and Other Energy Use by Poverty Status

	Poor	Non-poor	Total*
		– % –	
Fuelwood			
a) Use			
Most used source for cooking	68.9	66.4	67.8
Most used source for heating	79.4	81.8	80.5
Most used source for boiling water	58.9	51.4	55.6
b) Source			
Most often purchased from market	49.4	45.4	47.6
Most often get from NFA voucher program	41.4	44.3	42.7
Collect fuelwood from public land areas	47.4	38.2	43.3
Decline to reveal where to get fuelwood	24.3	30.0	26.8
Distance to forest (km)	8.4	6.4	7.4
Not easy to get access for fuelwood collection	42.9	40.0	41.6
Gas and electricity use			
Gas (cooking, heating or boiling water)	34.9	21.8	29.0
Electricity (cooking, heating or boiling water)	17.7	36.8	26.2

* Total includes households below the poverty line (poor), 30% highest income households (non-poor) and households that are above the poverty line, but not among the non-poor. Therefore, the *Total* is not a (weighted) average of the two categories.

44. **The poor are disadvantaged in fuelwood access despite their higher dependence on fuelwood . The poor live further away from the forest with the average distance of about 8.4 km compared with 6.4 km among the non-poor. The poor also have to bear a larger financial cost for fuelwood purchase.** About half of the poor collect fuelwood from public land areas compared with 30% of the non-poor. As shown in Table 5.1 above, among the poor about 49% of households mostly purchase fuelwood from markets compared with 45% among the non-poor. This ration is reversed when assessing access to the NFA voucher program (see Text Box 1 below). Only 41% of poor households had access to the program, while among the non-poor the rate was slightly higher at 44%. This finding provides some evidence of leakages of the NFA fuelwood voucher program to the better off households.

Text Box 1 Social Fuelwood Program

The current (1999) Forest Code and Rules of Forest Use place considerable emphasis on the rules and procedures for assigning wood for fuel and construction to poor, rural households and public institutions such as schools. Recipients of wood under the social program do not pay the fee for marking the cutting area and they pay a natural resource use fee that is lower than the standard fee for the category of tree that is actually assigned.

In 2015, about 600,000 m^3 of wood was assigned under the social program. The draft new Forest Code provides for wood to be allocated to needy households until the end of 2018. If the new Forest Code is adopted in its present form, in the future all consumers of fuel wood will have to pay market prices, which will be substantially higher than the subsidized price. The market price will be higher still if the government is successful in stopping illegal logging, which will significantly reduce the amount of fuel wood on the market.

The social program leads to notable losses for authorities. These loses are estimates at GEL 30 million annually. The financial loss from the reduced resource use fee is compounded by the fact that a substantial proportion of trees assigned for fuelwood would be suitable to be used as industrial wood.

Source: Garforth et al., 2016

45. **Proportionally, more poor households collect fuelwood from public forest areas than do the non-poor** at 47% vs. 38% respectively. However, the comparison is complicated by the high proportion of non-poor households (30%) that declined to answer the question regarding the legal status of the forests where fuelwood is collected. Among poor households, a lower – yet still significant – number of households (24%) declined to answer. The estimated annual household consumption of wood varies by region from $8m^3$ to $13m^3$ [40]. Currently, the total annual national firewood use is close to 2.3 million m^3, 80% of which is estimated to be illegal[41]. The finding that a higher proportion of the better off households declined to report the source of firewood collection may suggest that they are likely both reap the benefit of social firewood program and bear more responsibility of forest degradation caused by illegal logging. Further investigation in this area is warranted to gain a better understanding of fuelwood access, the targeting performance of the fuelwood subsidy program, and the distributional impact of future reforms in fuelwood subsidy policies (see Text boxes 2 and 3).

[40] WEG. 2015

[41] Garforth et al., 2016

Text Box 2 Case: Reducing Fuelwood Dependence through Forest-Smart Investment

Dependence on fuelwood for heating and cooking has been the main cause of illegal logging and forest degradation according to an analysis of the household energy end-use survey conducted in 2014[42]. Global experience shows that targeting investment to advanced biomass-to-energy technologies (such as palletization or chipping) combined with efficient combustion appliances (such as modern boilers and stoves) presents one of the promising routes to sustainably use forest resources to meet energy needs.

The impact of modern stove on fuelwood use. The impact on fuelwood use from expanding access to gas or electric stoves can be estimated using a regression model controlling for all confounding factors. The results show strong evidence of a large and statistically significant impact. Comparing two households identical in all other aspects (i.e. controlling for such confounding factors as socio-economic characteristics, location of residence, etc.), on average, the one with an electric/gas stove is 17% less likely to use fuelwood as the primary energy source for general use. The likelihood is lower to use firewood also as the main source for cooking and boiling water – 27%, and 16%, respectively.

In addition to reducing the threat of forest degradation from illegal logging, targeting investment to improve household access to modern and more efficiency biomass energy sources can generate multiple benefits. These benefits include a reduction in the double burden of income and energy poverty among the poor from energy cost saving, reduced exposure to indoor air pollution, and additional time-saving for fuelwood collection particularly for women.[43]

46. **The household budget share of energy expenditure is estimated to be about 10% among rural households using the 2016 IHS data and this can be expected to be much higher among the rural poor with lower household incomes.** In addition, the poor targeting performance of the NFA voucher program, as shown in Table 5.1 above, indicates programs that are targeted to improve household access to efficient and alternative energy sources are likely to benefit the poor disproportionally if NFA program were to be phased out in the future.

[42] USAID. 2014

[43] Malla and Timilsin. 2014

Text Box 3 "Forest Is Not Firewood"

In 2015, the Forest Law Enforcement and Governance Program (FLEG) and the Caucasus Environmental NGO Network (CENN) supported the Georgian government in the development of a state program to provide rural populations with sufficient heating resources. The program employed technology to improve efficient and sustainable use of forest resources and expanded energy sources such as gas, coal, briquettes, and nutshells.

The FLEG program and the MENRP pointed out how forests cannot represent the only available resource to satisfy the energy needs of Georgian households. In close cooperation with the NFA and the Forest Policy Service of the MENRP, the FLEG team and CENN carried out an assessment of fuelwood provision and consumption in the country. "According to our preliminary calculations, we need about 3,285,000 m^3 of firewood per year to heat the houses of the almost 550,000 Georgian families in need of fuel" said Marika Kavtarishvili, FLEG Program Coordinator for IUCN Georgia. "The annual amount of firewood currently available is approximately 188,000 m^3. The shocking truth is that there is a massive deficit. If we thought of bridging this gap exclusively through firewood, all Georgian forests would disappear in a few years".

www.enpi-fleg.org/news/forest-is-not-firewood/#sthash.nv5m7sNO.dpf

6. STATISTICAL ANALYSIS – CHANGES IN INCOMES AND DISTRIBUTIONAL IMPACT

6.1 Income determination analysis

47. **Knowledge on poverty dynamics in forest communities and on the drivers of poverty change is limited. At the national level, the analysis of recent trends and drivers of poverty reduction in Georgia reveal major changes in the underlying forces of poverty reduction[44]. The information collected in this household survey, although limited in its ability to analyze poverty dynamics, provides some identifying factors that are associated with household income in forest communities.** In 2010—2014, household income from economic activities played a significant role in reducing poverty. This is in sharp contrast to the pre-2010 period when income from social transfers were more important and income from economic activities had limited impact.

48. **The income determination analysis was carried out using an econometric model to control for confounding factors.** The income analysis was carried out for income by source and the aggregate household income. The income sources cover forest-related and other activities. The model[45] is specified to capture key factors at the household level, as well as village size. The findings are indicative and the results from this regression analysis should be interpreted with caution in establishing causality. It is challenging to establish the causal relationship due to the fact that income and its determinants such as asset ownership or other socio-economic conditions are often determined jointly. This creates a model identification problem. Identifying change dynamics can be done only once the survey has been repeated several times to provide panel data (Table 6.1).

[44] World Bank. 2017a

[45] The income model is specified as log(household income) = f(X_{hh}, $W_{village}$, regional dummy variables), where X_{hh} are household variables including age, gender and education of household head, asset ownership, access to pasture land, involvement in common-labor arrangement, village size, and regional fixed effect.

Table 6.1 Income Determination Analysis: Income by Source

	Income source						
	Forest	Agric.	Live-stock	Wage	Pension	Self-empl.	Total income
Household assets							
Smartphone						↑	
Computer and internet	↑						↑
Water pump			↓				
Gas/electric stove							↑
Chainsaw							
Car							↑
Number of cattle		↑	↑				↑
Number of sheep				↓			
Number of pigs			↑				
Number of poultry							
Easy access to pasture							↑
Key socio-demographics							
Household size						↑	
Male headed							↑
Village size*							
live in median size village	↑				↑		↑
live in large size village			↑				
No of observations	209	95	114	205	325	96	739
R2	0.26	0.46	0.53	0.26	0.43	0.37	0.35

* compared to small villages

Note: An upward arrow indicates a statistically significant positive effect, and downward arrow a negative effect on income. For example, households with gas or electric stove tend to have less income from livestock while having higher total income. Households in median size villages have higher incomes than those in small villages. A similar correlation could not be observed in large villages when compared to small ones. See Annex 2.

49. **The regression analysis shows that five variables have a significant correlation with household total income. These include computers/internet access, gas/electric stoves, car ownership as well as pasture land access and cattle ownership.** In summary, all other factors held constant, the average income of households with access to computer/internet is 30-40% higher, 20-23% higher with gas/electric stove, and 23% higher with access to pasture land, compared with households who do not own these assets. One additional cattle unit increases household income by 7%. For some, e.g. car ownership, it is likely that causality leads higher income households having cars, rather than the opposite. For example, while cars can be used for income generating activities, it is likely that higher incomes lead to car ownership, not the other way around.

50. **Focusing on forest income, the results show that internet access is the only statistically significant factor: households with computer and internet access have 35% higher income, all other factors being the same. Further studies are needed to uncover the causality – if any – between computer and internet use, and forest income[46]. The village size also matters: Households living in medium size villages are better able to generate forest income than their peers in smaller villages.** Given the lack of other village level information, village size might be capturing other village effects. The results for agricultural income show that ownership of cattle, unsurprisingly, is correlated with livestock income. Similarly, additional cattle increases agriculture income by 11%. This confirms the complementary between agriculture and livestock actives as found in other studies.

51. **The results show a significant gender bias in favor of male headed households across all income sources except for forest income and income from social assistance programs. The education attainment of either household head or spouse has no impact on income.** All other factors being the same, the income of a male-headed household is about 1.5 times that of female-headed household with a 30% higher pension and an 85% higher self-employment income. It is important to further explore the underlying causes of the large gender disparity in incomes against female-headed households in forest communities.

52. **Are these findings plausible and to what extent does correlation indicate causality? While the positive relationship between income and access to productive assets such as cattle and pasture land is well known in the literature and almost trivial, the income enhancing effect of access to gas/electric stoves is less well known.** One plausible explanation can be that household with modern stoves can reduce fuelwood use (as shown in Text Box 2 on page 25). As a result, these households can free up more time to engage in other income generating activities. There may also be exogenous factors that are not captured in the survey and these could explain *both* asset ownership and higher income. The positive relationship stove on total income likely reflects a positive *correlation* between income and ownership of gas/electric stoves, but establishing *causality* would require additional research and data.

6.2 Assessing the targeting performance of exiting social assistance programs

53. **During Georgia's transition from a centrally planned to market economy, the government made several efforts to rebuild the economy through a series of reform policies. These included an extensive range of social assistance systems, such as the targeted social assistance (TSA) program. The 2016 survey collected information on a range of social assistance programs including social insurance, social assistance income, and fuelwood voucher programs.** These programs cover pensions, child benefit programs, health insurance, and other social assistance income transfers. A regional assessment of these programs shows that Georgia is one of the best performers in Europe and Central Asia when a broad range of indicators such as targeting, coverage, and poverty are assessed jointly. However, national surveys do not always capture how well these programs reach rural dwellers in more remote forest-dependent communities.

[46] Causality is hard to establish and would merit additional surveys. However, globally there is a growing body of research focusing on the economic impact of internet access that has provided evidence showing the income-enhancing effect of internet access across many countries.

54. Global evidence from the past decades has highlighted that one of major causes of poverty, in particular among rural populations, is vulnerability to adverse shocks[47]. The poor face high income volatility because of their high dependence on natural resources such as forests, land and water as well as on their limited capacity to diversify economic activities. At the same time, the ability of the poor to cope with shocks is limited because they have limited access to financial assets such as credit and insurance to cope with risks. Social insurance and social assistance programs can be an important part of poverty alleviation policies to prevent people from falling into poverty after they have experienced livelihood shocks.

55. **The survey shows that among forest-dependent households, social insurance programs and income transfers are important safety nets in the event of economic shocks. Therefore, targeting through these programs has important implications on their overall impact. In addition, the NFA fuelwood voucher program is particularly important to the livelihoods of rural populations**. The majority of rural households depend on fuelwood for heating and cooking and fuelwood access is critical for household well-being. Additionally, energy costs as a share of a household budget is about 10% for average households based on the 2016 IHS. The share it is likely higher among the poor households. This indicates that the NFA fuelwood voucher accounts for a significant income transfer among the poor and as a result the targeting performance of the NFA fuelwood voucher program has a substantial welfare impact on the poor.

56. **The distributional assessment of the social insurance, the income transfer program, and the NFA fuelwood voucher programs show that social assistance programs are well targeted and reach the poorest with the poorest population having both a higher proportion of receipts and a larger share of assistance income contributing total income** (Table 6.2). Distribution is measured by the proportional program recipients across income quintiles. The only exception is the 3rd income quintile which has the highest proportion of receipts (72%). The transfer share of income is the largest among the poorest (28%) compared with the top income groups (less than 1%).

57. **The most revealing finding lies in the NFA voucher program for fuelwood. The results indicate[48] that the top income group disproportionally captures the NFA voucher subsidies with about 50% of the richest group getting fuelwood through the voucher program.** In contrast, the bottom income group has the lowest coverage of the NFA voucher program (35%). As a result, over 46% of the poorest households relied on markets for fuelwood compared with only 40% among the top income group.

[47] World Bank. 2001

[48] The results have relatively low statistical confidence level. A more detailed analysis would be needed to confirm the findings.

Table 6.2 Distribution Analysis of Social Assistance Programs: Income Transfer, Social Insurance, and Fuelwood Subsidies

	Income quantile					
	1	**2**	**3**	**4**	**5**	**average**
(1) receive social assistance income						
- GEL, per household, past 12 months	66.2	41.8	72.6	21.4	32.8	45.6
- share total income %	27.8	3.7	2.0	0.7	0.9	7.1
(2) receiving social insurance (incl. health care), %	82.1	83.9	88.0	94.8	93.5	88.3
(3) fuelwood access						
- most often buy from market %	46.3	50.9	40.7	47.4	40.9	45.7
- most often from NFA voucher program (%)	35.8	44.3	36.7	34.5	49.5	40.4

Quantile 1: poorest; quantile 5: highest income

6.3 Distributional impact analysis of policy changes: a simulation

58. **While it is difficult to fully quantify the impact of forest sector policies, reforms, and public investment proposals, a policy simulation exercise can a useful illustration of the distributional impact of different program proposals. Assuming current forest utilization pattern, poor households would benefit disproportionally from increased forest incomes.** In Chapter 7 below we present a number of different, generic options for developing the forest sector. The data does not allow for detailed impact analysis of policy interventions or specific investments. These would require more detailed information on policy changes and their triggers. Such an analysis is only possible when the survey is repeated to construct a longitudinal panel data on rural households. The data allows one simplified policy scenario to illustrate the potential distributional impact using a simple policy simulation. It answers the question: "who would benefit if forest revenues were to increase within the current consumption and production pattern?" This policy simulation exercise focuses on the distributional impact of the proposed programs across income groups. Table 6.3 presents the summary of the policy impact measured by the change in household income from the baseline in which no interventions take place to a scenario in which forest revenues increases by 20% as a result of sector reforms.

59. **The poorest two quintiles would benefit the most with the average per capita income increased by 65% and 33% respectively. This impact compares with 3% increase among the top two quintiles. This result is not surprising given that the survey showed that the poor concentered around low-return forest activities while the non-poor depend on wages and pension income.** This simulation is relatively simplistic. Mode-detailed modeling and cost-benefit analysis would be needed to sequence and prioritize public investments and policy actions in real life.

Table 6.3 Distributional Impact Analysis of Forest Income Increase

Income quantile	Household income T_0	Simulated income T_s	% Increase $(Ts-T_0)/T_0$
1	419	690	65%
2	1500	1991	33%
3	3525	3835	9%
4	5307	5475	3%
5	9378	9634	3%
Average	3926	4233	8%

T is the simulated income from policy changes. Forest sector reforms are defined broadly and in this case assume a 20% increase from current forest income among households engaged in forest activities.

7. CONCLUSIONS AND RECOMMENDATIONS

60. **Forests and forests resources, if sustainably managed and well regulated, can be important sources of support to the livelihoods of rural populations by boosting economic growth, increasing social equity, and promoting environmental sustainability in Georgia. Forests resources provide fuelwood for heating and cooking as well as non-timber forest products. Forests provide opportunities for economic diversification through such activities as nature-based tourism, production forestry, and other forest-based value chains. Forests also provide valuable environmental services that support agriculture, water supply, and a healthy living environment.** This paper uses the 2016 forest household survey to answer the overarching policy question for sustainable forest development: "how can policy interventions that are targeted to promoting sustainable forest management contribute to a 'triple win' outcome of poverty alleviation, biodiversity conservation, and forest sustainability?" The key findings from the survey and a large body of global evidence on linkages between poverty reduction and forest resources converge to a similar conclusion. This conclusion is that relying on forest resource extraction (timber and NTFPS) *only* and *in isolation from other* changes is unlikely to be an adequate option to lift forest- dependent communities out of poverty.

61. **The findings from the survey demonstrate that forests are an important resource in rural areas for people that use wood-based products in their daily lives. The use is mostly for non-commercial, subsistence purposes and forests have not contributed significantly either as a source of employment or as a source for economic activity. The 2013 National Forest Concept emphasizes that forests should be seen as an integral part of the sustainable development agenda in Georgia. Considering the current forest use pattern, one can question whether this objective can really be met and whether forests can indeed become a major contributor to Georgia's development.** To answer these questions, one needs to look at the sector and its potential from two different approaches. First, what is the potential to improve the development impact of the *current* use pattern? And second, what changes are required to *transform the sector* in a way that would help Georgia to meet the vision presented in the National Forest Concept.

7.1 Conclusions from the survey

62. **The survey had a large representative sample of 950 households. They survey was able to capture a vast data on rural household income and forest use. This was the first time this type of a survey has been conducted in Georgia and it was conducted during a period when the country was implementing an ambitious reform agenda in its forest sector.** Accordingly, the survey cannot provide time series information on how things have changed over time and provides only a static snapshot of a situation in rural Georgia in 2016. In addition, it is clear that some issues require more data. It would be particularly interesting to better understand how rural households use energy and how price changes influence fuel choice. Finally, some questions – particularly regarding the monetary benefits from sale of forest products – had low response rates and require additional research.

63. Ultimately, household surveys are based on people's perceptions and understanding of the issues at hand and there is always the possibility of miscommunication and potential differences in how the questions are interpreted by respondents. As an example, 59% of households responding to the survey use wood for cooking 'always' or 'mostly'. For residential space heating and water heating the shares are 91% and 54% respectively. However, when asked separately whether they have benefited from forest services, only 21% households responded positively. The vast majority of households who used wood for household energy do not recognize that they are benefiting from forest services[49]. Were these household surveys repeated more often, there would be a better chance of capturing the change over time and identify discrepancies in responses.

64. Even with these limitations in mind, **the survey has provided information that had not previously been available. Data allows for some preliminary quantitative analysis of the poverty and household wellbeing linkages that forests provide. The survey also provides responses to the policy questions that were identified at the beginning of this paper** (see paragraph 7 on page 3). Recommendations from each of these three policy questions are presented below.

Policy question 1. Are forest resources important to household income generation and could they provide a path out of poverty for forest-dependent households?

65. **Forests and forest products were found to play a surprisingly important role for household income when analyzed through *imputed* income. Almost half of the respondent households participated in collecting or selling forest produce. The most common activities were the collection of fuelwood and non-timber forest products for household consumption. Commercial, monetized activities were much less common and only a few households were involved in the trade of forest produce.** However, this is a topic in which the survey has not been able to capture the full extent of the issue. A relatively large proportion of households mentioned that they have procured fuelwood from others. This would indicate that there is also traded supply. For some reason this did not appear clearly in the survey.

[49] This cannot even be explained by using trees on farms for energy. 68% of households got their fuelwood from natural forests and 20% purchase wood from others, part of which must be coming from natural forests. The share of farm trees was only about 11%.

66. **The share of forest services in total income was clearly much higher for poor households than for non-poor ones. For the former, forests constituted roughly a third of income while for non-poor the contribution of forest to total income was only 2%.** The main sources of total income among non-poor were wage income and pensions, which indicate that theses households were – quite unsurprisingly – more connected to the modern sector. These households also had more diverse sources of income. Poorer people did not have access to as many income sources and their main income was forest produce and transfer payments including pensions and social protection transfers. In summary, forest income appears to be much more important for the poorest households than for the better-off. Does that mean that forests and forest income are poverty traps and people are not able to escape from forest-dependency? The answer to that question requires more detailed, time series data and an analysis of households who have been able to lead themselves out of poverty or have fallen back into poverty. However, the superficial interpretation would be that forest incomes have become a safety net for households that have little other income. Public social programs have been able to soften the blow, but still they provide only less than 20% of poor household income.

67. When forest policies are redesigned, it is essential to carefully analyze the impact of changes on the poorest rural dwellers. The difference in importance of forest incomes between the poor and non-poor is huge – 39% vs. 2% – and using averages across rural populations could lead to suboptimal outcomes if this distinction is not adequately recognized.

68. Natural hazards have an impact on rural livelihoods, but the impact is not as straightforward as was expected. The share of households that were negatively affected by shocks and natural hazards is high (e.g. 32% for droughts and floods and almost 66% by food price increase). However, the differences in the rate of hazard impact between poor and non-poor were small and for some shocks to non-poor were more often affected than poor households. This finding suggests that external shocks are relatively evenly distributed in the population.[50]

Policy question 2. Does forest income reduce income inequality? Is forest use 'pro poor'?

69. **The policy simulations conducted give some indication of how forest policies and development interventions could influence income distribution. In general, promoting improved forest management and sustainable forest use would have a pro-poor distributional impact.** The survey gives a one-off snapshot and therefore dynamic policy simulations should be treated with caution. With this limitation in mind, it can be assumed that increasing forest-based incomes would be particularly pro-poor. If forest incomes were to be raised by 20% – for example by interventions discussed in Chapter 7.2 below – this would benefit the poorest more significantly. The incomes of those households in the lowest quintile would increase by 65% while the incomes in households in the highest quintile would increase by only 3%[51].

[50] The data does not allow an assessment of the *depth* of impact (how badly the household was affected), only its *occurrence* (if the household was affected or not).

[51] However, this does not include technological change. Increasing incomes from forests would likely require increased use of machinery, specialist labor, and the formalization of the forest economy. It can be assumed that this would make the distributional impact less pro-poor. Secondly, since most of wood is used for subsistence consumption, at some stage it reaches a saturation point when, for example, all heating needs are satisfied. Therefore, the impact at lower income levels may be overestimated.

70. The dynamic impacts of consumption shocks and changes in income equality would require longer time series and panel data. As mentioned above, there is a huge difference between the poor and non-poor in the significance of forest income. Therefore, it is difficult to estimate whether increasing non-forest incomes – e.g. through social transfers – would lead to increase in total income or promote substitution such as the purchase rather than the collection of forest products).

Policy question 3. What is the level of commercialization? Is the forest sector source of informality

71. From the survey material, it is clear that **commercial formal sector forest activities play only a marginal role in rural Georgia. This is also reflected in the low share forests provide to formal GDP and employment. Only a small number of household members had received any wage income from forest-related activities** and well below 10% of respondent households (79 out of 950) reported any sales revenue from forest products and even in those 79 cases net revenue was often relatively low.

72. **It would be important to understand why this is the case and where there are mechanisms to increase commercial activities in a sustainable way.** It also needs to be recognized that underreporting is likely. International experience says that where forest – or any resource use – is technically illegal, people have a natural tendency to underreport it. As discussed above, 44% of households said that they purchase "all" their firewood (not including wood obtained from NFA). However, there was only little supply. This clearly indicates that either the fuelwood market is highly monopolized with only few suppliers or that supply is underreported. This also indicates high level of informality in the sector.

7.2 Vision for a transformational change: Pathways Toward Prosperity

73. **Forests in Georgia are an important resource and the findings from the survey clearly show that they have a direct influence on people's lives. So, how much can policy interventions targeted to promote sustainable forest management contribute to a "triple win" outcome of poverty reduction, biodiversity conservation, and economic development?** Global evidence shows that households that live in remote forest locations have attempted a variety of strategies to improve their livelihoods. These strategies have included resources extraction, migration, managing forest for food production, timber, and other economic activities. The key question lies in whether alternative income generating strategies can sustain reduction in poverty without causing forest loss or degradation.[52]

[52] Angelsen. 2010; Hecht et al. 2015; Brack et al. 2016

74. The current productive use of forests – other than for energy – is low or it is not properly captured by the survey or other statistics. This may imply that production volumes and related employment are actually low or that much of the use is illegal. This unregulated use is notoriously difficult to capture is surveys[53]. As mentioned earlier, Georgia does not have an updated forest inventory which would give reliable information on the resource base. However, forests cover 40% of land area, and even if effectively all – 98% – of the forests are in poorly accessible mountainous areas, there may be potential for sustainable production forestry. Currently one fifth of the forest area is formally assigned for production. Since forests cover such a large part of the country, it is plausible that better information and enabling investments could expand production forestry in a sustainable way. However, at this stage, exact estimates on this potential cannot be made.[54] Being mountainous does not necessarily mean that forests cannot be utilized. For example, in Austria annual roundwood production is in the range of 12–13 million m^3 and approximately 3 million m^3 in Switzerland. Obviously, countries are different and these countries have invested heavily in accessibility and other forest infrastructure. However, if the potential for production forestry exists and if it were to be exploited, it would require both a conducive regulatory environment and investments across areas such as forest information (including inventory), vocational training, and improving accessibility (including forest roads).

75. **A large body of evidence on the linkages between poverty reduction and forest use, together with findings from this survey and the one in Turkey, converges on a similar conclusion: relying on forest resources (timber and NTFP) alone is unlikely to lift forest-dependent communities out of poverty[55]**. Employing forest resources to lift these communities out of poverty would require public investment to strengthening the institutional capacity for sustainable forest management and to connect the forest industry to wider supply chains and markets. The extraction of forest products, particularly if done primarily by the forest-dependent poor, serves chiefly to make up shortfalls in income rather than providing a sustainable path to socioeconomic advancement. This possibly represents a poverty trap. On the other hand, timber extraction and wood processing on a commercial scale are often conducted by operators from outside of forest communities as these operators have better access to advanced technologies and supply chains as well as the capacity to overcome high transportation.

76. **Forest resources, when sustainably managed and regulated, can be an important additional source of income to support the livelihoods of rural population, to boost economic growth, to increase social equity, and to improve environmental sustainability when combined with other sources of income. Forest resources can provide significant income from timber harvesting and can meet the energy demand without causing forest degradation**. In addition, forest resources and services can provide opportunities for economic diversification through activities such as nature-based tourism and wage employment from forest management activities.

[53] Garforth et al. 2016 estimate that the volume of illegally harvested wood is 2.2–2.3 mill. m^3, i.e. over three times the legal extraction of 0.7 mill. m^3.

[54] Garforth et al. 2016 quote different estimates from past years. The NFA in 2013 estimated that 1,09 mill. m^3 could be harvested annual, it estimated 2015 net increment at 0.94 mill. m^3 and in 2016 that sustainable removals would be only 0.30 mill. m^3. For the report, the NFA estimated that Georgia's (excl. Abkhasia) sustainable harvest level would be 0.60 mill. m^3. This wide range of estimates demonstrates that new and reliable inventory data is urgently needed.

[55] E.g. Wunder. 2001; Wunder et al. 2014a, b; World Bank 2017b.

77. **In 2017, the World Bank presented a conceptual framework of pathways to prosperity in forest landscapes. The framework, called Pathways Toward Prosperity or P.R.I.M.E.[56], was based on what is known from literature, lessons and evidence from World Bank projects, and investments in the forest sector over the past decades. The key message in the framework is that poverty reduction in forested landscapes depends on how well policies and investments – both public or private – enable households to use the resources upon which they are most dependent (i.e. labor, land, and forests).** The framework identifies five areas that stakeholders including governments, development partners, NGOs, and the forest-dependent communities themselves should consider as priorities (Text Box 4). Policies also need to create conditions that allow households to benefit from new opportunities brought by structural changes such as rising urban middle class, fast growing global tourism, and new technology (e.g. digital technology, Internet and e-commerce).

[56] From the key components of the framework: **P**roductivity, **R**ights, **I**nvestments, **M**arkets, and **E**cosystems.

Text Box 4 P.R.I.M.E. - Pathways toward Prosperity

Five broad pathways can help launch the forest-dependent poor onto a sustainable path toward prosperity. These pathways identify economic development strategies and build on the premise that forests themselves will remain intact.

PRODUCTIVITY: Growth in labor and resource productivity is integral to economic development. In forested landscapes, labor productivity can be improved by enhancing individual and community skills in sustainable forest management. Resource productivity can be improved through the infusion of capital such as portable saw mills, through forest fire and pest management, or through tree plantations. Associated technologies, policies, and capacity strengthening activities need to meet the requirements of women, indigenous people, and other marginalized households to ensure that the poorest benefit.

RIGHTS: Wealth accumulation is an essential pathway out of poverty. One strategy is to increase the wealth of the poor by strengthening their rights over natural capital. A large literature base and local environmental movements point to the importance of a community's rights to use and sell forest resources in poverty reduction. Within forested communities, empowering women and other marginalized individuals to have tenure rights and decision-making power is particularly important.

INVESTMENTS: Poverty reduction in forested landscapes will not be possible without investments in complementary institutions and public services. Forest-related pathways to prosperity are only likely if the poor also have inclusive and affordable access to complementary public services such as education, health, agricultural extension, transportation, and mobile phones. The role of gender-responsive institutional arrangements in providing information, in enabling local level innovation, and in offering insurance from down-side risks will be important.

MARKETS: Income generation and diversification require strengthening small and medium timber and non-timber enterprises and increasing their access to markets. Markets for a small number of high-value, non-timber forest products offer one pathway that is likely to be more beneficial to women. Timber certification and export markets for timber offer an alternate, broader approach. This pathway may need careful designing to be responsive to the preferences of women, indigenous households, and youth as well as to conservation requirements.

ECOSYSTEMS: Ecosystems and their hidden services are integral to prosperity. Over the last decades, policy instruments such as ecotourism, payments for ecosystem services, and carbon markets have proven to be useful mechanisms to regulate ecosystem services and their benefits. It is important to channel this demand for ecosystem services into monetary and non-monetary support for the poor and for women within poor households.

Source: https://www.profor.info/content/prime-pathways-toward-prosperity

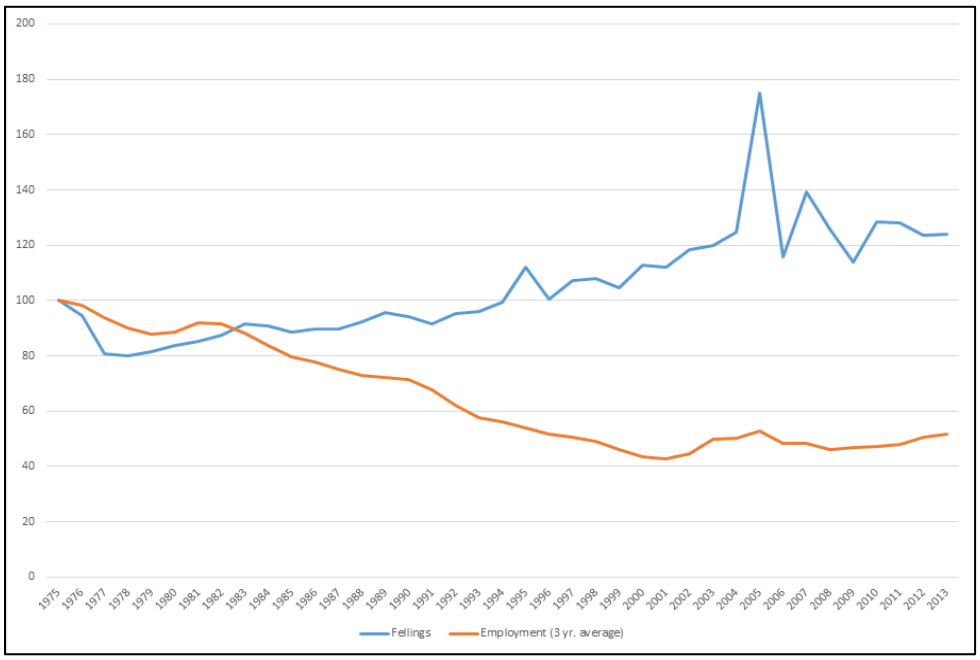
78. **Household surveys such as the one conducted in Georgia provide detailed information on some elements relevant for the framework and the search for pathways to prosperity should start with analyzing the most relevant drivers at the household level. Currently, forests provide essential elements in the livelihood of rural poor. But forests have not become – nor are they likely to become – elements for long term diversification and strengthening of rural economy. One could argue that the current use pattern resembles a "low level equilibrium" where low value, subsistence use does not provide adequate incentives for investments in more profitable value chains, economic activity, and job creation.** The P.R.I.M.E. framework provides a generic structure to identify interventions that create the right conditions for forest-based economic development. Despite the abundance of forests in Georgia, it is highly unlikely that they alone would be adequate to eliminate rural poverty. However, forests could be part of the economic diversification that is needed for economic resilience. The national forest policy, conditions, and parameters – strengths, weaknesses and policy objectives – have been defined in the National Forest Concept for Georgia (see Chapter 2 above). The document provides a useful framework for identifying the pathway to enhance the role of forests in the country. The National Forest Concept has identified problems, principles, and solutions that reflect all the elements included in the P.R.I.M.E. framework as can be identified in the mapping below. These linkages provide a basis for identifying a tentative plan of action or a roadmap for forest-based economic and social development.

Table 7.1 National Forest Concept and P.R.I.M.E. Framework

P.R.I.M.E. elements	Forest policy elements in Forest Concept		
	Problem	**Principle**	**Solution**
Productivity		- Forestry is an integral part of sustainable development	- Rational use of forest resources
Rights		- 'All forests are local'	- Forest ownership, management, and use rights
Investments	- Inadequate financing		
Markets	- Imperfect legislation, weak forest management institutions, and poor enforcement - High poverty level		
Ecosystems		- Principle of Sustainable Management of Forests - Precautionary principle to maintain the protective functions of forests and their ecological balance	- Adaption to the impacts of climate change
Crosscutting issues that apply to all P.R.I.M.E. components			- Legal framework - Forestry sector administration - Forest management institutions - Education and science

79. **Productivity is the basis for economically sustainable forest use. The appropriate use of inputs and well-functioning markets can be created by the right policies and public investments. Productivity is an end-result from a number of factors. Some factors are dependent on the choices of market actors including smallholders and individual entrepreneurs while others are dependent state action.** Investments in the appropriate production technology need to be done by the businesses themselves. However, the level of business investments will be dependent on political and economic stability, secure tenure rights, and access to finance. One particular way of improving productivity where public interventions can help is training and education. A well-educated labor force is more productive, embraces technological change, and improves competitiveness. At the same time, improving total factor productivity creates trade-offs. Improving labor productivity requires capital investments and may lead to a reduced labor force. This can be seen in many countries where mechanization of forest work has led to a decline in total forest labor force. For example, in Sweden total fellings increased by about 25% from 1975 to 2013 while workforce declined by half (Figure 7.1) leading to a huge boost in labor productivity.

Figure 7.1 Employment and Production in Swedish Forestry 1975–2013 (1975=100)



80. **The National Forest Concept promotes the decentralization of forest management and strengthens local communities' rights to use and access the forests. The Concept also recognizes that different forests need to have different management and ownership structures**. Some forests may be transferred to local authorities promote the protection of forests and their sustainable use. Forest tenure is globally recognized as a key element in sustainable forestry. However, forest tenure is a complex issue with no clear, one-size-fits-all rule of best practice. Some countries, for example many EU member states and parts of North America, have successful private forestry practices where large numbers small non-industrial forest owners supply extensive forest industries through well-functioning roundwood markets. In many other countries such as those in Eastern Europe, most forests are owned by the state and their utilization is organized through direct state management or concessions agreements with private forest enterprises.

81. Although the devolution and strengthening of user rights can take several paths in Georgia, some key principles need to be considered. First, **rights and responsibilities are closely related and need to be in balance with each other. The right to forest access needs to be linked to responsibility for the sustainable and efficient use of forest produce.** For example, commercial use needs to come with responsibility for appropriate logging practices. NTFP collection should not damage other forest assets. Therefore, the expansion of user rights to local communities needs to be accompanied by capacity building, training, and awareness raising and will require nationwide partnerships between authorities and non-governmental organizations including business associations. It will be a time-consuming process and will ultimately lead to a revised social contract in Georgia on forest use.

82. **The development of economic activities and reform of the whole forest sector requires notable investments by both the public and private sectors.** The Georgian forest management system and administration are going through transformational change that will require increased knowledge of the forest resources themselves. This knowledge base includes a long overdue, updated national forest inventory as well as adequate capacity to keep the inventory updated. Successful transformation will require improved capacity to manage and disseminate information as well as improved human and physical capacity to manage the forests in a new and more efficient way. Building these capacities requires public investments. Without adequate investments, the extensive and participatory process that has led to the current revised policy environment will likely fail to deliver outcomes on the ground.

83. **Most of Georgia's forests are in mountainous regions and accessibility is a major constraint. Solving the issue of accessibility will require investments in the forest road network to bring down the relatively high cost of wood transport that makes industry uncompetitive**[57]. But it is not only production forestry that would benefit from an improved forest road network. Tourism and various forest management activities including forest fire management would benefit from an updated road network. The overall cost of implementing the sector reform program has not been assessed. However, it is highly likely that a combination of domestic and international financing will be needed. Therefore, organizations like the World Bank and bi-lateral development partners including the European Union should play a role.

84. **While public investment will build the foundation for a restructured forest sector in Georgia, private investment is needed for the production and processing of forest produce. These investments will be driven by private actors based on private incentives. As a result, the state will have only a limited role in individual investments decisions.** Generally, Georgia is a conducive place to conduct private business. However, the forest sector has characteristics that reduce the relevance of generic business climate surveys – which may have an urban bias – in assessing the investment climate for forest investments.[58] Private investment comes from different sources that can range from large, international firms to local, small and medium size enterprises and can even include entrepreneurs who have established small woodlots or employ themselves in processing. All investors, irrespective of size and background, aim to generate sustainable and high risk-adjusted returns from their investments. This is dependent on the investors' business skills, general market conditions, and business cycles which cannot be influenced. But much is also dependent on government policies and public investments. Text Box 5 below discusses some constraints to private investments that can be addressed by public policies.

[57] Garforth. M. et als. 2015

[58] The 2016 Doing Business Survey by the World Bank and IFC ranks Georgia's business environment 3rd best in the Europe and Central Asia (non-OECD) region and 16th overall. For discussion on business climate surveys in the forest sector, see Castrén, T., Katila, M., and Lehtonen, P. 2014a.

Text Box 5 Policy Constraints to Private Investment in the Forest Sector

The main constraints to financing private investment for sustainable forest management in many countries include the following:

- *High real and perceived risks in developing countries*: These risks include political risks, insecure land tenure, currency risks, social and environmental risks, as well as reputational risks. These can be mitigated by improving land tenure systems and macro policies.
- *Weak availability of both domestic and foreign equity and loan financing combined with limited understanding of forestry sector investments within financial institutions*: It is more difficult to get international equity financing especially for smaller projects. Debt finance is often made available only after sufficient equity is in place so equity and debt financing are often linked. This financing is often outside the immediate scope of forest policies and requires collaboration with financial regulatory institutions.
- *Insufficient access to debt financing in emerging economies because of the domestic banking sector's low liquidity:* Forestry businesses, except those interested in short-term returns irrespective of sustainability impacts, have extreme difficulty raising financing. If domestic debt financing is available, interest rates can be prohibitively high in local currency and loan payback periods can be very short from six months to three years.
- *The lack of information on forest resources and investment opportunities: The lack of information* leads to higher (up-front) costs to prepare investment projects and higher transaction costs through the investment cycle for small and medium-sized projects. For example, in Georgia the lack of inventory data may deter private actors in the sector.
- *The public goods nature of some aspects of the investment cannot be translated to cash flow benefits*: This is because there are not enough markets for environmental services.

Adapted from Castrén, T; Katila, M.; Lehtonen, P. and Lindroos, K. 2014b.

85. **Ultimately, if forests are to become a source for vibrant economic activity beyond pure subsistence use, there is a need for functioning markets for forest goods and services such as ecotourism. These markets are also a precondition for attracting private capital into the sector. The current wood product markets are relatively underdeveloped and characterized by a focus on the low quality–low price product segment**. Further, there is little demand for wood in construction, the international timber trade undeveloped, and domestic industry is uncompetitive[59]. The markets for NFTPs are undeveloped and mainly focused on domestic sales. Finally, in general, the public has low level of knowledge about forest products and how they can be used.[60]

86. Developing markets for forest products and services needs collaboration between the public and private sectors. Only producers themselves know what is available and what can be produced. The public sector including business associations is needed to coordinate between various, often small producers. General market development is also a public good and thus public sector action is often needed. This collaboration allows for effective reform of regulations in the sector. Appropriate regulations and formalization are needed to ensure legality, sustainability, and regulatory compliance. Unnecessary overregulation needs to be avoided.

[59] Gartfoth et. als. 2016.

[60] ENPI-FLEG. 2016.

87. **One area in which appropriate regulation is needed is environmental sustainability to ensure that the ecosystem services that forests provide are maintained.** The National Forest Concept emphasizes sustainability and environmental services. These priorities can be linked to market driven instruments. For example, the certification of sustainable forest management through the Program for the Endorsement of Forest Certification (PEFC) or the Forest Stewardship Council (FSC) would help both market development and environmental sustainability[61]. In the long term, various payments for environmental services such as carbon payments or compensation for watershed protection could be a way to monetize good environmental management. However, these initiatives are still in the pilot stages and will not be able to generate major income flows in the near future.

88. One increasingly important opportunity for monetizing environmental services is ecotourism and adventure tourism. Tourism has become an important economic activity in Georgia and much of that is driven by the natural beauty of the country (see Text Box 6 below). Tourism is also a sensitive and competitive business area. Therefore, maintaining the natural resources in pristine condition is essential for long-term success of the industry.

Text Box 6 Nature-based Tourism in Georgia

Nature-based tourism – or ecotourism – has increasingly been recognized as an important pathway to achieving both conservation and sustainable development. Nature-based tourism is commonly defined as tourism whose main purpose is the viewing or enjoyment of the natural environment. Nature-based tourism includes hiking, birdwatching, and safaris. The tourism sector in Georgia saw rapid growth over the past decade. In 2014, the total value added from the tourism sector represented about 6% of GDP, 59% of service export revenues, and about 11% of total employment.[62] Using the statistics on visits to the Georgia national protected areas, Meladze (2014) shows the number of visits increased about 60 times from 2007 to 2013 from 5,700 in 2007 to 351,000 in 2013. Based on a combination of field studies tracking tourist statistics in both protected areas and perspective nature-based tourist areas (Kvemo Karti, Erusheti Ridge, the Guria mountainous area, the Javakheti area) from 2009 to 2014, Khomeriki and Meladze (2015) confirm that Georgia has substantial natural resources and the capacity to develop nature-based tourism.

The recent national tourism strategy recognizes Georgia's natural heritage as one of the key assets for tourism development. However, the strategy also recognizes that these assets need to be protected and enhanced to tap into their full potential. Also, investments in the accessibility and management of protected areas are needed. In 2013, more than half (52%) of tourists were involved in nature-based tourism and another 13% exploited adventure tourism which also depends on well-managed environment.[63]

Given the level of overall development in Georgia and the level of government commitment, promoting forest-based tourism can be a potential route for forest-dependent households to diversify into high-return income generating activities. However, for the potential of sustainable tourism development to be realized, complementary investments need to be put in place. These include investments in rural infrastructure, access to internet services, access to credit and other financing services, and increased SFM capacity to monitor and enforce conservation regulations.

[61] There is also evidence that forest certification would make commercial financing more readily available for private investments. See Program on Forests (PROFOR). 2012.

[62] http://gnta.ge/wp-content/uploads/2016/06/2015-eng..pdf

[63] Based on the 2016 data from the Ministry of Economy and Sustainable Development and Georgian National Tourism Administration.

89. Crosscutting themes are essential to all elements of forest sector development. Georgia is developing a new forest code that is expected to be approved in 2018[64]. Implementation of the legislation will depend upon professional and highly qualified forest administration and management institutions at both the national and local levels. The current institutions under the Ministry of Environmental Protection and Agriculture have qualified staff. However, the proposed paradigm shift in forest management including the development of extensive forest management plans requires new staffing and the retraining of existing staff. As the new code has not yet been finalized, lower level implementing regulations have not been prepared. It is essential that these regulations are supportive of the overall principles of the National Forest Concept and its objectives. Global experience is not often encouraging. In many countries, the forest sector is overregulated which leads to persistent informality and corruption. It is essential that the regulatory framework is appropriate and does not lead to excessive costs. For example, many countries have detailed regulations for transport or international trade of otherwise legal forest produce well beyond what is required for phytosanitation, safety, or legal verification. It is essential that regulations are well-targeted, fit-for-purpose, and do not lead to unnecessary transaction costs.

90. Linking the current policy objectives in Georgia with good international practice on how to develop a sustainable forest-based economy can be done. The discussion above provides options for a transformational change in somewhat generic and qualitative terms. Detailed quantitative analysis will be needed to develop a detailed implementation plan and an assessment of its potential impact. These examples and international experience demonstrate that forest-based value chains can contribute to Georgia's development. These value chains will not solve all development issues in rural Georgia and investments. in agriculture, education, and social development will still be needed. But these value chains can be part of the solution when properly planned and implemented in partnership by all key stakeholders.

91. This survey on forests and poverty in Georgia was the first of its kind and therefore has some limitations. It does not provide time series or panel data and therefor does not allow for the detection of *change* over time. Nor does they survey measure the impact of policy changes or external shocks. Additionally, they survey design was based on experience from other countries and regions where the underlying issues are different from Georgia. At the same time, the survey provides an interesting snapshot on the situation and a baseline for follow-up investigation. Therefore, it is important that the survey be repeated over time to get a deeper understanding on forests usage and how it changes over time.[65]

[64] At the time of writing in March 2018 it had not been approved.

[65] It is not necessary to conduct a full-scale survey every time. The World Bank and PROFOR have developed a tool for repeated low-cost surveys. This Forest-SWIFT (Survey of Well-being via Frequent Tracking) has a set of 10–15 key questions that can used to track forest dependency. For more information, see http://www.profor.info/knowledge/forest-swift-methodology-high-frequency-forest-poverty-data-collection

92. **Systematic collection and the availability of data is a precondition for well-designed policies. This applies to both biophysical information such as inventory data on the forests themselves as well as socioeconomic data from household surveys and market information on production and prices.** Systematic data collection will enable policy makers to make informed choices and allow for proper impact assessments. Forests and forest-dependent livelihoods will also be affected by climate change. Recognizing the impact of potential climate changes using quality data will help to identify appropriate mitigation measures as well.

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ANNEXES

ANNEX 1: Research Design Sampling and Estimation Methodology

1. STRATIFICATION CRITERIA

i. Stratified sampling involves dividing a population into subpopulations and then applying random sampling methods to each subpopulation to form a test group. Researchers use stratified sampling to obtain a sample population that best represents the entire population being studied. Its advantages include minimizing sample selection bias and ensuring some segments of the population are not overrepresented or underrepresented.

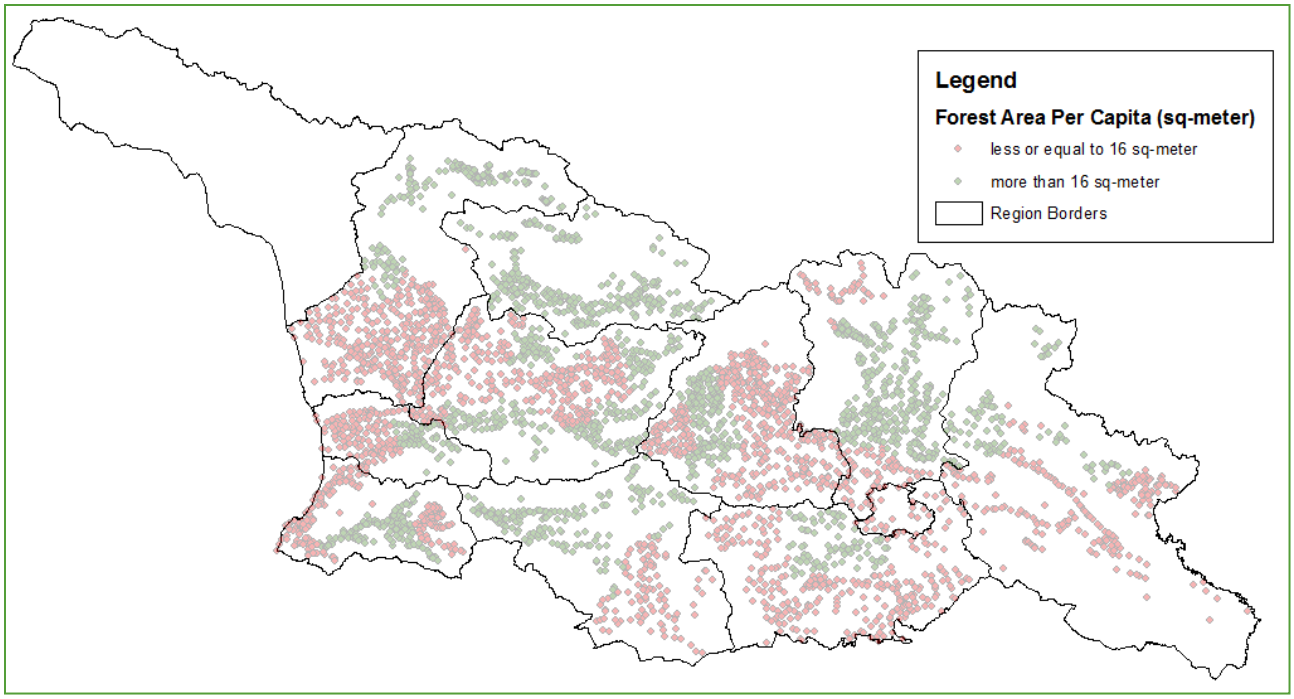
- ***Stratification Parameter: Forest Cover per Capita.***

ii. In order to find the forest cover per capita, a GIS analysis was done by using forest cover and municipality borders shape files. Through this, forest area per municipality was calculated. The graphical distribution of the forest area per capita is illustrated below. Later, the total forest area in each municipality was divided by the total population and the forest area per capita was found at the municipal level. Administrative borders were not available for villages. Therefore it was not possible to calculate forest area per village. Forest area per capita for a given village was assumed to be the same as the value assigned for the municipality.

iii. The threshold for grouping the village is selected as 1.6 hectares forest area per capita, the median value for the forest area per capita for all villages (3730). That means, for half of the villages in Georgia (around 1850), forest area per capita is less than 1.6 ha, and for the rest, more than 1.6 ha. The following two groups thus were established.

- Group 1: Villages which have less than the median forest area per capita (<1.6 ha)
- Group 2: Villages which have equal to or more than the median forest area per capita (>1.6 ha)

Annex Figure i Forest Area per Capita Distribution (Village level)



- ***Stratification Parameter: Frequency of Natural Hazards***

iv. For the purpose of stratification, aggregated historical hazard data provided at http://drm.cenn.org was used. Natural hazards included landslide, rock fall, snow avalanche, mud flow, drought, hail storm, wind storm, earthquake, inundation, cold wave, lightening, and wild fire.

v. Detailed information on the natural hazard frequency of the regions and the graphical distribution of the frequency of natural hazards are also given in tables and figures below.

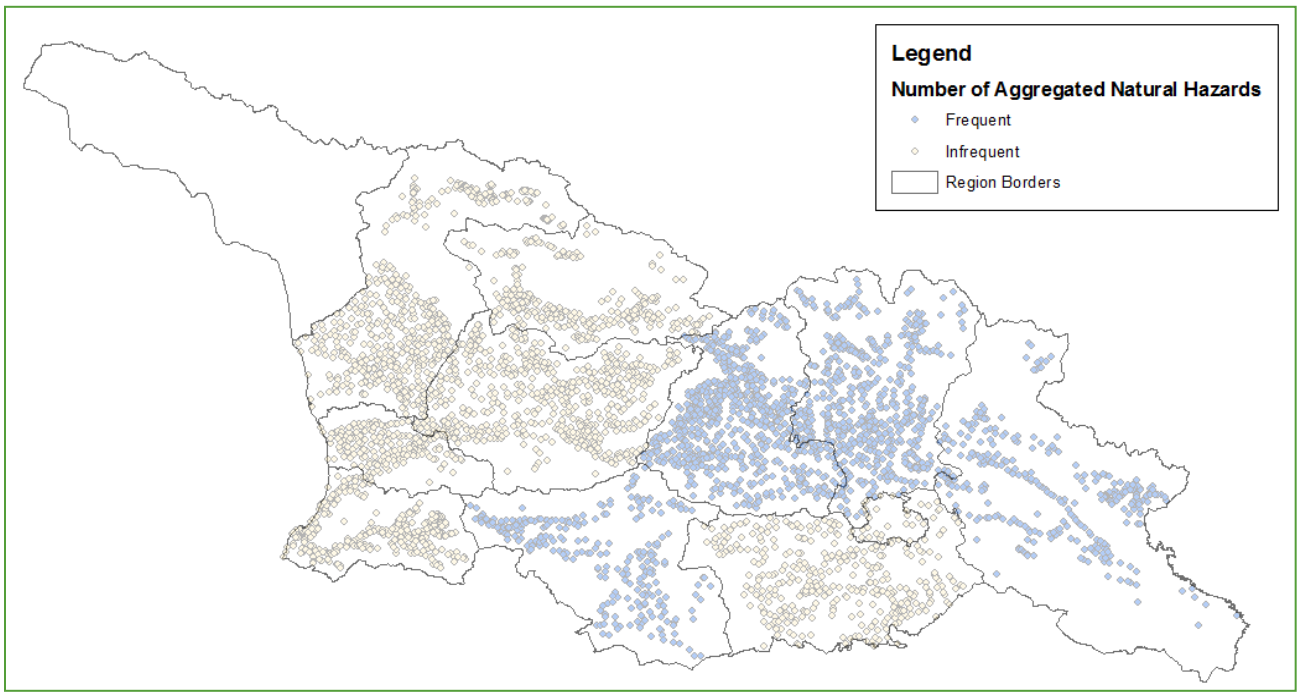
vi. Again, by using GIS techniques, villages were grouped by using the regional natural hazard frequency level as below.

- Group 1: Villages located where natural hazards occur frequently
- Group2: Villages located where natural hazards occur infrequently

Annex table i Natural Hazard Frequency at Regional level

Region Name	Number of Aggregated Historical Hazards for the last 50 years	Frequency
Samegrelo-Zemo Svaneti	Between 5 and 10	Infrequent
Racha-Lechkhumi – Kvemo Svaneti	Between 5 and 10	Infrequent
Imereti	Between 5 and 10	Infrequent
Guria	Between 5 and 10	Infrequent
Adjara	Between 10 and 25	Infrequent
Samtskhe-Javakheti	More than 100	Frequent
Shida Kartli	More than 100	Frequent
Mtskheta-Mtianeti	Between 50 and 100	Frequent
Kakheti	Between 25 and 50	Frequent
Kvemo Kartli	Between 5 and 10	Infrequent
Tbilisi	Between 5 and 10	Infrequent

Annex figure ii Frequency of Natural Hazards



vii. As a result, villages in Georgia were divided into four strata by using the above-mentioned grouping definitions:

- Stratum 1: Villages which have less than 1.6 ha forest area per capita and where natural hazards occur frequently (low forest, high hazard: LF–HH)
- Stratum 2: Villages which have less than 1.6 ha forest area per capita and where natural hazards occur infrequently (low forest, low hazard: LF–LH)
- Stratum 3: Villages which have equal to or more than 1.6 ha forest area per capita and where natural hazards occur frequently (high forest, high hazard: HF–HH)
- Stratum 4: Villages which have equal to or more than 1.6 ha forest area per capita and natural hazards occur infrequently (high forest, low hazard: HF–LH)

viii. There are 4433 villages in Georgia including the ones in politically sensitive regions. All the villages in Georgia were stratified according to the above definitions. But after removing the ones in politically sensitive regions, the total number of villages was found to be 3730, which was accepted as the sampling frame.

ix. The distribution of the total number of villages (sampling frame) according to stratum is given in Annex table ii below.

Annex table ii Grouping of Forest Villages

Hazard Rate / Forest area	Hazard happens frequently	Hazard happens infrequently
Villages has < 1.6 ha forest area per capita	Stratum 1: 827 (22.2%)	Stratum 2: 1207 (32.4%)
Villages has $\geq$ 1.6 ha forest area per capita	Stratum 3: 748 (20.0%)	Stratum 4: 948 (25.4%)

x. The above design layout was taken as the basis of the stratified population.

2. SAMPLE DESIGN OF THE SURVEY

xi. Sampling design is the most critical technical part of the study. A total of 950 households were randomly selected within the selected (n = 95) forest villages. The final sampling design is a Two-Stage Stratified Cluster Probability Sampling Methodology which is used for this survey design.

xii. In order to select sample households, first of all designers needed to select the sample villages randomly. For this purpose, one needs to define the number of households to be interviewed in each village. It was decided to select ten households for interview in each selected village. This figure was selected based on the population size of the villages and previous experience from comparable surveys. As a result, a total of n = 95 villages was distributed to each sample stratum by using probability proportional to size sampling.

xiii. In each stratum, villages were selected by using a systematic selection method. GIS technology was used to ensure that selected villages were geographically uniformly distributed within each stratum. For household selection a cluster of 10 households was created in each selected village using the serpentine order method.

- ***Sample Size Computation Methods***

xiv. For computing the number of sample villages, the following temporary sample size determination formula was used for a proportion. Criteria for the precision alternatives are based on the acceptable level of the E = Error of Margin $\left(\chi^2_{0.05,1}\left[se(p)\right]\right)$ criteria. (E) is defined as the maximum level of error which can be tolerated by the user of the survey results.

xv. The unknown population proportion for any given survey variable is taken as P = 0.5 to guarantee the largest element variance which is possible for this survey (Kish, 1995; Survey Sampling, John Wiley & Sons). The number of sample elements are defined with a confidence coefficient of 1 – α = 0.95 (which is 95% confidence) and a degree of accuracy/ margin of error with α = 0.01.

xvi. Computation of temporary sample size for the villages was:

$$n^* = \frac{\chi^2_{0.05,1}\left[P(1-P)\right]}{(E)^2} = \frac{\chi^2_{0.05,1}\left[P(1-P)\right]}{\left(\chi^2_{0.05,1}\left[se(p)\right]\right)^2} = \frac{3.841\left[(0.5)(0.5)\right]}{(0.10)^2} = \frac{0.96}{0.01} = 95$$

xvii. Computation of the ultimate (final) sample size of villages, when considering the population size of villages, was

$$n = \frac{n^*}{1+\frac{n^*}{N}} = \frac{95}{1+\frac{95}{3500}} \cong 95$$

, i.e. 95 sample villages

- ***Allocation of Sample into Strata***

xviii. Total number of selected sample villages (n = 95) are allocated to each stratum. Number of villages to be selected for each stratum is calculated proportionately to their population size. Number of villages which are selected by proportional allocation, and their allocation into sample strata (n_h):

$$n_h = \left(\frac{N_h}{N}\right) n = (W_h)\, n$$

- Stratum 1: (827/3730) * 95 = 21 villages
- Stratum 2: (1207/3730) * 95 = 31 villages
- Stratum 3: (748/3730) * 95 = 19 Villages
- Stratum 4: (948/3730) * 95 = 24 villages

xix. The allocated sample values are presented as the sample design layout on below.

Annex table iii Distribution of Sample Size for Each Stratum

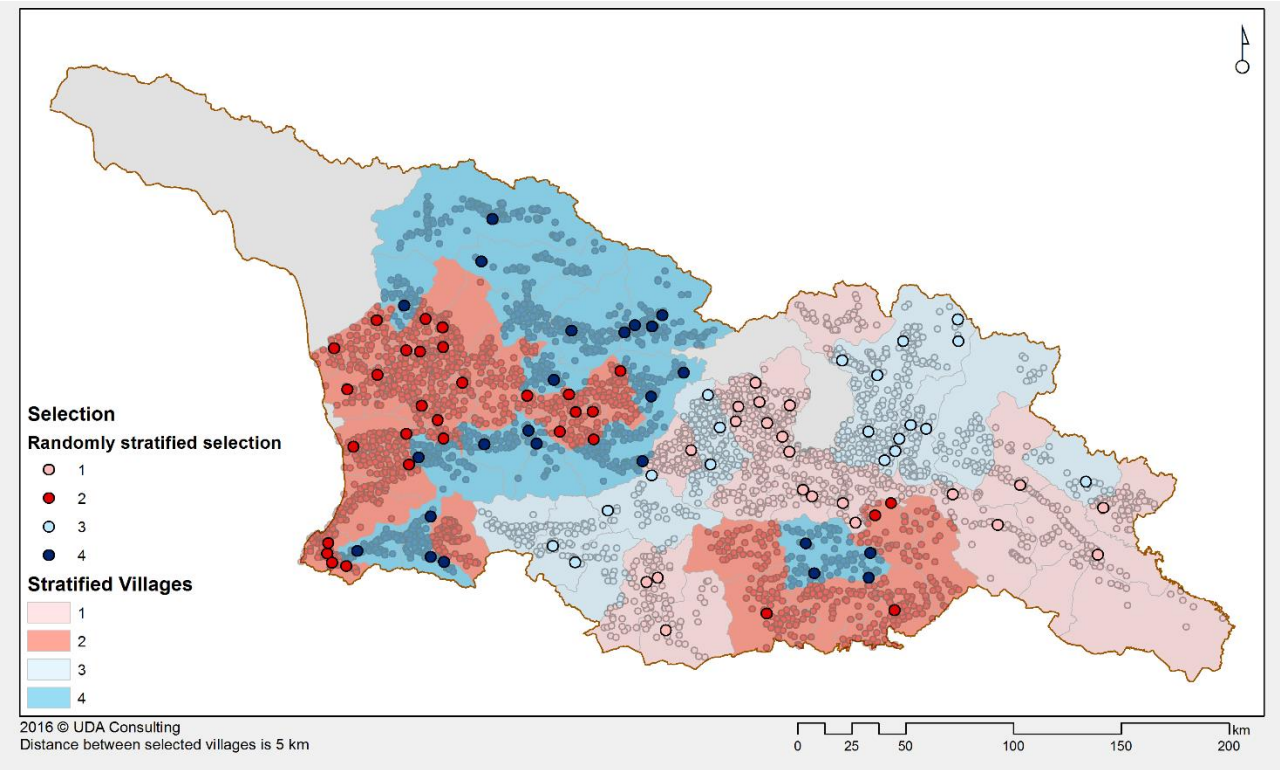
Stratification	Villages located where natural hazards happens frequently	Villages located where natural hazards happens infrequently
Villages with than 1.6 ha forest per capita	21	31
Villages with equal or more than 1.6 ha forest per capita	19	24

- ***Sample Enumeration Methods***

xx. The sample design of this survey consisted of stratified, two-stage equal sized clusters. It was agreed to conduct interviews with 10 households (cluster size) in each village. Consequently, the total number of households for this sample survey will be h = n*B = (95)*(10) = 950 selected sample households.

xxi. Villages for each stratum were selected randomly. However, in order to distribute the villages geographically, a 5 km distance (minimum) distance was kept between each selected village. Again, GIS applications was used to select the villages randomly according to these criteria. Graphical presentation of the locations of the selected villages are given in the map below. The decision on the altitude of the villages had been already made. After the selection of the villages, it was observed that total of 69% of the selected villages were below 1000 m and the rest (31%) were at or above 1000 m. The distribution of the selected villages (n = 95) according to the altitude is almost same with the distribution of the all villages (N = 3730) in the sampling frame. This indicated that distribution of the sample villages is a good reflection of the sampling frame according to the altitude variable as well.

Annex figure iii Distribution of the Selected Villages



3. ESTIMATION METHODOLOGY

xxii. The definition of the population and survey variables are presented for each design stratum in the following table.

Annex table iv Population and Sample Values within Sample Design Strata

Population and Sample Values	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Overall Total
N: Total number of villages in the country	N1= 827	N2= 1207	N3= 748	N4= 948	N= 3730
n: Selected number of sample villages	n1= 21	n2= 31	n3= 19	n4= 24	n= 95
h: Selected number of sample households	h1= 210	h2= 310	h3= 190	h4= 240	h= 950
m: Number of people in sampled households	m1= 671	m2= 1013	m3= 598	m4= 716	m= 2998

- ***Evaluation Methods of the Survey Estimates***

xxiii. The number of sample households within the strata can be computed in the following way. Here, cluster size B = 10 are taken to be constant in all villages.

$h_h = (B)\ n_h = (10)\ n_h$

- Estimated number of household members:

$m_h = \left(\overline{H}\right) h_h$

- Here, $\overline{H}$ is the mean number of household size, and can also be defined as:

$\overline{H} = m_h / h_h$

- The mean of the variable y for any survey strata can be computed as follows:

$\bar{y}_h = y_h / n_h$

- Here, sample total value for variable y within the sample strata will be:

$y_h = \sum_{i=1}^{I} Y_{hi} = \bar{y}_h\ n_h$

- The weighted survey mean for variable y is:

$y_w = \sum W_h\ \bar{y}_h$ here the weight is $W_h = N_h / N$

- Estimation method for population strata total:

$\hat{Y}_h = F_h\ y_h = N_h\ \bar{y}_h$

- Estimation of the population total:

$\hat{Y} = F\ y = N\ \bar{y}$

- ***Confidence Intervals for the Survey Estimates***

xxiv. The confidence interval for the survey estimates was computed using the following equations:

- For a proportion:

$CI:\ \Pr\left\{ p-\chi^2[se(p)]<P<p+\chi^2[se(p)] \right\}=1-\alpha$

- For a mean:

$CI:\ \Pr\left\{ \bar{y}-z^2_{\alpha/2}[se(\bar{y})]<\mu<\bar{y}+z^2_{\alpha/2}[se(\bar{y})] \right\}=1-\alpha$

- Population total for a proportion:

$CI:\ \Pr\left\{ \hat{Y}-\chi^2[se(\hat{Y})]<\pi<\hat{Y}+\chi^2[se(\hat{Y})] \right\}=1-\alpha$

- Population total based on a meanL

$CI:\ \Pr\left\{ \bar{Y}-z^2_{\alpha/2}[se(\hat{Y})]<Y<\bar{Y}+z^2_{\alpha/2}[se(\hat{Y})] \right\}=1-\alpha$

For α=0.05 $CI:\ \Pr\left\{ lowerbound<\pi<upperbound \right\}=0.95$

- ***Estimation of the Population Totals for Selected Survey Variables***

xxv. In this survey, the population mean is estimated as the expected value of the sample mean of the same variable. On the other hand, sample proportion and sample totals are converted to the survey population total through expansion factors.

xxvi. Village sampling fractions are given below. Here, the overall sampling fraction (=sample selection probability) will be the same in all sample strata in the case of proportional allocation.

$$f=\frac{n}{N}=\frac{n_h}{N_h}=f_h \quad \forall h \qquad \text{and} \qquad f=f_h=\frac{n_h}{N_h}=\frac{1}{F_h}$$

xxvii. Village expansion factors will be the inverse of this relationship.

$$F_h^{(1)}=\frac{N_h}{n_h}=\frac{N}{n}=F^{(1)}=\frac{3730}{95}=39.26$$

xxviii. The computational methods of the expansion factors for the population totals and the results of some important expansion factors by regions and total are summarized below.

Annex table v Computation of survey expansion factors by sample design strata

Sample Design Strata	Village Expansion Factors $F_h^{(1)}$	Household Expansion Factors $F_h^{(2)}$	Person Expansion Factors $F_h^{(3)}$
Stratum 1	$F_1^{(1)}=N_1/n_1$ = 39.38	$F_1^{(2)}=h_1/n_1$ = 10	$F_1^{(3)}=m_1/h_1$ = 3.20
Stratum 2	$F_2^{(1)}=N_2/n_2$ = 38.94	$F_2^{(2)}=h_2/n_2$ = 10	$F_2^{(3)}=m_2/h_2$ = 3.27
Stratum 3	$F_3^{(1)}=N_3/n_3$ = 39.37	$F_3^{(2)}=h_3/n_3$ = 10	$F_3^{(3)}=m_3/h_3$ = 3.15
Stratum 4	$F_4^{(1)}=N_4/n_4$ = 39.50	$F_4^{(2)}=h_4/n_4$ = 10	$F_4^{(3)}=m_4/h_4$ = 2.98

Annex table vi Number of Sample Villages, Households and Household Members with Expansion Factor of the Estimates within Each Stratum

Strata number h	Number of selected sample villages nh	Village expansion factor $F_h^{(1)}$	Number of sample households hh	Number of household members mh	Household expansion factor $F_h^{(2)}$	Person expansion factor $F_h^{(3)}$
1	21	39.38	210	671	10	3.20
2	31	38.94	310	1013	10	3.27
3	19	39.37	190	598	10	3.15
4	24	39.50	240	716	10	2.98
Overall	**95**	**39.26**	**950**	**2998**	**10**	**3.16**

Household expansion factors will be:

$$F_h^{(2)} = \frac{h_h}{n_h} = \frac{h}{n} = F^{(2)} = \frac{950}{95} = 10.0$$

Person expansion factors will be:

$$F_h^{(3)} = \frac{m_h}{h_h} = \frac{m}{h} = \overline{H} = F^{(3)} = \frac{2998}{950} = 3.16$$

Some common *expansion factors* for the total population size estimates:
Village expansion factor = Total forest villages / Sample forest villages = 3730 / 95 = **39.26**
Household expansion factor = Sample households / Sample forest villages = 950 / 95 = **10.0**
Person expansion factor = Household members / Sample households = 2998 / 950 = **3.16**

ANNEX 2

Annex table vii Income Determination Analysis: Income by Source

dependent variable = log (income by source)

	forest	agriculture	livestock	wage	pensions	self emply	tot income
Asset variables							
smartphone	-0.088	0.194	0.028	0.43	-0.096	1.072*	0.199
computer and internet	0.346*	0.076	0.411	0.371	-0.03	-0.104	0.377**
water pump	0.371	-0.245	-0.529*	0.428	-0.072	0.44	-0.007
gas/electric stove	0.053	0.196	0.01	-0.164	0.105	-0.135	0.16**
chainsaw	0.024	0.184	0.038	-0.134	0.056	0.392	-0.102
car	-0.25	0.082	-0.131	0.117	0.05	0.303	0.193
Num_cattle2	0.048	0.140*	0.109***	0.021	0.006	-0.065	0.073
Num_sheep2	0.001	0.026	0.003	-0.034*	-0.019	0.025	0.124
Num_pig2	0.034	0.033	0.075**	0.004	-0.036	-0.321	0.067**
Num_poutry2	-0.009	-0.018	0.018	-0.001	0.008	-0.021	-0.002
Easy access to pasture land	-0.149	-0.131	0.385	-0.202	0.072	-0.21	0.025
household socio-demographics							
Involved in common farm-labor	0.119	-0.316	-0.35	0.202	-0.052	-0.26	0.012*
household size	0.015	0.074	0.009	0.06	-0.001	-0.034	-0.04
age_head2	0.014	0.051	0.136*	-0.012	0.014	0.109**	0.035
age_head2_sq	0	0	-0.001*	0	0	-0.001**	0.019
household head (male)	0.234	1.381***	0.207	0.622	0.327***	0.845*	0
household head with high school edu	-0.031	-0.54	-0.111	0.044	-0.109	0.657	0.405***
Head with tertiary education	-0.165	-0.33	-0.655	0.405	-0.108	0.105	-0.07
Spouse with high school education	0.009	-0.548	-0.695	-0.033	0.171	-0.334	-0.013
Spouse with tertiary education	0.192	-0.829*	-0.386	0.245	0.174	-0.05	-0.198
Village and location							0.092
live in median size village	0.425*	0.104	0.171	0.282	0.201*	0.359	0.328**
live in large size village	0.207	0.527	0.900**	-0.204	0.151	0.211	0.022
Regional fixed effect included	2.044***	0.029	-0.166	-0.606	-0.111	0.289	-0.158
No of obs.	209	95	114	205	325	96	739
R2	0.26	0.46	0.53	0.26	0.43	0.37	0.35

Note: villages are grouped into small, median and large size based on village population

legend: * p<0.05; ** p<0.01; *** p<0.001