EXECUTIVE SUMMARY

Regional analysis of forest and environmental product use and dependence amongst rural households in South Caucasus, Eastern Europe and Russia

Riyong Kim Bakkegaard
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Introduction

An estimated 1.6 billion people are dependent to some degree on forests for their livelihoods, of which 350 million to a high degree for their subsistence or income (World Bank 2004). Environmental products[i] – i.e. products from non-cultivated ecosystems such as natural forests, woodlands, wetlands, lakes, rivers, and grasslands – can be a significant income source for rural households providing energy, food, construction and medicines both for subsistence and cash uses. This has come to be known as the 'hidden harvest' (Campbell and Luckert 2002).

Forest products, specifically non-timber forest products (NTFPs) have been characterized as often bulky, low value to weight, and need little skill to harvest. Furthermore, forest products are characteristically quite extensively spread in remote areas, where access is relatively easy or weakly regulated; (Angelsen and Wunder 2003). By their very characteristics, forest products are attractive to the poorer segments of the population and represent both a dependable source of subsistence food and fiber, as well as a source of quick income (e.g. de Merode et al 2004, Vedeld et al 2004).

In the literature, attempts to quantify resource use amongst rural livelihoods have been case-based (in selected communities), and as a result, the true value of forests and other environmental products is not captured in GDP measurements and much debate about a forest's potential to achieve significant poverty alleviation, as the quantitative contribution of forests is not well-documented (Dasgupta 1993, Oksanen et al. 2003, FAO 2006). A uniform methodology can assist in consistently measuring the role of forests and environment in household income and address the factors in environmental resource use, and efforts are underway to systematize the capture of environmental resource use in nationwide and global surveys.

This document summarizes the outcomes of the regional activity, which aims at defining the real value of forest resources in the region. It will ultimately fill a critical gap in information to quantify the true value of fully-functioning forest for rural communities in these countries. The activity covers seven countries: Armenia, Azerbaijan, Belarus, Georgia, Moldova, Ukraine, and the Russian Federation and is implemented under the regional program "Improving Forest Law Enforcement and Governance in the European Neighborhood Policy East Countries and Russia" implemented by World Bank, the International Union for Conservation of Nature and Natural Resources (IUCN) and the World Wide Fund for Nature (WWF).

Today, the value of forest products and services other than timber is apparent in the wooded areas. For the entire FOREST EUROPE[ii] region, the total value that was reported for non-wood

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goods reaches almost EUR 2 763 million, of which EUR 2 116 million are marketed plant products and EUR 648 million are marketed animal products (Forests Europe et al, 2011). The concept of sustainable forest management has also needed to encompass the contribution of forests to livelihoods of rural communities in this region (Forests Europe et al, 2011). For example, fuelwood is an essential resource on which household survival depends in this region, but there is a gap in knowledge on the actual value of its contribution to household welfare and income.

The objective of this study is to quantify the relationship between rural communities and the natural resource base around them. Through the implementation of a common and earlier tested methodology adjusted to the region, the study aims to measure the true value of a fully-functioning[iii] forest to rural communities and thereby generates quantitative results that can be used by policy makers to improve forest governance and develop appropriate forest resource policy that encompasses the priorities of local communities.

Methods

Using the common methodology based on elements of the World Bank Living Standards Measurement Survey and the CIFOR Poverty Environment Network, a regionally-adapted quantitative household survey was developed to systematically account for household income and wealth for the preceding 12 months across the 7 countries to allow for inter-country comparisons of environmental product use. Using a qualitative, focus group discussions method, a survey was also implemented at the community level to judge the most important products to peoples' livelihoods, as well as record community infrastructure and socio-economic characteristics.

The main method of valuing environmental goods was own-reported values, but estimating value can be problematic to rural households who are not used to quantifying amounts of products collected, let alone give value to them. In cases where products were difficult to value, such as fuelwood for subsistence use, enumerators were instructed to first ask about the local prices of a unit of fuelwood. If prices were not available or the respondent had difficulty, then barter prices were used- where people were asked how much one unit of fuelwood could be bartered with another traded product. Finally, enumerators could choose to ask respondents what they would be willing to pay for a unit of fuelwood.

The ENPI-FLEG Forest Dependency team consisted of one regional consultant and seven national consultants - one from each participating country. Questionnaire training took place from 31 March to 2 April 2014 in Chisinau, Moldova. Each national consultant had a team of enumerators

who went to the field for implementation of surveys between May and August 2014. September and October was spent mainly for data entry into a specially designed Microsoft Access database and data was cleaned and analyzed thereafter.

For purposes of regional analysis, data was converted to USD Purchasing Power Parity (PPP) using the World Bank 2013 conversion factors for private consumption[iv]. For inter-household comparisons, data was also converted to adult equivalent units (aeu)[v].

National consultants were brought together on the 30th September 2014 for a consultant's workshop where preliminary results of the national studies were presented. On 28th October 2014, a regional conference was held to present the main results of the regional study.

Study area

The forests in the ENPI-FLEG region fall within the northern temperate and boreal forest zones (FAO, 1999). Three of the ENPI countries, Armenia, Azerbaijan and Georgia belong to the Southern Caucasus region which is one of the richest regions in the world for species and race diversity of wild-growing fruits boasting over 260 species of fruit plants (FAO, 2006). Over 90% of the forests of Russia are classified as undisturbed by humans (FAO, 2003), and the forests of Belarus, Ukraine and Moldova also provide a rich variety of products upon which local communities depend. In fact, temperate and boreal forests in this region are a traditional source of forest products not only for timber but also for products such as resin, tannin, fodder, litter, medical plants, fruits, nuts, roots, mushrooms, seeds, honey, ornamentals and exudates (Forest Europe et al, 2011). The focus on timber production has increasingly been shifted towards people's use of the forests, and particularly the subsistence use of forest products is becoming apparent (Forest Europe et al, 2011).

The region is unique when compared to other forested regions in the world, as it has undergone a socio-political transformation after the collapse of the Soviet Union in 1991. Countries in the region experienced various degrees of market reforms, decentralised decision-making and privatization of previously state-owned lands. This led to recession, high unemployment and high poverty especially in rural areas (Tikkanen et al, 2003). The difficult rural conditions, marked further by a lack of alternative economic opportunities, has meant that rural populations are diminishing as young people are migrating out and leaving behind an increasingly aging population (e.g Heleniak, 1999, Visser 2010).

One of the major patterns of migration is labor migration to urban areas overseas or between former soviet states, and is encouraged by promises of better living conditions, entrepreneurial aspirations and supported by newfound freedoms of exit and entry (Tishkov et al 2005).

In all seven countries, surveys were conducted in the pre-identified pilot regions. 1256 households were surveyed across the regional sample, in communities located primarily in the forested regions of the countries. In addition in each community, one community questionnaire was implemented together with a key informant and/or village focus group discussion.

Figure 1 Regional map of study regions

The South Caucasus region is ranked among the planet's 34 most diverse and endangered hotspots by Conservation International, and the 2010 IUCN Red List identifies around 50 species of globally threatened animals in the Caucasus. Over 43% of the land area is covered by priority conservation areas and corridors (Slyven, undated). Half the total population of these three countries live in the rural areas. High migration rates are common in the rural areas, where the majority of the rural population lives below the poverty level (Balyan 2014; Figure 1). 196 households were sampled in forested and mountainous regions of Armenia: North (Lori Marz), North

East (Tavush Marz) and South regions (Syunic Marz). 150 households were sampled in the mountainous Zakatalsky district northwest of Azerbaijan, where two thirds of the territory is covered by forests. In Georgia, 200 households were sampled in the Tianeti Municipality of Mtskheta-Mtianeti Region, because of high land-use and forest resource dependence.

Compared to the other countries, most of the area in Ukraine, Moldova and Belarus consists of plains and lowland with forest being concentrated in the Carpathians and Crimea (FAO, 2003). Gomel Region in the southeast of Belarus with borders to Russia and Ukraine in the south has the highest forest cover percentage, and therefore 200 households were sampled in this region. In Moldova, the communities selected for the survey were spread between North, Central and South regions, with a total of 150 households sampled. Three regions in Western Ukraine were selected representing diverse forest types, and 150 households were sampled.

Finally, Russia accounts for more than one-fifth of the world's total area of forest (865 million hectares; FAO, 2010). Due to the geographical extent, three regions with high forest cover, and contrasting natural conditions were chosen - North-West Russia, Central Siberia and the Russian Far East. 210 households in total were sampled in these regions.

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Table 1 Summary characteristics of countries

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Russia	Ukraine
Forest cover	11.5%	11.8%	39.3%	40%	13%	45%	15.9 (16.5% calculated per terrain without water surface)
Area	351000ha	936000ha	9.48 million ha	3 million ha	450000ha	865 million ha	9.6 million ha
Forest type	Broad-leaved (90%) mainly oak, beech and hornbeam. coniferous (10%)	Mainly broadleaved beech with some coniferous	Coniferous (59.6%), with mainly Norway spruce and Scots pine. Broad-leaved (40.4%)	Broad-leaved (80%) coniferous (20%)	Broad-leaved, mainly *Robinia pseudoacacia* and Oak	Northern boreal mixed and temperate broad leaved. Coniferous (80%)	Broad-leaved (56%) coniferous (44%)
Forest ownership	state	state	state	State	Mostly state (85%) and municipality (15%), private (0,2%)	state	Mainly state (87.5%), communal (12.4%) and private (negligible)
Forest use	Very limited forest available for wood supply, and limited commercial forestry, with rest inaccessible due to economic reasons. collection of fuelwood, fruits, aromatic and med plants and fodder important	Extraction for wood, and also collection of wild fruits, game meat, and fodder, nuts and med plants	75% for wood supply with rest under conservation. Collection of NTFPs, berries and mushrooms	Use of wood for timber and NTFPs - berries, fruits, mushrooms, nuts.	Circa 90% of harvest is fuelwood and circa 10% is timber. A number of NFTPs, such as game, berries, fruits/nuts etc.	66% available for wood supply and rest inaccessible due to economic reasons. Collection of diverse NTFPs incl. berries wild fruits and game meat.	Big environmental importance of forests. 15.8% of forests belong to nature protection areas. In general, about 50% of forests have various limitations of commercial timber extraction. Other use: Christmas trees, NTFP collection (berries, mushrooms, medical plants), resins and and birch sap

Use rights	Paid use with issue of license, warrant or forest ticket for single use. Collection of NTFPs for personal use permitted.	Paid use for leasing from 1-10yrs with provision that 20% remain forested	Forest use rights obtained for a certain period of time. For wood 1–15 years, or short-term use for < one year. Usage rights also given for collection of NTFPs and hunting.	Paid use of timber forest resources for personal consumption within established limits. Free use of NTFPs for personal purposes	Legal harvest done by Agency Moldsilva or partially through forest lease of standing timber. Hunting and other NFTPs are regulated. Access to forests is granted, except to PAs and for commercial harvest.	New forest code has essentially made it illegal for local population to harvest wood products	Tree cutting without felling ticket is prohibited and punishable. NTFPs can be collected for free for subsistence except in protected areas where it is restricted to certain areas. Commercial NTFP collection is allowed by special ticket.
Main regulation	Forest Code 2005; logging ban since 1996	Forest code (1998)	Forest Code (2000)	Forest Code (1999) National Forest Concept (2013)	Forest Code (1996)	Forest Code of the Russian Federation (2006).	Forest Code (2006), Land Code (2001)
Fuelwood provision from state?	8m3 to forest dependent communities	Some provided by state, but mostly illegal cutting	Fuelwood and timber can be bought from state at subsidized price, up to 4.99 m3 per year, after which fuelwood is sold at a higher price	Can buy permit to cut from state, with limit of 7m3 (in the lowland areas) 15 m3 (in high mountainous areas), Mostly illegal cutting due to poverty	Authorized by Ministry of Environment, Illegal logging Is mainly subsistence driven	previously provided by the state (under Soviet times) but now generally illegal due to inconsistencies in the Forest Code and lower level legislation	Only branches <3cm diameter are free. Otherwise bought from forestry service, with special ticket

Sources: FAO, World Bank, Metla, National Forest codes, National consultant reports

Results and Discussion

Forest products and their value

Across the regional sample, 103 different products were identified.

Fuelwood is a vital resource for households in the region as it is the main source of heating and energy for cooking for most rural households. Across the countries, fuelwood provisions by national governments vary and often is not sufficient to meet the energy needs of rural households (see Table 1). As a result, much fuelwood is illegally cut. Fuelwood surprisingly only makes up 17% of all forest product value (Figure 2). However, ***due to the often complex and sensitive rules surrounding fuelwood harvest, the recorded fuelwood is likely underestimated***[vi]. Fuelwood collection is mainly for subsistence, accounting for 27% of the value of subsistence forest products, and only 3% of the value of cash products (Figure 3).

Approximately one quarter of the value of forest products comprised wild fruits, and of these wild fruits, 65% of total value were from 17 different types of berries: primarily cranberry, blueberry and wild strawberry. Berries dominate forest product collection for cash, making up over 50% of total value of cash forest products collected (where only 10% is collected for subsistence). In Armenia and Azerbaijan, cornelian cherry is a high value product sold fresh and used for processing, along with a diverse range of other berries such as wild rose berries, wild strawberries, blackberries and raspberries. In Russia blackberries and cranberries are collected in large quantities (43% of total forest value), with cranberries being easier to collect and fetching high value. Blueberries in Ukraine are an important seasonal income (43% of forest value in Ukrainian sample) and also fetch a high price due to hand-picking and organic status. In Belarus, cranberries and blueberries are collected for sale (52% of forest value in Belarus sample)

Mushrooms (17%) and nuts (15%) both have significant cash values across Russia, Belarus, Moldova and Azerbaijan. Across the regional sample, quantities sold and consumed are relatively equal. Hazelnuts in Azerbaijan and walnuts in Moldova are collected for sale. Mushroom collection on the other hand, is a recreational activity in Ukraine and Russia, and across the countries mushrooms are collected more for subsistence than sale.

Livestock related products, specifically fodder originating from the forest, makes up 11% of total value and is largely for subsistence use. This is predominant in Armenia and Georgia where livestock breeding are important livelihoods. Sawnwood processing is also common, particularly in Russian Far East (contributing to 25% of value of forest products in this region), and Moldova (12%

of value). Other products found across the sample, include alcoholic beverages (mainly in Georgia and Russia), medicinal plants (small values across all countries), fish and meat.
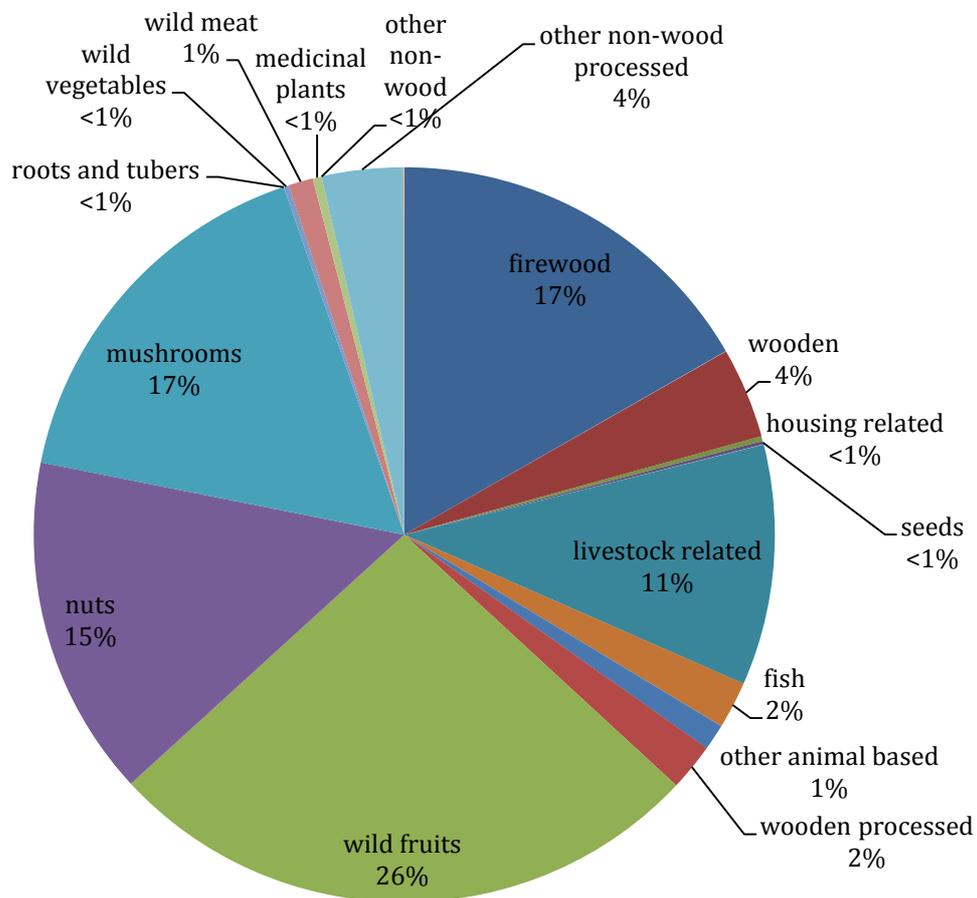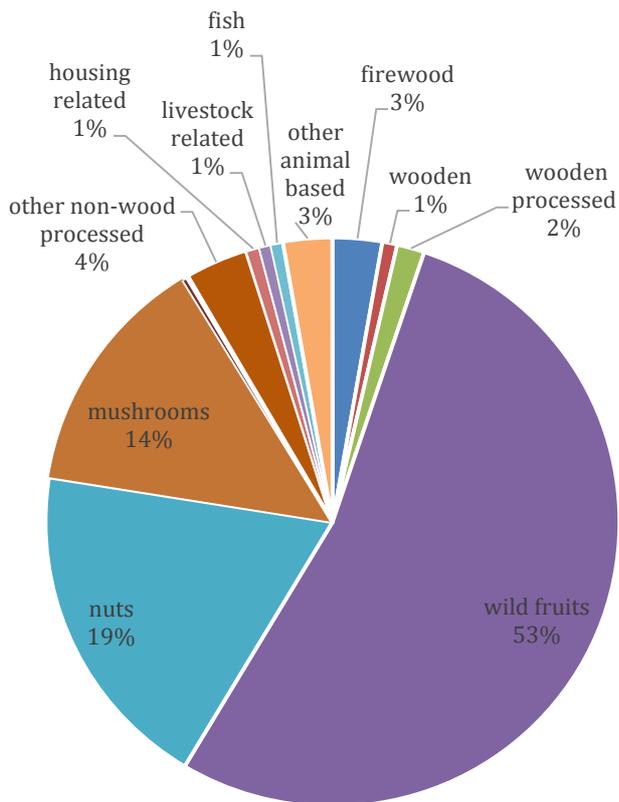

Figure 2 Shares of total value of forest and environmental products ENPI FLEG countries and Russia
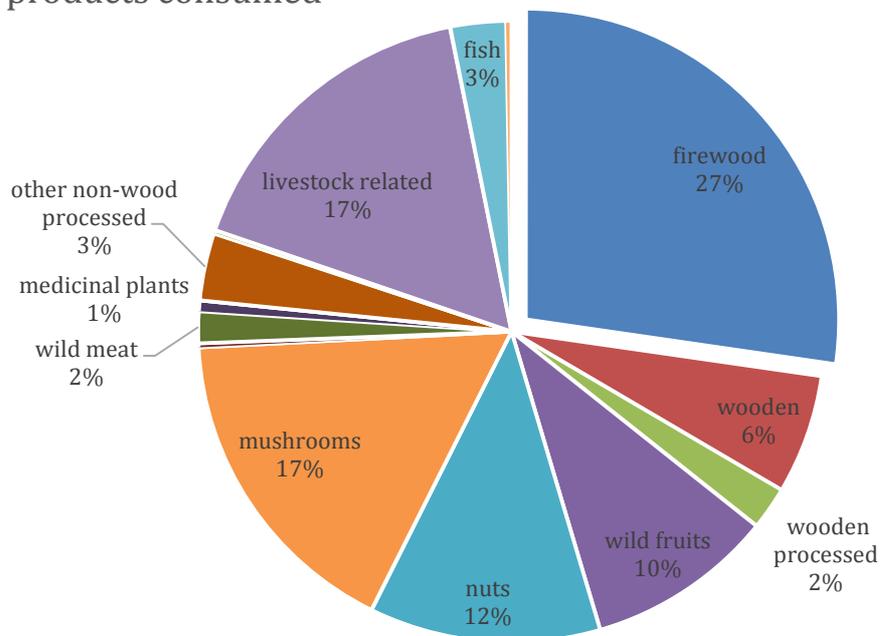
Forest and environmental products sold

- fish 1%
- housing related 1%
- livestock related 1%
- other animal based 3%
- firewood 3%
- wooden 1%
- wooden processed 2%
- other non-wood processed 4%
- mushrooms 14%
- nuts 19%
- wild fruits 53%

Forest and environmental products consumed

- fish 3%
- livestock related 17%
- firewood 27%
- other non-wood processed 3%
- medicinal plants 1%
- wild meat 2%
- mushrooms 17%
- nuts 12%
- wild fruits 10%
- wooden 6%
- wooden processed 2%

Figure 3 Forest and environmental products for cash and subsistence (percentage value)

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Forest dependence

To measure the forest dependence, a numeric is used here called Relative Forest Income, which is total forest income[vii] divided by total income (after Vedeld et al 2004).
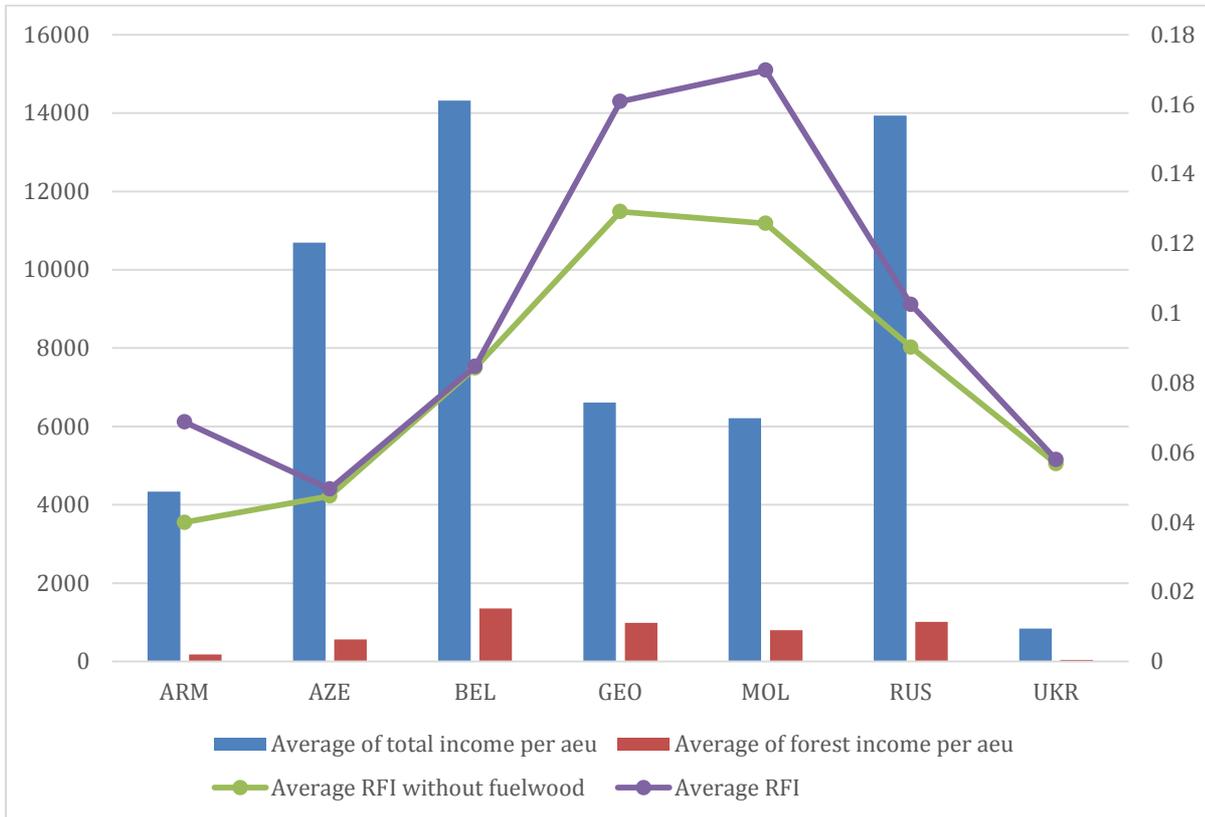

Figure 4 Average forest dependence and total and forest incomes across countries

Figure 4 gives an overview of forest dependence (RFI; purple line) compared to total income per aeu (blue bars) and forest income per aeu (red bars). Some distinct patterns emerge - Belarus and Russia are the richest per aeu. ***On average Georgia and Moldova had the largest RFI and the largest difference between RFI and RFI without fuelwood, indicating that fuelwood makes up a significant component of forest product collection. The national reports also support this- despite gasification in Georgia, fuelwood dependence remains high due to high costs of gas***. In Moldova, dependence on fuelwood for heating is high. Official statistics for sold fuelwood are provided from the national forest authority Moldsilva who is responsible for sale, yet fuelwood capture as income in the household survey suggests some degree of illegal logging (Zubarev et al,

2014). Armenia also shows this trend, and again high gas prices drive the high reliance on fuelwood.

On the other hand, ***Azerbaijan, Belarus and Ukraine have almost no difference in forest dependence when fuelwood is removed from forest income, reflecting the strict policies around fuelwood extraction and the reluctance of respondents to report this, or the provision of fuelwood at subsidized prices as in the case of Belarus.***
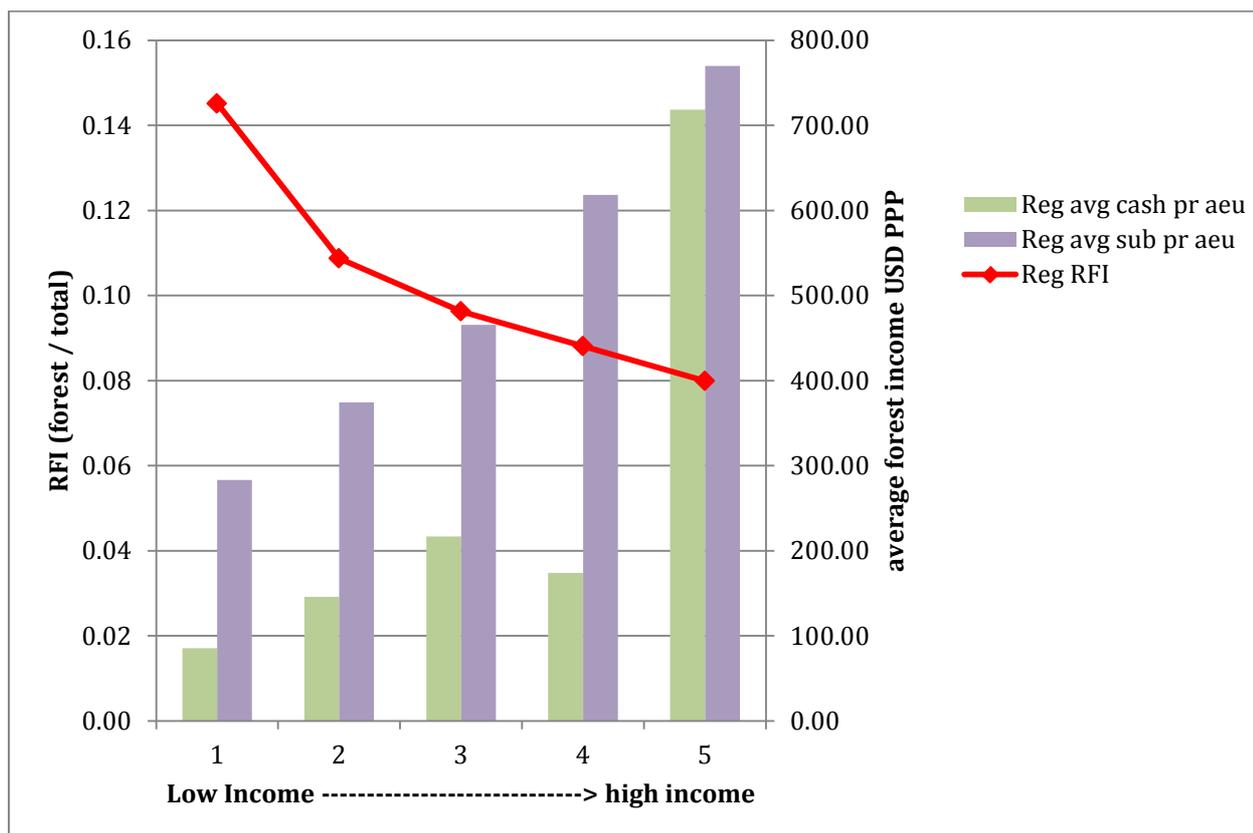

Figure 5 RFI over regional averages for cash and subsistence forest incomes (USD PPP) per aeu

Further, the samples in each country were divided into five equal income categories (quintiles) based on their total income per adult equivalent (aeu) income. Quintile 1 reflects the poorest where quintile 5 is the richest. In Figure 5 a regional average for forest cash and subsistence per adult equivalent is given across the five different quintiles. The red line represents the regional average RFI, which importantly shows that ***poor are more forest dependent than their richer income counterparts***: the typical relationship shown in previous studies of forest dependence amongst rural populations in tropical forest regions (e.g. Cavendish, 2000, Fisher 2004, Mamo et al 2007, Bakkegaard, 2008). Indeed, this relationship is due to a variety of factors,

including the fact that these resources require minimal capital and skills to harvest, and are usually accessible for extraction (Angelsen and Wunder, 2003, Belcher 2005).

Similarly *average regional cash forest income per aeu is also highest in the richest quintiles*, further confirming trends in other studies (Vedeld et al, 2004), and this was found in every country sample. Richer quintiles often have better resources (e.g. money, labour) to invest in extracting forest resources and also in realizing their cash potential and this can be often tied to their higher social status and thus network in communities (Ambrose-Oji, 2003).

Socio-economic characteristics are also determinants in forest resource use behaviour, and in a simple analysis using pairwise correlations[viii] household characteristics were correlated to RFI and forest cash and subsistence per adult equivalent (Table 2). Larger household for instance could mean greater income needs and the need to feed more household members (e.g. Appiah et al, 2007) but also more labour to diversify into more rewarding income streams (Mamo *et al*, 2007). In this case, *higher RFI is significantly correlated with smaller household sizes showing that forest income make up larger shares of total household incomes in the smaller households*. In fact, the higher forest subsistence per aeu drives the correlation here, indicating that *small households harvest products for subsistence.*

Table 2 Pearson correlation coefficients

	RFI	Forest cash per aeu	Forest subsistence per aeu
	r	r	r
Household size	-0.1279 *	-0.0554	-0.2908*
Distance to market (km)	0.1022 *	0.0800	0.0480
Age	-0.0891	-0.0924	0.0540
Education of HH head (yrs)	-0.0325	-0.0352	-0.0032
Wage per aeu (USD PPP)	-0.1570 *	0.1237 *	0.2415 *
Other per aeu (USD PPP)	-0.1672 *	0.1055	0.0640
Net livestock animal per aeu (USD PPP)	-0.0753	0.0243	0.1358 *
Net agriculture per aeu (USD PPP)	0.0057	0.0548	0.2079 *
* denotes significance at 5%			

Greater distance to market is also significantly correlated to greater share of forest income in total household income and implies that *households earning higher incomes from forests have the opportunity to exploit a more expansive high quality resource base*.

Lower income from other sources per aeu is significantly correlated to higher RFI, showing that *other income could suffice to support rural households without them having to tap into forest income*.

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However, it could be related in some degree to the demographics of those who receive other income. Although age is not significant, 83% of other income is made up of aged pensions suggesting that the aged population receiving pensions have lower shares of forest income in their total household incomes. Studies from tropical regions suggest that the intensity of forest resource collection could be beyond the capabilities of an aged household (Vedeld *et al*, 2004, Mamo *et al*, 2007), suggesting that the younger households are more likely to engage in resource collection.

Age and other socio-economic characteristics, such as the role of education, deserve further analysis on the national level. Education of household heads has been found in other studies to lead to less forest dependence (e.g. Godoy and Conteras 2001, Adhikari et al 2004) as education can lead to better opportunities for outmigration and off-farm employment (Mamo et al 2007). This however, could be confounded where forest product collection activities serve a recreational purpose as in Russia and Ukraine.

In a simple analysis of gender role in collection, the regional sample showed that **subsistence products were collected by both adults in the households, but largely by men** (Figure 6). As in other regions, certain activities may culturally be the domain of men (e.g. charcoal making in Malawi, Fisher 2004). In the regional sample, firewood, wild meat, fishing and livestock related (fodder) were largely collected by men, but *proportionally*, women were relatively more involved in nuts and medicinal plant collection.
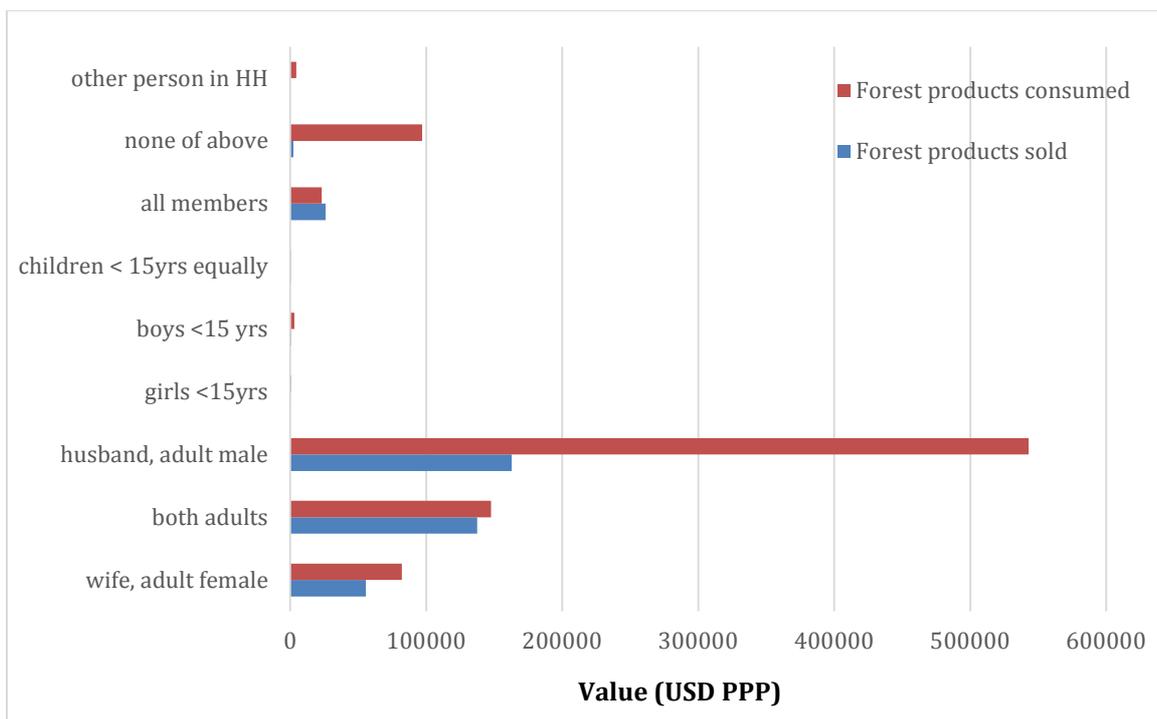
Figure 6 Main collector of subsistence and cash forest products

Forests and sustainability

In community focus group discussions, communities identified the most important products for their livelihoods. Almost all country samples identified fuelwood as a central product with the other main products being berries (cranberries or blueberries), nuts, and mushrooms. Most communities also revealed a decline in availability in a forest product.

Often cited reasons for decline had to do with reduced forest areas due to logging or overharvesting (berries). Non-local harvesters attempting to cash in on lucrative berries have left cranberry distributions low. Furthermore destructive harvesting techniques that speed up harvesting but damage regrowth have also led to their decline. Climate change was also an often cited reason as the drying up of marshes shrinks cranberry distribution.

Nuts in the Siberian pine in Altai have also suffered from overharvesting and destructive techniques. Chestnuts in Azerbaijan have also been in decline due to disease and drying climate, and climate has also been the culprit for changing distributions of mushrooms in Russia.

Finally across countries, fuelwood was recognised as an important product and generally in decline. Main reasons attributed were reduced forest area due to unregulated logging or forest use restrictions, climate change (less rainfall and drought causing shrinking forest area), and increased collection and overharvesting (illegal).

All of these reasons point to the need for better forest management to secure the availability of economically and socially important forest products. Indeed, this is a resource base that is essential for rural households to survive during winter months. Fuelwood harvesting and provision in particular needs to be better managed as gas prices are beyond the affordability of some rural households to make the total switch to gas.

Climate variability is also affecting both forests and forest product availability, and this is already being felt by communities. Diminishing forest incomes in rural livelihood strategies means that rural households need to be able to make a viable living from other activities. This could include agriculture, which will require investments into technology transfer, market development and the labour market. Alternatively, it could mean generating more employment opportunities for rural people. In any case, policy makers will need to consider where incomes will be generated if not from forests.

Conclusion

The role of forest and environmental resources in rural household incomes is evident. Forest products are important for subsistence and cash income in this region, and therefore vital to livelihoods of the rural people. This is particularly pertinent in these countries, where rural economies are still lagging behind their urban areas, and migration, poverty, and lack of jobs are encouraging the depopulation of rural communities.

This analysis is one of the first characterising forest resources use in such an extensive area of the northern temperate and boreal forests, in countries that are transitioning from decades of Soviet rule to new economies. Results from this regional analysis have confirmed the trends found in forest poverty studies in the tropical forest regions, but in this region outmigration and aging populations are common, as are the opportunities to migrate for labour to neighbouring countries.

The average regional forest dependence of households is 10.3% with national variation from 5% to 17%, and even higher variation within study sites. ***Fuelwood remains important despite the beginnings of gasification in communities. The latter remains practically out of the reach of rural households due to high gas prices and costs of installation. Berries and mushrooms contribute greatly to cash income, with some households using income from these products to supplement other sources of household income.***

The analysis has shown that forest income makes up a larger share of total household income if the household is poorer. Consequently, ***poorer households are more dependent on forests. Also, the richer households of the community generate more forest cash income.***

Importantly, most communities see ***forest products as declining in availability*** citing reasons such as overharvesting, illegal logging, and climate change as main drivers that result in the shrinking of the resource base. Thus, in the face of overall macro-economic development and climate change, it is critical to understand how people depend on nature so that appropriate measures can be taken to secure households who may be dependent on forests for their livelihoods.

Although these studies are only snapshots in time of localised cases, they serve to demonstrate that forests and the environment provide important resources to the rural households. These not only points to the need for continued research and analyses, but for the development of appropriate policies that take into account the resource needs of rural communities in order to ensure that the people who are most dependent on forests and the environment are not excluded from an important base for their survival.

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[i] Forest products are classified as a subset of environmental products. Forest products are any products originating from forests, which are defined as *lands of more than 0.5 hectares, with a tree canopy cover of more than 10 percent, where the trees should be able to reach a minimum height of 5 meters in situ, and which are not primarily under agricultural land use (FAO, 2000).*

[ii] Covers the European continent as far south as Turkey and Cyprus and as far east as Georgia and Russia.

[iii] full-functionality refers to the functionality to rural communities as well as environment.

[iv] Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S. dollar would buy in the United States. This conversion factor is for private consumption (i.e., household final consumption expenditure) (World Bank, 2014).

[v] after Cavendish (2002): Adult equivalence scales standardize households accounting for household composition in order to allow one member of a household to be compared to another member of another household.

[vi] The issue of underestimation, particularly of certain products like fuelwood where harvesting is illegal in some countries, and general reliability and validity of the data is discussed in the full regional report.

vii Forest income captures income earned from forest as well as non-forest environments that exclude any form of cultivated field (which would enter the household income as agricultural income). The term "forest dependence" and its measure "Relative Forest Income" is therefore used to describe the share of forest and environmental (wild non-cultivated) income in total household income.

viii Pairwise correlations in STATA v.11 is a statistical technique that is a measure how well two variables are related to each other. A positive sign suggests that as the column variable increases, the row variable increases. the size of the correlation coefficient is also indicative of the strength of the association, with all r values falling between -1 to 0 to 1.

About the author

Riyong Kim Bakkegaard (Riyong@hotmail.com), the regional consultant for this study, has worked extensively in tropical forests regions of South East Asia, and Congo and Brazilian Amazon basins examining the socio-economics of rural livelihoods and dependence on natural resources. She holds a PhD and MSc in natural resource economics and rural development with specialization in tropical forestry and REDD+/PES. Based in Denmark, she is currently working on developing methodologies for valuing the environmental contribution to household welfare with FAO, CIFOR, PROFOR and the World Bank, and also works on low-carbon and climate resilient development at UNEP DTU Partnership.

About FLEG II (ENPI East) Program

The Forest Law Enforcement and Governance (FLEG) II European Neighbourhood and Partnership Instrument (ENPI) East Countries Program supports participating countries' forest governance. At the regional level, the Program aims to implement the 2005 St. Petersburg FLEG Ministerial Declaration and support countries to commit to a time-bound action plan; at the national level the Program will review or revise forest sector policies and legal and administrative structures; and improve knowledge of and support for sustainable forest management and good forest governance in the participating countries, and at the sub-national (local) level the Program will test and demonstrate best practices for sustainable forest management and the feasibility of improved forest governance practices at the field-level on a pilot basis. Participating countries include Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, and Ukraine. The Program is funded by the European Union.
http://www.enpi-fleg.org

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