UNDERSTANDING THE FORESTRY SECTOR OF ARMENIA: CURRENT CONDITIONS AND CHOICES

Main Report

Nils Junge& Emily Fripp

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CONTENTS

ABBREVIATIONS AND ACRONYMS

AAC	Annual Allowable Cut
AMD	Armenian dram (currency)
ENA	Europe North Asia (region)
ENPI	European Neighbourhood Policy Initiative
FAO	Food and Agriculture Organization
FE	Forest Enterprise
FLEG	Forest Law Enforcement and Governance
FMP	Forest Management Plan
FREC	Forest Research Experimental Centre
FW	Fuelwood or firewood
NGO	Non-governmental Organization
NPAC	National Program Advisory Committee
SFMC	State Forest Monitoring Centre
SNCO	State Non-commercial Organization
WWF	World Wildlife Federation

EXECUTIVE SUMMARY

- The Armenian forest faces two fundamental problems. First, demand for wood far exceeds official supply. Second, the forest growth rate is slower than current estimated rate. Armenia's forested area is too small to allow for complacency.

- Officially recorded supply of fuelwood, at approximately 75,000 m^3[1] in 2010, is far below estimated household consumption, which was estimated at 457,000m^3 [2] but could be multiple of that. In addition there is an unknown demand for timber for industrial purposes, some of which could possibly be exported. As a result, demand is met by a shadow market.

- Because the Annual Allowable Cut determined by the Forest Management Plans is quite low (and often, when set by the government, is even lower) the state has no way of capturing the revenue generated by the shadow market. This is combined with weak institutional structure underfunded Hayantar (forest authority).

- Socio-economic indicators strongly suggest that consumption of wood extracted from accessible forest areas is higher than the forest growth rate in those areas. The result is the gradual loss of Armenia's forest stock. This leads to widespread degradation and accompanying environmental problems, which will get worse over time.

- To confront these twin threats, one way or another supply must be increased and demand must fall. Supply can be increased in at least three ways: i) better forest management, increased ii) reforestation and afforestation, and iii) more imports. Demand can be reduced, at least partially, through i) promoting affordable alternative fuels, ii) facilitating imports, and iii) measures promoting home energy efficiency.

- The study explains how weak forest management, imited forest resources, high poverty levels, rising gas prices, and tolerance for corruption combine to create unsustainable conditions. While from a market perspective solutions to the problem are fairly clear, from an environmental perspective, the problem is multi-dimensional and extremely challenging. However, there are a series of measures that can be undertaken to reduce demand and increase supply.

- Combined with improved forest management, any measures that reduce consumption of wood and increase the quantity and quality of trees will have environmental, social and economic benefits.

- Overexploitation will remain a problem as long as demand exceeds growth rates, and as long as intermediaries (brigades) are allowed to extract as much wood as they can sell.

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[1] Officially recorded supply equals AAC + fallen wood, illegal production and imports.

[2] Assessment of the Economic and Social Impact of Unsustainable Forest Practices and Illegal Logging on Rural Population. (ICARE 2011)

1. INTRODUCTION

Objectives

Armenia's limited forest resources are under intense pressure for fuelwood and industrial timber. Official supply is a fraction of estimated fuelwood consumption, creating a shadow market which relies on large volumes of informally or illegally harvested wood. The majority of households, even in forest communities, purchase fuelwood from intermediaries.Wood harvested for processing and, potentially, export, adds further pressure on forest resources. There is no sustainable forest management.

The current study seeks to provide a framework for implementing a sustainable forestry policy. Drawing on recent forest sector studies, the report summarizes current conditions, and examines choices facing the Government, based on a multi-dimensional understanding of forest resource use and misuse in Armenia. It examines competing demands for fuelwood and timber under conditions of limited supply and weak state institutions. It assesses the limitations and opportunities for development of a forest sector industry. It assesses competing economic, social and environmental pressures and their implications for forest sustainability. From an institutional perspective, it considers the factors which enable a reduction in illegal logging, and how policies may be able to address it.

Why another study? The problems in the Armenian forestry sector have been well researched and are broadly known. Sensible recommendations have been developed in various studies over the years. Yet even thefew policy measures that have been introduced, while formally implemented, have led to superficial or incidental changes without addressing underlying problems. In an attempt to promote renewed efforts to address forestry sector problems, the current study builds on technical and socio-economic analysis and assesses political economy factors within the sector. It estimates the impact of a series of policy changes to help the government decide what path to take. Itcombines a technical study with institutional and socio-economic analysis, drawing on market, socio-economic, policy, and political economy assessments. It seeks to address why, after a decade of efforts, progress toward developing a sustainable forestry sector has been less than effective. Drawing on this the recommendations acknowledge the potential risks and present means of mitigating against such risks.

Report structure

The reportfollows a narrative structure. Section 2 outlines the context, looking at both the problems facing the forest sector (to answer the question why a study is needed) and potential positive drivers of change. In order to clarify what is at stake, Section 3 describes the forest from a resource perspective. It explains why it is in such high demand by different stakeholders, and the implications for sustainability. Sections 4 and 5 look at demand from a socio-economic and industry perspective respectively. To understand market dynamics in a high demand/limited supply environment Section 6 looks at how the market functions, seeking to address the imbalance between supply and demand, reviewing prices and institutions which facilitate and exploit the situation. Section 7 then examines the role of institutions and political economy

factors in addressing the market. Section 8estimates the impacts of a number of policy measures – in social, economic, environmental and corruption terms.Section 9 provides a series of concrete recommendations. It presents possible directions and steps which can promote a sustainable forestry sector.

The report draws on new research in the forestry sector, primarily: a socio-economic assessment based on new household survey data[3], a qualitative study of household knowledge, attitude and perceptions,[4] and a review of the processing industry, and official statistics.[5] A review of forest studies, political economy and other relevant material was also used for background information. Interviews with at least 30 organizations and entities (including government, non-government and donor) were conducted, and preliminary results were discussed at two National Program Advisory Committee (NPAC) stakeholder workshops.

Note: This report is an overview of forest sector issues, and should be read in combination with other recent FLEG studies for a more comprehensive understanding of the sector.

2. CONTEXT

Is Armenia's forest sector is at a fork in the road? On the one hand, there is continuing pressure on forests as a common resource pool, with continued over-exploitation of fuelwood and high quality timber. Weak institutions and insufficient political will have, up until now, been unable to limit these activities. On the other hand, there are both natural and socio-political factors which underlie the problem. The policy and institutional reforms agenda began in the late 1990s after intense public pressure to protect the country's forests. However, it has met with limited success, for reasons discussed in this report. Renewed attention is being given to addressing forest sector concerns at high levels in the government. This represents a fresh opportunity to push for comprehensive solutions to the problems.

Good principles, poor practice. The new Forest Code (2005) states that: "*The main goal of the national forest policy for the Republic of Armenia is the provision of sustainable management of forests and forest-lands. The task for the Government is balancing nature protection and public interests, by creating conditions for the country development, keeping at the same time ecological and social values of the forests*". The Code is built on the principles of sustainable forest management, balancing economic, social and environmental factors to ensure a sustainable forest sector. While the language in the Code is exemplary, it is not reflected in practice, i.e. policy implementation. Thus there is a tendency to fixate on illegal logging (among both government and NGOs) rather than the implementation of the principles of the Forest Code. Perhaps this is because it is one of the most visible indicators of Armenia's forestry problems. However, defining illegality in the forest sector is tricky, and in any case it is only part of the story.

[3]ICARE (2011). Assessment of the Economic And Social Impact of Unsustainable Forest Practices and Illegal Logging on Rural Population of Armenia.

[4]Hazarashen.(2010). Knowledge, Attitude and Perceptions of People Living in Communities Adjacent to Forests.

[5]AM Partners. (2010). Wood-Processing Sector Survey

The Problem

Years of unsustainable and illegal logging have reduced both forest quantity and quality.Following independence, an energy crisis led to significant deforestation, reducing Armenia's already minimal forest cover. A shadow industry sprang up which logged much of the most valuable species for export and domestic processing ("creaming"). At the same time, the market for fuelwood remained robust, and was exploited by informal operators, reportedly in collaboration with local state institutions and officials. Thus, social pressures morphed into economic pressures.

Forest management has been too weak to ensure sustainability.Hayantar, the forest agency responsible for forest management, is under-resourced (in terms of budget, equipment, and qualified personnel). Foresters have a low status and low salaries and receive minimal training. Forest management plans (FMPs), developed over the last 5-7 years, arenot necessarily followed. While FMPs have been introduced and developed with donor assistance, there is resistance to implementing them, in part based on lack of knowledge on their utilization. There is political imperative regarding the AAC, which overrides the cutting levels prescribed in the FMPs. There is also a public perception that FMPs may not be based on accurate data.

Corruption in the forest sector is inevitable as long as demand outstrips supply. Although difficult to measure, corruption in Armenia is perceived to be widespread, and has not spared the forest sector. Corruption works against equitable outcomes by undermining social justice and breeding distrust and cynicism toward government. Resistance to policy measures can be expected, often resulting in non-implementation of legislation.

Institutional structure limits forestry sector actors from performing their functions. Hayantar (ArmForests, the national forest agency)embodies a dual role as both manager and user of forests. This gives rise to conflicting incentives, especially in times of tight budget constraints. Hayantar's status as a state non-commercial organization (SNCO) limits its ability to control. Furthermore, responsibility for forests is split between the Ministry of Agriculture, to which Hayantar belongs, and the Ministry of Nature Protection, to which the Environmental Inspectorate, charged with identifying illegal logging, belongs.

Social pressures continue to exert a strain on forest resources.Fuelwood continues to be in high demand, despite a program which has seen most urban areas and half of rural areas supplied with gas since 2004. Currently, 566 communities have mains gas,[6] out of 915 total.Fuelwood from logged trees sold by intermediaries is likely the number one factor behind over-exploitation of forests. In addition, higher growth rates than those projected by Forest Management Plans would be expected, but grazing and unrestricted access on deforested areas weakens regrowth and can lead to permanent deforestation. Only when grazing is restrictedare degraded or deforested areas likely to grow back as forests.

[6] Source: ArmRosGazProm: www.armrusgasprom.am.

Points of Resistance / Drivers of Change

***Awareness and activism on forest sustainability is growing*.** There are a number of environmentally-oriented NGOs in Armenia whoensure that the issue remains on the agenda. Thegrowth of social network sites, awareness of biodiversity and climate change concerns and the links with forestry are also growing, creating an enabling environment for activism towards forest sustainability.

Poor accessibility has thus far protected part of Armenia's forests. Armenia's topographical features mean that as much as one third of its forests are located on steep terrain, making trees difficult to extract. The absence of logging/forest roads reduces access to areas farther from existing road networks. This lack of access puts pressure on the more accessibly located forests, making it difficult to extract wood in a balanced manner.

International partnerships can serve to raise awareness and promote change. Armenia is one of seven ENA (Europe North Asia) members of theFLEG ENPI (European Neighborhood Policy Initiative) which seeks to tackle both supply and demand. ENA FLEG[7] is not politically binding, but participation signals a willingness and commitment to erect a framework for a legal and sustainable forestry sector. The FLEG ENPI and EU FLEG(T) Acton Plan[8] both recognize the importance of tackling supply and demand for illegal products as a key component for addressing the supply of illegal timber.

Box 1: FLEGT – The role of consumers and producers

The World Bank supported FLEG programmes and the EU FLEGT Action Plan both focus on Forest, Law Enforcement, Governance, and for the case of the EU, Trade. The FLEG processes started with the Asia FLEG in September 2001, followed by the Africa FLEG in 2003 and then the ENA FLEG in 2005. The EU's FLEGT Action Plan, approved by Council in October 2003, aims to tackle the global problem of trade in illegally timber products, addressing both demand and supply through actions in both consumer and producer countries. From a consumer perspective actions include: support to the development of Public Procurement Policies for timber; review of legislative tools (an outcome of which is EU Timber Regulation approved in 2010), and support to buyers (retailers/traders) to buy legal and sustainable products. From a producer country perspective a key component is the development of Voluntary Partnership Agreements (VPAs) between the EU and individual producer countries. VPAs commit producer country partners to help improve the stewardship of their forests: introducing systems to regulate forest practices effectively; track forest products and license their exports to the EU to ensure legality. Other support to producer countries, without a VPA, includes: defining legality, and supporting government institutions and companies to ensure legality can be met and means of verification or ensuring compliance with legality are in place.

For these reasons the Armenian government has come under intense pressure from international organizations as well as from domestic population to protect its forests and

[7]The Europe North Asia Forest Law Enforcement and Governance, ENA FLEG, political decree signed in 2005, also known as the St Petersburg Declaration.

[8] The EU Forest Law Enforcement, Governance and Trade (EU FLEGT) Action Plan was approved by the EU Council in October 2003 It outlines actions to be implemented in both the EU and producer countries, addressing demand through for example procurement policies and legislation, and supply through technical assistance for legality assurance systems, in some cases under a Voluntary Partnership Agreement (VPA) between the EU and a producer country partner.

improve forest management. Before moving on to discuss the implications, the next section provides an overview of the state of the forest.

3. THE FOREST RESOURCE

Forest Area and Stock

Despite increasing importance placed on forest over the past decade, there is no consensus on what constitutes the level of forest cover in Armenia. There are various estimates but it is uncertain to which extent they are based on robust scientific and analysis. For the purposes of this study, we present the available information on forest cover from the differ sources. A 2010 FAO assessment[9] estimated forest cover at 262,000 hectares (ha) and earlier estimates suggest the figure may be considerably lower. Moreno-Sanchez (2005) estimated forest cover at 245,000 ha, and a Forest Resource Assessment from 1998 and 1999 estimated that only 215,357 ha of forest was considered to be suitable for forest resource extraction and it is likely that this has been further reduced over the last decade.[10] Virtually all forest resources are located in Tavush and Lori marzes (northeast) and Syunikmarz (south), with just 2% located in central Armenia. Perhaps between 62% and 75% of forest land under Hayantar has forest cover.

Regardless of what the precise figures are, the fact remains that Armenia has extremely low forest cover. Armenia has extremely limited forest resources, making it particularly vulnerable to over-harvesting. Overall, as a share of Armenia's land area (29,800 sq km) forest cover stands between 7% and 9%. This is somewhat below neighbouring Azerbaijan (11%) and far lower than Georgia (40%).

Reforestation and afforestation programs are in place but could be more robust.Reforestation and afforestation programs have been implemented on approximately 33,540 ha of forest land over the past 10 years (2000 to 2009), although of this 3,854 ha has been replanted, and 5,944 ha are designated for the promotion of coppicing.[11] The remaining area has been left for natural regeneration through fencing or mineralisation.

Because of the difficulty in accessing much of Armenia's forests due to topographical features, only a share of the forests can be reasonably utilized. As noted above, the fact that a large share of Armenia's forests (up to one half) is located on difficult to reach terrain, either on steep hillsides or in ravines (approximately 80% of the country's terrain is mountainous) reduces access and therefore availability. Although total forest stock is estimated at 34 – 40 million m^3,[12] realistically, less than two thirds of this is accessible, with implications for supply and demand management.

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[9] FAO, Global Forest Resources Assessment, 2010

[10]Thuresson, T, B. Drakenberg& K. Ter-Gazaryan. (1999). Armenia Forest Resources Assessment, Report on Sample-based forest resource assessment of the forests possible for exploitation in Armenia.

[11]Hayantar.

[12]Hayantar.

Limited forest resources offer fewer environmental, social and economic benefits. On a per capita basis, Armenia's forest cover (0.1 ha) is far below both CIS (2.7 ha) and world averages (0.5-0.8 ha).[13] The forest thus represents a limited natural resource, from an environmental, economic and social perspective – the population enjoys fewer environmental benefits than in other, forest-rich countries;and an economic perspective – the domestic wood processing industry is unable to achieve the economies of scale necessary to be competitive (although some companies are able to do well).

Limited forest resources reduce international leverage. Limited resources translate into low exports and in Armenia's case these are negligible. Official exports in 2009 were 976.4 tons (USD 283,900) of wood and wood articles. From a policy perspective, this severely reduces the ability of international actors such as buyers within the EU and the EU regulatory requirements, to exert pressure for sustainable forest management.

A limited forest resource base implies a lower ability to absorb losses. Poor forest management and illegal logging has a greater impact because the resource base is smaller.Because of the low level of forest stock and many inaccessible areas, Armenia is more vulnerable and cannot afford to neglect the problem from a domestic perspective. Overharvesting of trees pushes the country's forests closer to their limits than would be the case in forest-rich countries like Russia, for example.

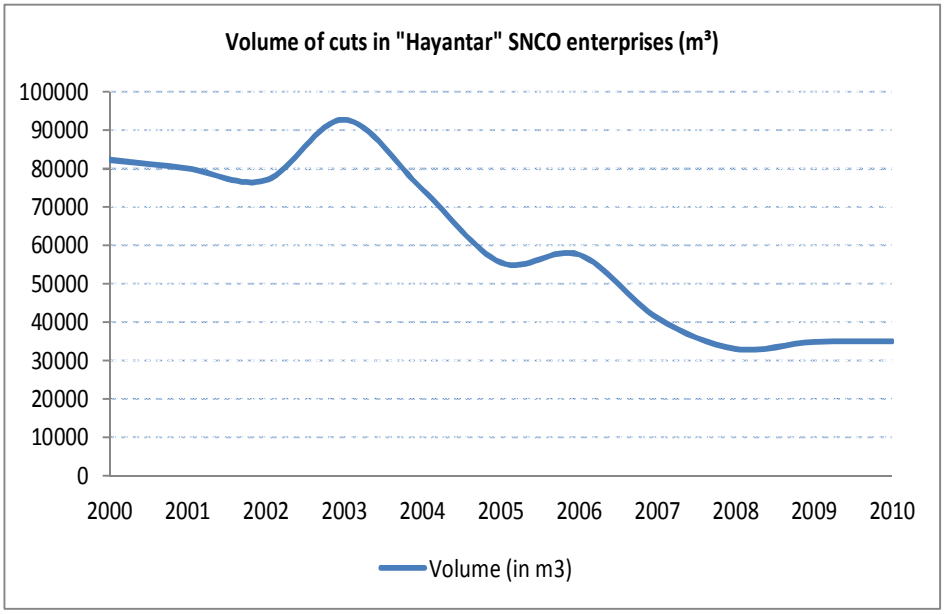
Armenian rich variety of forest species is at risk. According to 1993 estimates, just under half the stock was beech, with oak (30%) and hornbeam (14%) making most of the balance, and other species (walnut, ash, pear, hazelnut, etc.) especially valued for furniture, the remaining 6%. New assessments are likely to show that illegal or poorly managed logging has severely degraded the high quality species structure in accessible areas. These ratios will have changed significantly, reducing the variety and value of the forest. For example, there are reports from the population that many, if not most, of the walnut trees have been illegally cut down.

Supply

Responsibility formanaging supply lies with Hayantar. The majority of commercial timber or fuelwood supply originates from the 18 Forest Enterprises, responsible for managing forests under Hayantar. Supply is notionally based on Forest Management Plans (FMPs), developed over the past several years by the Forest Research Experimental Centre (FREC).However, the FMPs severely limit the AAC, and government has in recent years set them even lower than the aggregate FMP levels. In 2010 AAC was 35,000.

[13]SavcorInduforOy. (2005).

Figure 1: Volume of cuts in Hayantar enterprises



Source: Hayantar, 2010

The AAC reflects concerns over the extent of forest degradation. In theory, the AAC could be set far higher. Past estimates of forest growth range from 1.5 to 3 m^3/ha, which would result in 393,000 to 686,000 m^3 of annual growth, based on 262,000 ha of forest cover. However, Hayantardoes not consider raising the AAC feasible, for the following reasons:

i) Only 63% of the area with forest cover is accessible, so the AAC should not take into account inaccessible land;
ii) Keeping AAC artificially low can allow forest areas to recover, reversing some of the degradation;
iii) Officials are concerned over the reaction of environmental NGOs, who may perceive an increase in the AAC as further endangering forest sustainability; and
iv) A low AAC is needed to offset continuing high levels of illegal production, so that, an informal approach to planning is taken to address informal activities.

A low AAC will continue to guarantee illegal logging activities. In fact, although concern over regrowth is valid, one could argue that a low AAC, which does nothing to address demand, actually guarantees that the vast majority of cutting will be done illegally/informally. Regardless, the aggregate AAC shouldbe based on accurate data in the FMPs and reflect a summation of the AACs for all 18 FE. It should not be artificially changed by the MoA. Information supporting the AAC would be made publically available, along with FMPs, an arrangement that would help with communication with the public and NGOs.

Low AAC is supplemented by other sources – fallen wood, illegal production, and imports. Clearly, the official AAC is insufficient to meet domestic demand (as shown in following sections), and is supplemented in various ways: through the sale of fallen wood, sanitary cuttings, and illegal production. Fallen wood and sanitary cuttings by their very nature are not

predictable in volume but can make up a significant share of the volume of forest products supplied to the Armenian market.

- *Fallen wood:* Estimates from technical experts and Hayantar, suggest that fallen wood could be as much as 1 m^3/ha of forest cover. Thus, fallen wood could be potentially as high as 262,000 m3, although, again, not more than two thirds of this may be accessible.
- *Imports* of timber products, in particular processed and semi-processed products, have increased steadily during the past decade, and in particular over the last three years. Meanwhile, exports have been declining in recent years. This is quite possibly due to the decline in availability of high value tree species suitable from years of creaming of the forests.
- *Sanitary cutting*: In 2009 total from sanitary cuttings (which is part of the AAC) amounted to 19,621 m^3, a sharp decline over the past few years. For example, sanitary cutting in 2003 was 58,537 m^3.

Records of illegally logged trees have little relation to unauthorized exploitation. Illegally logged trees are identified by both Hayantar and the Environmental Inspectorate.In 2009, the total recorded volumes of illegal timber sales was 2,287 trees. Under the assumption that each tree provides 1 m^3 of wood, this would equate to roughly 2,287 m^3. However, these records have little to do with the unregistered (and above AAC) cutting, which occurs at a scale far above the trees identified as illegally cut.

4. SOCIO-ECONOMIC DIMENSIONS OF FUELWOOD DEMAND

This section, based on household survey findings for forest communities conducted in 2003 and 2010, reviews the socio-economic dimensions of demand for trees and forest products.

Households comprise the main consumer group of forest products. Although representative and reliable data on non-household consumption is unavailable, all indicators suggest that households are the largest consumer of domestic forest products, through their reliance on fuelwood for heating. This means that forest policy reforms, supply and demand solutions, and institutional issues are all, by implication, social issues as well. The main factors behind household fuelwood use are i) low welfare levels, ii) lack of attractive alternatives; iii) widespread availability; and iv) access.

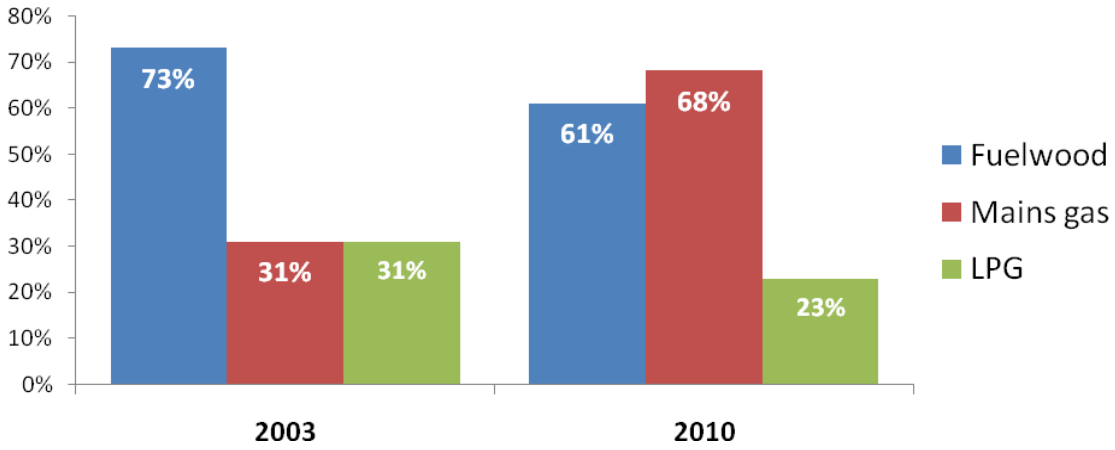
Poverty rates in Armenia continue to be high. Although welfare levels among forest community households have improved slightly, close to a third of the population is considered poor, which translates into pressure on forest resources.In 2010, 30.3% of forest community households fell into the lowest self-reported welfare category, i.e. responding that they did not having enough to cover basic needs, a slight drop from 2003,when the level was 31.5%. This is similar to official welfare statistics, according to which 34.9% of the rural population, which covers both forest and non-forest communities, fell below the official poverty line in 2009.[14]In

[14]NSS. Note that although, compared with 2003 findings, the welfare situation appears to be stable, a severe global recession hit Armenia relatively hard, reflected by a 14% fall in GDP and first increase in the poverty rate since 1998. It is therefore likely that 2010 welfare levels obscure improvements which occurred in the intervening years and were then reversed.

conclusion, it is reasonable to assume that many rural households will be cost-conscious in deciding what fuel type to consume.

Introduction of gas pipelines has not led to full substitution away from fuelwood. Armenia has had a program to deliver gas via mains to rural areas since [2004]. It was reasonably assumed that availability of gas would act as a substitute, moving households away from reliance on fuelwood, and thereby easing pressure on forests. However, this has happened only in part. While availability of mains gas to surveyed households increased from 31% to 68%, use of fuelwood fell only 12 percentage points, from 73% to 61%. Use of LPG as fuel also delined over the period

Figure 2: Households who use different types of fuel, 2003-2010



Source: FLEG-ENPI survey
Numbers exceed equal 100% because many households use more than one type of fuel.

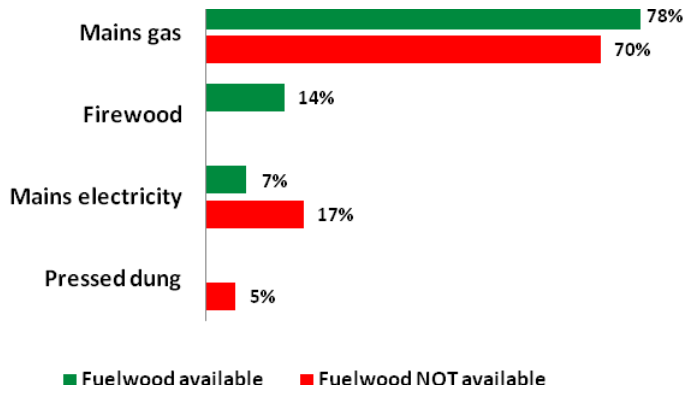
Gas prices have risen relatively faster than the average cost of fuelwood since 2003. Between the two surveys, the price of gas more than doubled, from 51 to 132 AMD/m3, while fuelwood prices increased by only 29% among surveyed hosueholds (both in nominal terms). This has likely prevented gas usage from rising in line with its availability, and has been a key factor in continued use of fuelwood.

Continued use of fuelwood is related to both availability and relative cost. Althoughthe vast majority ofhouseholds (over 77%) expressed a preference for mains gas as a fuel source, 61% of households continue to use fuelwood. Many households, both in rural and some urban areas still lack access to gas and depend on fuelwood, electricity, and other sources of fuel. Fuelwood consumption per wood-consuming household has decreased only slightly over the period, from 9.8 m^3 to 8.86 m^3. The main reasons for the decline are: increased provision of gas and electricity and a fall in demand by urban areas.

Since 2003, fuelwood use among surveyed households has declined, but average price paid per cubic meter has increased. Fuelwood use by volume decreased by 16.9% between 2003 and 2010 (among surveyed households). The average market price of fuelwood per cubic meter paid by community members has risen by 29%, from 6,990 AMD to over 9,083 AMD which is

less than inflation over the same period (39%). If fuelwood supply had fallen significantly, one would have expected to see some combination of a greater increase in households using gas, or a more rapid rise in price of fuelwood.

Figure 3. Preferred source of fuel(2010)

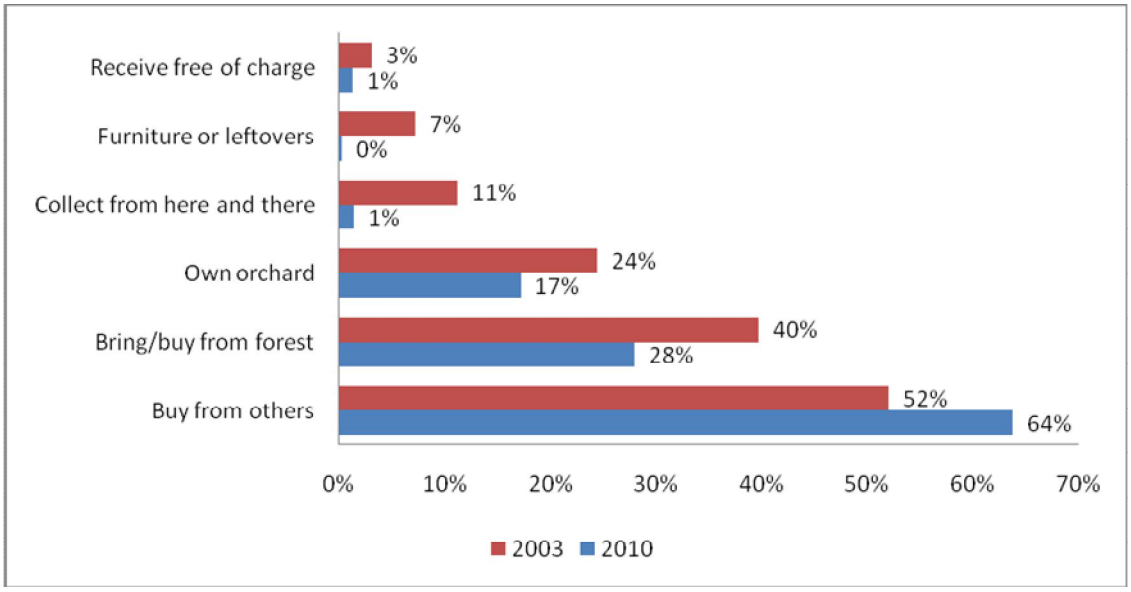


Source: FLEG-ENPI household survey

Many rural households are dependent on forests for both environmental and social benefits. Thechallenge lies in balancing the short term benefits derived from fuelwood for heating and cooking, and the long-term environmental benefits of a healthy forest. This is the responsibility of the state, via Hayantar. Communities also rely on the forest for Non-Timber Forest Products (berries, nuts, etc.) and require access through the forest areas to reach community grazing lands. And they benefit from environmental services provided by the forest resource, such as prevention of erosion and flooding.

Access to fuelwood and timber is restricted in favour of a few. Few households obtain their wood (including fallen wood) directly from the forests, because of difficulties in accessing forests, because they are unable to obtain permits from the Forest Enterprise, or because of inconvenience. This is despite the fact that they have a right, in theory, to buy fallen wood and other trees planned for thinning, through the purchase of tickets at 1,200 AMD. Access is sometimes restricted in the name of protecting the forest. However, access restrictions also serves to create rent opportunities, for example, by giving certain groups or individuals favourable treatment in exchange for a share of the revenue generated.

Figure 4. Sources of fuelwood



Source: FLEG-ENPI household survey

Most households buy fuelwood through intermediaries. Contrary to common perceptions, only a minority of people collect their own fuelwood. In 2010, the survey results show that more than 64% of households bought fuelwood from a third party, who sell fuelwood in the village, rather than collecting from the forest directly.This is an increase from 52% of households in 2003. In that year, 40% of households collected fuelwood directly from the forest, dropping to 28% in 2010.These are typically brigades, who log the trees themselves and transport logs on trucks.

Households cannot be held directly responsible for illegal logging or unsustainable forest use. During the crisis years of the 1990s when a large amount of trees were cut down for fuelwood, households were clearly responsible for deforestation. It was a resource which allowed them to survive harsh winters. It is not at all clear, however, that households continue to be responsible continuing illegal logging. Communities report that it is harder to access the forest and obtain permits, resulting in an increase in purchases of fuelwood from middlemen.

5. INDUSTRY

Armenia's wood processing has decreased and is fragmented. During the Soviet era the forest processing industry was developed with large scale capacity and relied heavily on imports of raw material or logs. Now the industry is fragmented and under-utilised, and relies on old and inefficient equipment. According to official statistics the number of small and medium sized processers operating in Armenia declined from 300 in 2007 to 79 in 2008[15].

[15]The Economics of Armenia's Forest Industry, Economy and Values Research Centre, 2007 and NSS Yearbook, 2009, http://www.armstat.am/en/?nid=45

Some sawmills are linked to Forest Enterprises while others function on an ad hoc basis, operating when supply is available and often undertaking small and bespoke orders.

The industry faces multiple constraints. Most operators face the same issues – lack of supply, increasing costs, stricter controls and growing NGO pressure which, together with increased competition from imports (in terms of processed semi-finished and finished products), make competing in the domestic market difficult and in export markets unlikely[16]. Nonetheless, it is not excluded that there are some large sawmills which are protected and that these operate very profitably.[17]. The legal status of some operators is questionable. Unsurprisingly, actualdemand for raw product is difficult to ascertain due to the poor data and reluctance by industry actors to supply information.[18]

Case study – Veneer mill in Ijevan

During the Soviet period Armenia wood-processing industry was based on imported raw material, reaching about 1 million m3 (imports in 1988) (AM Partners 2010). During this period imports were sourced globally, with, for example a veneer mill in Ijevan processing tropical hardwoods from Africa and Asia, into veneer, using a factory with capacity for 6 million m3 production of veneer, with 500 employees. The factory today processes 240 m3 per year. A lack of reliable raw material, poor quality and high cost, and in addition limited market access have left the operator with massive over capacity with old under-utilised machinery (Interview with owner in July 2010, persona communication). In the 1990s the annual volume of processed wood was estimated to be 800,000-850,000 m3but after independence the situation changed due to increases in transportation costs, economic blockade and imported wood price increases (AM Partners 2010).

There may be insufficient volume of raw material to sustain a productive forest industry. Currently, roughly one third of total official production, approximately 10,000-15,000 m^3,[19] is made available for commercial production, an amount widely considered insufficient to induce investments in and development of the industry. Given the small volume generated by incremental growth rate, poor accessibility for a large share of the forest, and the creaming of high quality roundwood, there may be insufficient volume of raw material. Combined with antiquated equipment following years of underinvestment (which raises operating costs), lack of finance, and lack of reliable and sufficient supply of raw material, has made most of the forest industry sector of Armenia unprofitable/unproductive. It is highly likely that many operators keep costs down by hiding actual production and usage. This may be the only way of maintaining profitability for those still operating.

A strategy must be developed before investments are promoted. Government and industry players must give careful consideration to what products the industry could viably produce, what markets would be targeted and what is the most efficient and economically viable use of Armenia's limited forest resources, and then plan accordingly.

[16]AM Partners, November 2010, Wood-Processing Sector Survey

[17]FLEG-ENPI survey.

[18]Both the 2003 and 2010 sawmill surveys faced challenges in identifying existing sawmill operators, and then getting them respond to questions.

[19] Interviews with Hayantar staff in June, July and October 2010

Industry prospects depend to some extent upon the Government's objective for the forest sector. Should the Government focus on developing a processing sector that can compete with imported products, thus increasing domestic supply and incentivising the imports of raw materials for the industry through tax related initiatives? Or should it focus on more high value niche products, using available Armenian supplies, and thus producing a lower volume but of higher value? This would involve restructuring of the industry into small and medium sized operators. Through investments in new technologies they would focus producing products such as bespoke furniture, or artisanal products for tourism and better-off customers.The issue requires further discussion.

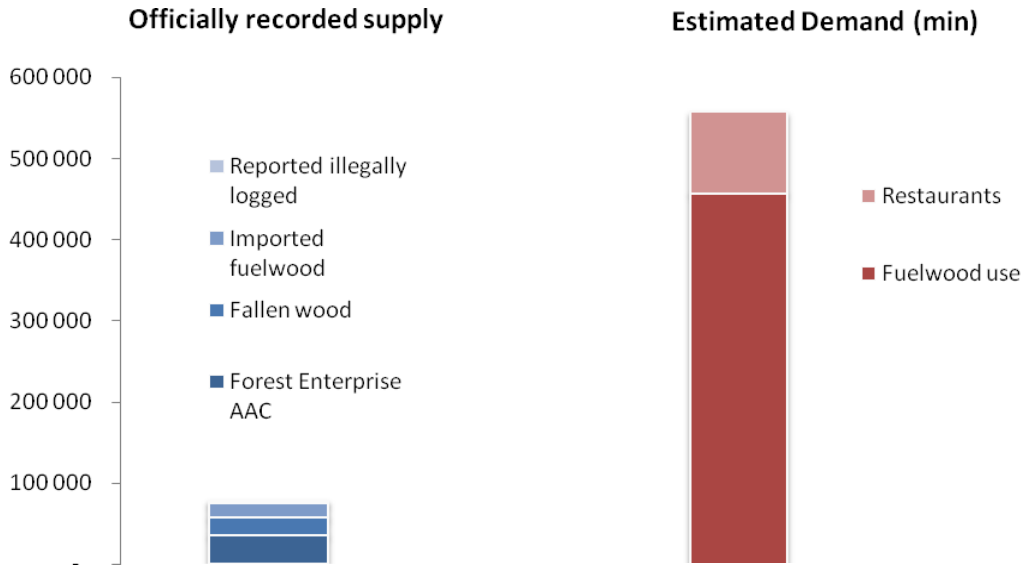
6. MARKET DYNAMICS

Estimated demand far exceeds supply. Demand is comprised of fuelwood for household use (extrapolating from the average household to the national level), wood used by the restaurant industry (for barbeque), timber for primary and secondary processing, and exports. (The amount of raw material demanded by the rapidly shrinking wood processing industry is unknown, but circumstantial evidence suggests it is considerably less than in the past.) Relying on the same conservative calculations used to estimate demand in the 2003 study (ERM), when fuelwood demand was estimated at 561,000 m^3 (solid wood), updated figures for fuelwood demand would be 457,000 m^3 (solid wood) in 2010. This is an absolute minimum, and can be considered unrealistically low, as it is based on the assumption that only households within 10 km of forests use fuelwood.

Households farther away from forests also use fuelwood. The proposition that only forest community households use fuelwood is not borne out by the either the 2003 or 2010 survey. In fact, fuelwood demand is quite possibly several times that amount. Both surveys included households more distant than 10 km (up to 20.8 km) and although fuelwood use declined with distance, it was still significant.[20]. Since the 2003 study did not consider fuelwood use by households living more than 10 km from forests or in urban areas. Beyond this, it' not unrealistic to consider that over 120,000 m^3 fuel-wood may be used by the restaurant industry. In addition, much of the wood product for industry is sourced informally.[21]

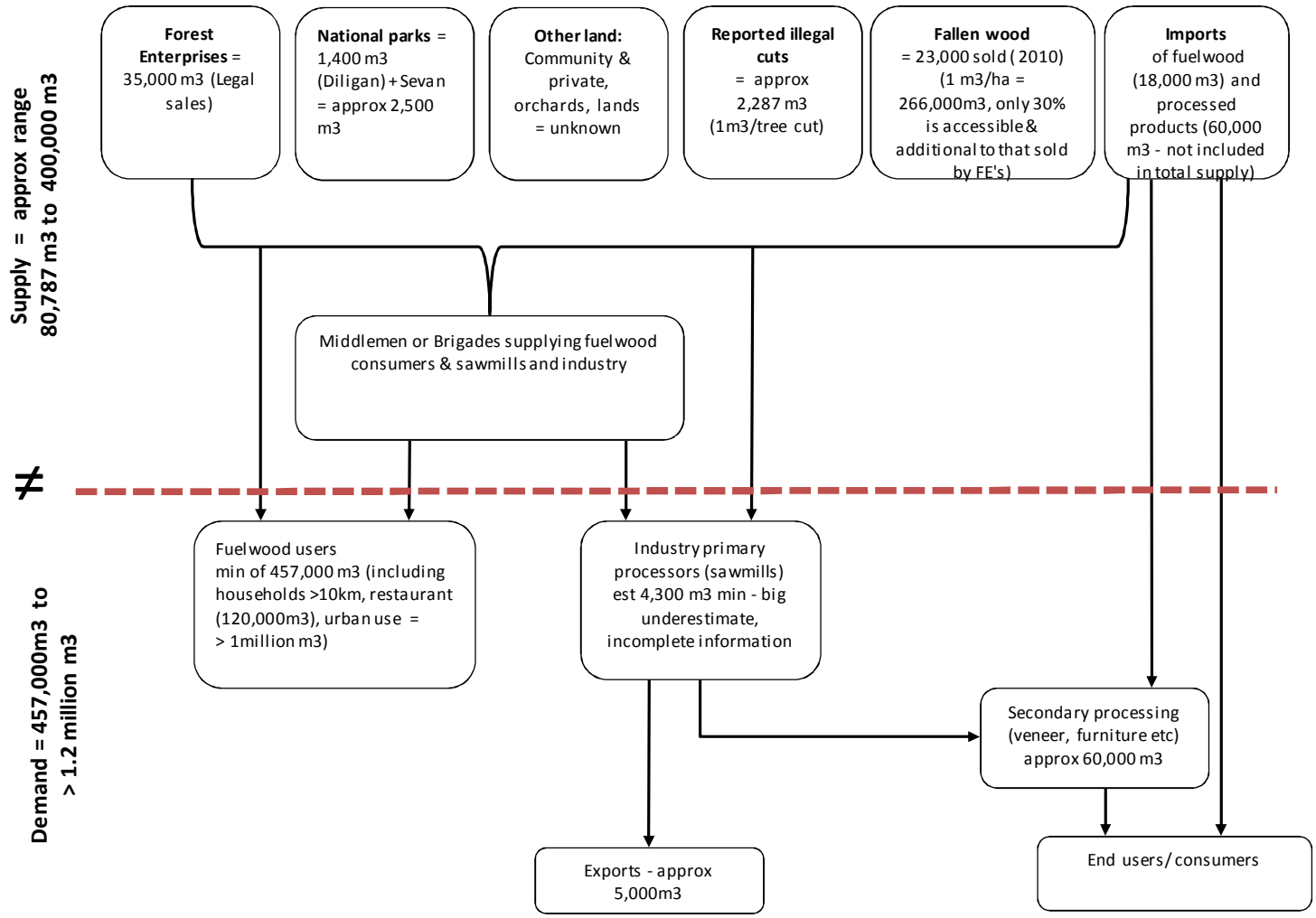
[20]See ICARE study for details.
[21] See the Annex for how these estimates were derived.

Figure 5. Gap between supply and demand (m³)



Source: Author estimates based on Hayantar data and household surveys

Figure 6 Stylized map of supply and demand, depicting relationship between end products and their sources



The supply/demand gap is being met informally. The significant supply and demand gap implies that illegal or informal production, sale, and consumption of forest products, continues. "Illegal logging" in the narrowest sense may well have decreased – a perception held by most stakeholders as well as survey respondents (87.2% of the latter believed it had fallen over the previous 5 years.) However, legality is somewhat a subjective matter (see box). There are several consequences of the gap between supply and demand, as is common in conditions of scarcity. In Armenia, all have been observed:

i) Prices are driven up
ii) Forest management is undermined
iii) Forest sustainability is compromised
iv) Incentives for bribes are created
v) Rents are generated by well-connected groups and individuals

A shadow economy persists. From a good governance perspective, the distributional impacts are undesirable.

Unclear legality

For some, particularly community members, 'illegal logging' is understood to mean trees logged clandestinely without a permit. For others, such as Hayantar, it is restricted to those trees identified as illegally logged (i.e. by the Inspectorate, which identifies and counts stumps). However, it is likely that most demand is met by brigades who carry a permit and operate with the knowledge of authorities, but the permits issued either don't correspond with the permitted levels.

Hayantar and the Ministry of Agriculture determine prices for fuelwood and wood products sold by the Forest Enterprises. The sameofficial prices for wood set in 2004 were still being applied in 2011. Real prices have fallen by over 39% over the period, since they are not adjusted for inflation. Beyond this, prices are determined by the market. This is true for all timber/wood products bought and sold beyond the Forest Enterprise, whether legally or illegally produced. The illegal timber market thus can be considered a free market, where prices reflect demand and supply. The price at which wood is sold by the Forest Enterprise to intermediaries is fixed. Thereafter, the price charged to end users (community members, industry, or foreign importers) is whatever the market will bear.

There are two main sources of profits. Profits, or rents, are derived in two ways. They reflect the difference between the official price and the end price, less costs. Second, they come from under-invoicing, i.e. more product is obtained than that stated on the invoice provided by the FE. Because the demand for fuelwood is so far above the AAC, it is impossible for Hayantar to register higher sales of wood. Therefore, this type of corruption through under-invoicing will be inevitable as long as demand outweighs supply.

Quantifying corruption. A straightforward way of quantifying forest sector corruption is to measure the gap between officially recorded supply and estimated consumption of fuelwood, based on household surveys. After accounting for wood obtained from community forests, orchards and old furniture, which comprises a relatively small amount (less than 20% of households gather wood this way), everything above and beyond the 75,000 m^3 registered by Hayantar and 18,000m^3 in fuelwood imports, is off the books (primarily through under-invoicing). As a result, hundreds of thousands of cubic meters of unauthorized wood are obtained annually. At 9,083 AMD per cubic meter, this is equivalent to between US$7.2 million and US$21.8 million of lost state revenue in

fuelwood alone. Added to this is an unknown quantity of high quality wood for domestic processing and export.

Distribution of rents. The rents accumulated through this control of the market are shared between private actors and government officials and civil servants, a share Hayantar is unable to capture. If it could, this would go a long way toward solving its budget problems. Profits are said to be very large in the informal sector.In most countries illegal loggers are typically accused of undercutting legal producers by charging lower prices, since they don't pay taxes and other forest charges, lowering their costs. This is not the case in Armenia.

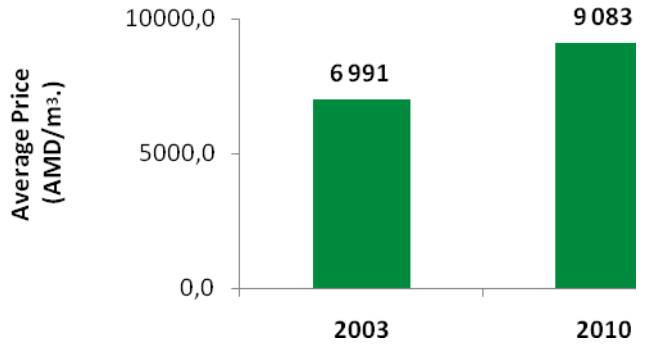
Table 1. The official price of fuel-wood from logging, 1 meter long (stacked cubic meter) ('000 AMD)

Species	Standing	In the logging area	In the lower storage places (at the gate)
Oak, ash, maple	5.0	6.0	9.0
Pine, lime-tree	3.0	4.0	7.0
Beech	5.0	6.0	9.0
Hornbeam and others	5.0	3.0	9.0

Source: Hayantar data

Price of fuelwood has risen in nominal terms. Survey data reveals actual average prices as reported by households. These prices represent a combination of prices, including purchase of fallen wood using tickets, fuelwood from logging, and any other informal payments that may have been made. From the 2010 survey the price in fuelwood has increased from an average of 6,990 AMD per m^3 to 9,083 between 2003 and 2010. While many households may often be paying the official price for fuelwood, it is clear that they are consuming far more than the AAC limit.

Figure 7. Trends in Fuelwood Price



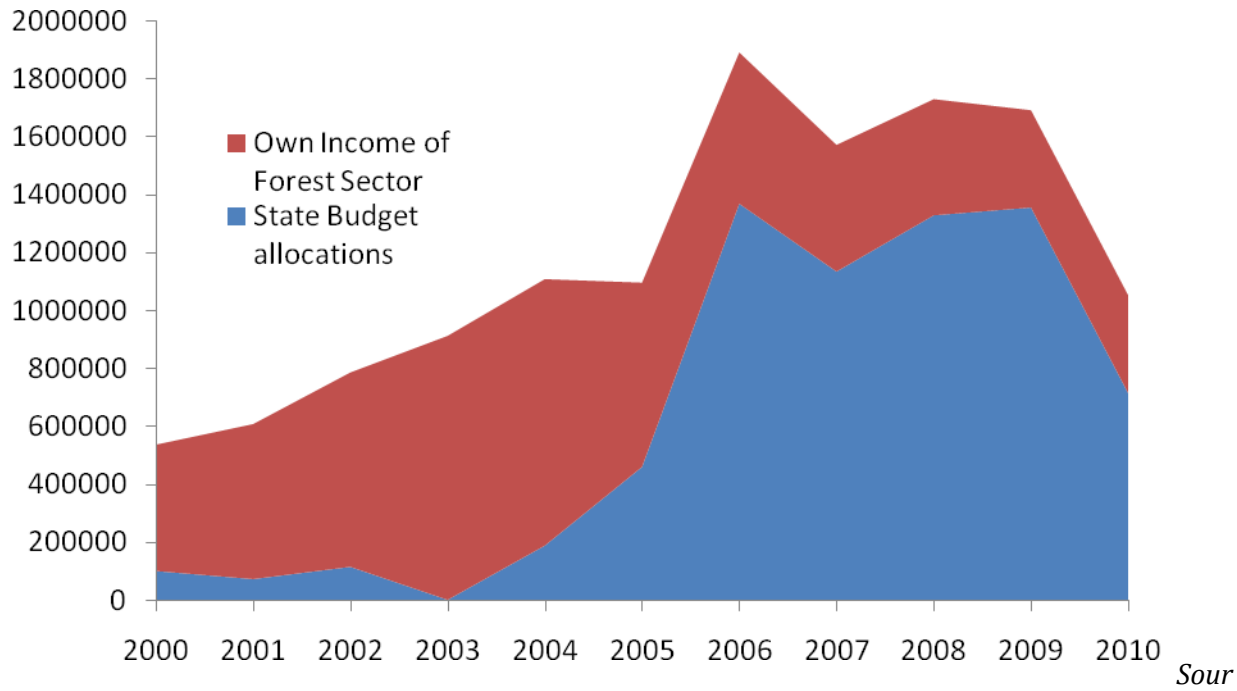
Source: World Bank and FLEG-ENPI surveys

Below market prices have negative impacts on Hayantar's budget. Hayantar's weak financial position is partly related to its inability to sell its products at market prices. Being a non-

commercial organization, Hayantar, on the one hand, has to protect forest through government funding, on the other hand, it has no budget to protect forests because its funding has been cut. Therefore, Hayantar has to generate funding by cutting trees. The challenge is not insurmountable, however. In other countries, the two roles can go hand in hand if principles of sustainable forest management are applied. Prices, which were set in 2004 and have not changed since, do not reflect the economic value of the standing timber. As a result Hayantar is not maximising potential revenue. Figure 9 – shows declining revenues generated from forest sales as production declines. If supply falls due to lack of availability the price should be increasing but prices are in fact stable.

Hayantar is squeezed between declining real prices and a falling budget. At the same time, budget allocations to Hayantar, which rose markedly beginning in 2004, have fallen again, putting further pressure on the agency. However, most fuelwood consumers are paying market prices, since they purchase from middleman. Market prices have increased. The result is that a redistribution of forest product income away from the state, the form of Hayantar, and the only entity responsible for management. Revenue is being diverted to private actors, and any state officials who facilitate this.

Figure 8. Forest Sector Budget ('000 AMD)



Source: Hayantar

7. INSTITUTIONS AND POLITICAL ECONOMY

The forest sector institutional structure is weak. Hayantar'sdual responsibility as manager and user of forests, and overlapping and unclear mandates between the Ministry of Agriculture and the

Ministry of Nature protection, exacerbate the problem of overexploitation and reduce the likelihood that solutions will be implemented. Stakeholders are able to abnegate responsibility for problems by pointing the finger at one another. Hayantar's low status is one factor why the forest sector receives inadequate attention at the national level. The State Forest Monitoring Center, a newly created body, has low capacity and limited credibility and has until now been unable to focus on its core mission of determining whether the forest is managed in accordance with FMPs.

Capacity in the forest sector is low. At Hayantar and the SFMC,low remuneration, the inability to hire adequate staff, unclear and improper hiring standards, low human resource capacity and quality severely limit the effectiveness of these institutions. A commonly voiced complaint is that technology and equipment is outdated or unavailable, limiting Hayantar's ability to monitor or manage forests.

There is limited information sharing. Data on forests or forest policy and management is not made available***.*** NGOs, while ensuring that forest protection and sustainability remains on the agenda, may not always have the benefit of technical expertise. Lack of reliable data, and publicly available information inhibits good understanding of the situation and thus decision-making. It also increases suspicions regarding forest sector activity among the public and among NGOs, which may or may not be warranted. A poor information environment also allows powerful and cynical stakeholders to act with impunity and avoid accountability.

The critical node: brigades and their enablers. Although its underlying causes are manifold, overexploitation of forests occurs through a very specific mechanism: brigades cut and extract more trees than permissible, with the explicit or implicit approval and support of persons charged with forest management. The process can be described as semi-legal, since formal documentation (permits) usually exists, but does not correspond with volume. So long as these actors are given no incentive to stop, the activities will continue, and there is no reason to believe that other measures will succeed.

State capture.
Armenia, like many other transition and developing countries is prone to state capture,[1] the phenomenon where government officials and civil servants use their office to pursue personal benefits. Offices become an investment, which are bought (and sometimes with borrowed funds that must be repaid, making it a kind of investment opportunity). The government is not merely a set of institutions which makes laws, controls law and order, and provides and administers services and public goods; it is also a collection of individuals pursuing individual short-term benefits. The motivation of individuals is not necessarily aligned with the official functions of government.

Brigades and those who enable them are driven by economic and political interests. One of the key informal institutional mechanisms is in the form of brigades who log, transport and sell wood, and the interests they work for and are protected by. The central government has little control over these interests, who are generally powerful players in the regions. Finding these groups alternative livelihoods is not a feasible proposition, as others would immediately take their place. Eliminating their activity is extremely difficult because they work under cover of legal permits. Increasing

inspections is costly and might simply result in more illegal activity as the number of actors demanding bribes will increase.

Most activities in the forest sector occupy a grey area between legal and illegal, formal and informal. It is important to bear in mind that the relationship between legal and illegal (or formal and informal) activity is not, in practice, adversarial. Illegal and corrupt activities often depend on the existence of legitimate rules and institutions, and piggyback on them. Although many technically well-designed policies and laws are weakly or only partially implemented, and often fail to lead to the desired results, this does not mean they are unwelcome or not being utilized by stakeholders; a great many of them serve as conduits for illegal or informal activity. A culture of circumvention is deeply embedded in the forest sector, as elsewhere in Armenia, and this can greatly limit the effect of reforms.

Formal and legal procedures are used for informal and illegal exploitation. Whether actions are 'illegal' depends somewhat on the individual's or institution's experience, bias, position and objectives. Outright stealing, without a permit, is uncommon. Most overexploitation comes from the abuse of legitimate procedures – specifically, cutting in excess of the permit amount, and misclassification of timber logging as 'sanitary cutting.' Insofar as state agencies benefit from this approach it would be considered corruption, since it involves "the abuse of public office for private gain," a standard definition of corrupt practice.[22]

Pervasive corruption works against reforms. In good case scenarios, reforms would redistribute benefits in a socially equitable manner. However, technical and institutional reform measures appear to be relatively easy to circumvent or ignore. It is possible that reform measures are even welcomed by entities which have found ways of diverting new donor funding, which may have merely become a new resource to harvest rents from. It is always difficult to uncover direct evidence of corrupt practice. However, there are reports and circumstantial evidence for the following (all of which benefit individuals at the expense of their respective institutions):

i) Rent seeking. Public goods (forests and their attributes), although non-excludable,are controlled for private interests. In other words, they are treated as a private good, and the profits are shared between public officials and entrepreneurs.
ii) Bribing police and environmental inspection on the highways. Police collect bribes from truck drivers carrying logs, who are stopped on their way to Yerevan. Brigades may pay a total of 10,000 AMD per load en route to their destination, which is factored into the expenses.
iii) Non-competitive allocation of informal rights to log. Brigades, who cut down and sell trees obtain these rights informally, without a fair selection process, and it is highly likely that in many cases they share their gains with officials who grant them access.

Why corruption matters for Armenia's forestry sector. To understand the incentive structure operating within the Armenian forestry sector, the role corrupt practices play must be included. The reasons are as follows:

[22]World Bank (1997).

i) Inequitable opportunities and outcomes are promoted as some individuals and groups are given special treatment. The result is distrust and cynicism toward government.
ii) Informal payments make estimating supply and demand difficult because data is not available for them (neither amount nor frequency)
iii) Hiring of forest sector staff based not on qualifications but on political connections – and especially for positions which are lucrative because of access to side payments and kickbacks – appears to be a key factor in poor sector performance.
iv) Resistance can be expected to any new policy measures, because attempts to change stakeholder behaviour would reduce the proceeds (from corrupt behaviour).

International experience, from Hong Kong, to Georgia, however, strongly suggests that corruption can only be stopped if there is internal political will, not through outside intervention.

As long as parties driven by short-term personal interests more powerful than those in long-term and public benefits, the political economy equation behind overexploitation will not change. Beyond the issue of corruption, is the question of power and influence. Stakeholders who stand to see their costs rise or benefits fall as a result of new measures can be expected to resist or distort those measures. They may accept the measures, since most of them involve development aid, which is also at times perceived as a resource to be harvested, but then fail to implement them as designed. Since powerful stakeholders and decision makers benefit from the status quo, they are also likely to lose from any changes. The poor and marginalized, living in forest communities and relying on fuelwood, are most likely to benefit from the new measures, yet they have minimal influence over their implementation. That is, those who suffer the consequences are the least powerful to stop overexploitation. Only measures which redress this imbalance in some way can be effective. Changing these internal dynamics through outside intervention is extremely challenging.

Government can beboth a driver or a brake on development. Some development theorists (the modernization school) hold that development issues are solved through government policy. Other theorists (especially Marxists) hold that because government is controlled by elites, it does not act in the interests of the poor.[23] Most likely, it depends on a given context. In some countries and some sectors, government is part of the solution (of development issues), while in others it is part of the problem. The inability to resolve long-standing issues in the forest sector, as well as other sectors, suggests that the 'government policy = solution' equation in Armenia does not necessarily hold. This can explain why measures and assistance aimed at resolving the overexploitation of Armenia's forests have been weakly implemented, disregarded or, in some cases misused.

A fundamental problem with the forestry sector is the weak alignment of actions with rewards. Normally, rewards to preventing illegal logging don't accrue to the actors powerful enough to make a difference; in fact, they are more likely to be punished. The rewards for reform, in a country with weak institutions and accountability like Armenia, are unlikely to go to the reform promoters (NGOs, donors, reform champions in government). For donors, the result of a successful reform effort would ultimately lead to a cessation in aid to that sector, a poor incentive. For reform

[23]Isbister (2006).

champions, the rewards of stopping illegal logging will go to forest communities and the population at large and only in the distant future.

External points of influence. One of the critical drivers of change in addressing illegal logging is through external pressure. In countries with large timber exports, this has been accomplished in recent years through private sector voluntary initiatives such as certification programs, public sector procurement policies and legislative measures for example the EU Timber Regulation, 2010, and a number of other measures. The impact of actions taken by governments, civil society and the private sector is reportedly large.[24] However, the key determinant, trade, is missing in Armenia. Because Armenia's exports are so minimal and consumers in urban areas who are likely to be those concerned are being supplied with products that are imported, this leverage (for change in the management of Armenia's forests) is unavailable. Furthermore, if Armenia loses most of its remaining readily accessible forests, the regional environmental impact would most likely be negligible. This feeds into global and regional indifference vis a vis Armenia.

8. IMPACT ANALYSIS

This section assesses distributional impacts which may arise from the implementation (or non-implementation) of new or revised forestry policy measures in Armenia.

Four different scenarios are considered:

A) Targeted gas subsidies to forest community households,
B) Eliminating permit price for collecting fallen wood;
C) Liberation of wood price by Hayantar; and
D) No action taken.

Impacts of these changes may be transmitted in a number of ways, direct and indirect, and they affect stakeholders differently. For this analysis, only the following impacts are considered:

i) Households, specifically the poor (bottom 30%, based on self-reporting), via changes in welfare;
ii) Exploitation of the forest resources through supply and demand of wood;
iii) Forest management (Hayantar) budget; and
iv) Other stakeholders as relevant

Because of data constraints (especially the absence of time series data on household consumption patterns, recent census data, and reliable wood supply data) the impact and distributional analysis adopts a cautious approach. That is, no models are used and instead comparative analysis is used to

[24] Lawson, Sam. (2010). Illegal Logging and Related Trade: Indicators of the Global Response. Chatham House Briefing Paper.

project the magnitude of the most likely changes. The advantage of this approach is that it is transparent and fairly easy to grasp by non-specialists.

The analysis is based on the household surveys taken at two points in time (2003 and 2010) and covers only households located in communities between 0 and 20.8 km from forests.

A. TARGETED GAS SUBSIDIES (FOR HOUSEHOLDS IN FOREST COMMUNITIES)

Expected impacts

i) Positive and significant environmental impact: 400,000 m^3 annual reduction in FW use, possibly bringing total consumption below annual growth rates

ii) Annual cost to budget: US$ 12.4 - $24.6 million

iii) Increase in tax revenue: from ArmRosGazProm as gas consumption rises

iv) Reduced corruption: rents by up to US$9.6 million

v) Positive health impact: households switch to cleaner energy

Current situation

Armenia has a program in place to supply natural gas to households since 2004. By 2010, 596,353 households in Armenia (of which 60.9% were located outside of Yerevan) were registered as gas users.

The price of gas for residential consumers was at 132 AMD/m^3 in early 2011.

Proposed measure

A targeted gas subsidy provided to 119,000 households living in forest communities (i.e. located within 10 km of forests). The subsidy would need to be substantial, bringing the price of gas down far enough to cause households to switch away from FW.

Discussion

The discussion takes a deliberately narrow view of subsidies, and does not consider fiscal impacts.

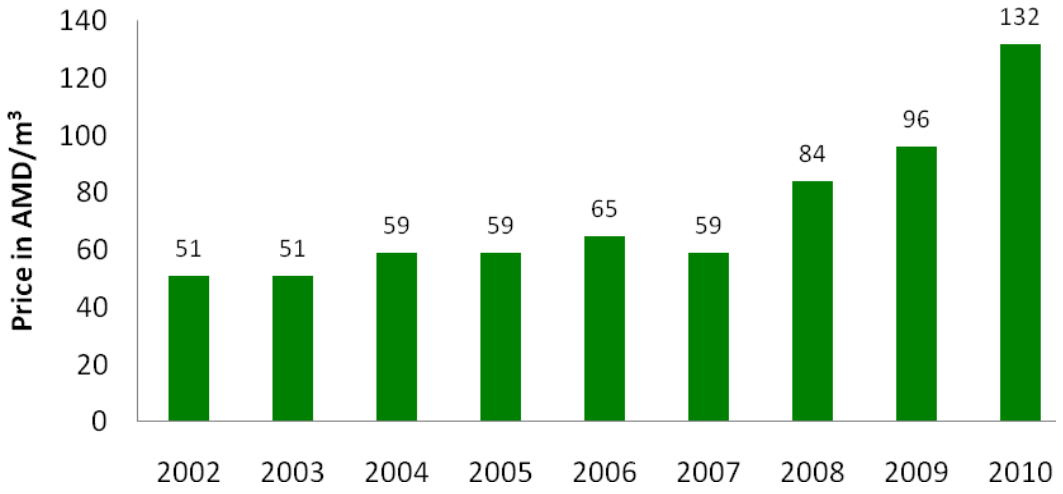
When the Illegal Logging Action Plan (ILAP) was developed in 2004, the gas supply program just being rolled out was considereda promising alternative energy supply under Component 4, and was expected to reduce FW use. It would alleviate pressure on the forest resource by causing a significant number of households to switch away from reliance on fuelwood. This expectation has not, however, been met.

According to the household surveys, 31% of households used gas in 2003, jumping to 68% in 2010. In 2003, 72% of households used fuelwood, while in 2010, 61% used fuelwood. A significant share of households, 57% reported that they used both FW and gas in 2003. Only 30% of households use only gas and no other fuels; 36% use gas but no FW.

Why the continued reliance on FW despite the widespread availability of mains gas? The answer is the price of natural gas. Although 78% of the population would prefer using mains gas (if all fuel prices were equal), only 31% rely on gas exclusively, and 46% of gas users also use FW. The increase in gas price clearly inhibits switching completely. Many respondents told interviewers conducting the socio-economic survey that FW use will certainly go up if gas prices keep rising.

The cost of gas remained relatively steady through 2007, when it was 59 AMD/m3. However, by 2010 it had more than doubled, to 132 AMD/m^3, even though Armenia continues to buy natural gas at a subsidized rate from Russia.

Figure 9. Natural gas price (AMD)



Source: ArmRosGazProm

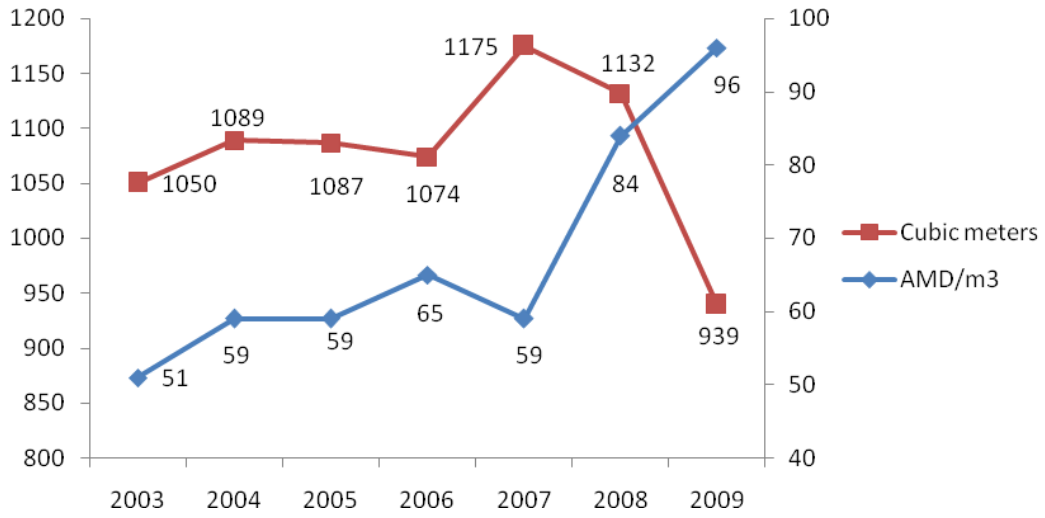
It is not only the steep increase in the price of gas, but the relative change in prices, as Table 1 makes clear, with FW increasing at a far slower pace than gas, and even less than the cumulative inflation over the period.

Table 2. Relative changes in fuel prices

	2003	2010	Change
Fuelwood (AMD)	6,991	9,083	29%
Natural gas	51	132	158%
Inflation (cumulative)			39%

A subsidy should cause most households to use less fuelwood. Ideally, from an environmental and health perspective, the subsidy would be designed to be large enough to cause them to stop using FW altogether.

Figure 10. Supply and demand for gas (avg. household consumptionnon-Yerevan)



Source: ArmRosGazProm

As seen in the above figure, households are sensitive to gas price increases. Beginning in 2005, price of gas and consumption per capita move in opposite directions.When the price rose above 59 AMD/m3, households increased or decreased consumption, very likely in reaction to changes in price. (Changes in household income could also be a factor.)

The Government is currently introducing a subsidy which would reduce the cost of natural gas to households by 32 AMD/m^3 for the first 300 m^3 used. An estimated 60,000 households would receive the subsidy. The purpose of subsidy is to provide relief to poor households. To the extent that it reduces expenditures of poor households it should have the intended affect. However, it will not provide relief to two categories of poor households: i) those who do not have access to gas in their community; and ii) those who have not connected their home to gas lines, generally because of the cost of connection and/or the cost of new stoves and equipment for heating and cooking with gas. Some households may decide to switch to mains gas, but the number will probably be small, especially if the subsidy is perceived as a pre-election sweetener, and not a long-term policy.

The effective benefit of the subsidy will be a maximum of 9,600 AMD (32 AMD x 300 m^3). The average level of natural gas consumption outside of Yerevan was 939 m^3 in 2009, for total expenditures of 90,144 AMD at 96 AMD/m3. (According to the 2010 household survey, average gas expenditures were 93,278 AMD per household.) The 9,600 AMD discount will represent just over 10% of a household's gas expenditures.

Analysis

The analysis is based on several assumptions. First, it assumes that the subsidy will be large enough to cause most households to switch completely to gas. Second, it assumes no start-up costs for those households living in communities with gas, but who have not yet connected their home to the main lines. A share of unconnected households will find the gas price sufficiently attractive to absorb the connection cost themselves.

This analysis does not incorporate the elasticity of energy demand, which would allow a more accurate estimate of optimal gas subsidies. If gas subsidies as a means of reducing fuelwood use are considered, a model to estimate the optimal subsidy level should be developed before any decision is made (to reduce unnecessary budget expenditures).

The net impact is determined by estimating the cost of the government gas subsidy against the volume of wood that would not be consumed (trees saved). Ancillary impacts include reduction in corruption, as demand for wood falls, increased profits for the gas company as it sells more gas to more customers, and improved health indicators as more households use a cleaner burning fuel.

Subsidy

The total government subsidy amount depends on the number of households receiving the subsidy, the cash value of the subsidy per cubic meter, the number of cubic meters subsidized, and the number of households with a gas connection. It can be adjusted downward to account for 'empty homes' where the owners have migrated.

The total subsidy amount will be a function of the subsidy level (per cubic meter), number of households with a gas connection, and household gas consumption.

$S = f\ (H, S, C, Y, a)$

Where S is the subsidy in AMD, HH represents households, C is amount of gas consumed per household in m^3, 'a' is the share of households with a gas connection, and 'b' represents the share of unoccupied households.

The number of households living within 10 km is estimated to be 119,000. Why only households living within 10 km of forests? Because these are the most likely to use FW,

since they have the easiest access to forests. Also, they pay the lowest average price per cubic meter, since the price of FW increases with distance from the forest.

The survey found that approximately 68% or respondents are connected to mains gas, equivalent to 80,920 households within the area.

As noted, households are price sensitive to gas, and thus gas consumption will depend on the level of the subsidy. The year 2006 is used as a proxy for gas price and consumption, since gas prices in that year, appear to be at the limit above which households begin to cut back on gas use, and may be switching to FW. In 2006, the price of gas was 65 AMD/m^3, and the average household consumed 1,074 m^3. To return to these levels would imply a subsidy of 67 AMD/m^3. This is double the proposed current Government subsidy for poor households.

It can further be assumed that in subsequent years more households in forest communities will have access to gas, rising from 68% today to 90% in two years.

An extended analysis takes into account the possibility that Armenian gas prices will converge with international prices by 2014. Georgia can be used as a proxy for gas prices Armenians may pay in the future. Currently, the price paid for gas by Georgian households is 51 Tetri (around 30 Cent). The subsidy is therefore raised from 67 to 100 AMD beginning in 2014, while the subsidized user price is allow to rise to 80 AMD, under the assumption that income will rise enough by then to not cause a return to using FW.

Table 2.Estimated cost of targeted gas subsidy

Year	HH	Users	Actual price (AMD)	Subsidy amount (AMD)	Subsidized price (AMD)	Gas consum. (m3/HH)	Annual subsidy (mill. AMD)	Annual subsidy (mill. USD)
2012 & 2013	119,000	68%	132	67	**65**	1,074	5,823	**15.5**
From 2014	119,000	90%	180	100	**80**	1,074	11,503	**30.7**

Source: author calculations

It is possible that only some 80% of subscriber households are occupied and using gas. In this case, the level of subsidy would decrease by 20%, to US$12.4 million in the first two years and US$24.6 million subsequently.

The total annual subsidy is thus US$12.4 million in the first two years and almost doublethis amount in subsequent years. Of course, much depends on the how the price of natural gas changes.

Benefits

How effective is such a subsidy level in terms of costs and benefits, taking into account environmental and governance benefits?

Currently, households that use FW consume on average 8.86 m^3.and spend 9,083 AMD. They represent 61% of forest community households. Many households use different sources of FW, but on average, they spend about 51,481 AMD per year on FW. This comes to 3.7 billion AMD per year on FW, or US$ 10.0 million. In 2006, gas-consuming households spent 64,115 AMD on gas, which is much closer to today's FW expenditures than the 90,183 they spent on gas in 2009.

If the 119,000 households in forest communities stop using FW, this is the total amount they would save. Additional policy measures would be needed to complement the gas subsidy to reduce use of FW. These include public awareness campaigns, elimination of tickets for collecting fallen wood, and more energy efficient homes.

Does this imply that a subsidy would not be economically effective? Not necessarily. US$10 million represents only the FW market value of the forests, not the economic and environmental benefits of leaving the trees standing. In both economic and environmental terms, a tree that is standing is worth considerably more than its value as FW.

The amount of forest stock saved annually would be something less than 457,000 m^3, which is the total estimated amount the 119,000 forest community households are using now. Assuming that of this amount 20% is in the form of fallen wood (the officially recorded 23,000 m^3, and just as much that goes unrecorded), annual consumption of forest wood would decrease by over 400,000 m^3. This represents a large share of total wood consumption in Armenia. Reducing annual losses to forest stock by this amount would very likely be enough to bring consumption down below the annual growth rate.

In addition, as more households consume gas, tax revenue from ArmRosGazProm paid to the government will increase.

Finally, the impact on corruption can be estimated. It will be manifested by the reduction in rents generated by unofficial cutting (through under-invoicing). The value of rents will be roughly equivalent to aggregate household expenditures on FW (US$ 10 million), less the price of permits paid to Hayantar. Since an estimated 457,000 to 1 million cubic meters of FW are harvested annually, and Hayantar could only book 31,024 m3 of FW sales in 2009, this means that 426,000 m3 of FW *at aminimum* was harvested unofficially (on the backs of permits for 31,024). The permit price paid by brigades can be approximated at 5,000 AMD. This is equivalent to 155 million AMD, or US$ 413,653.

Since the targeted households paid US$10 million for FW, approximately US$9.6 million was collected off the books, in rent. A share of this was used to defray costs of illegal logging, of

course, leaving an unknown amount to be shared among parties who engaged in, facilitated or turned a blind eye to the practice.

Although this loss of revenue to brigades, local elites, highway police and environmental police, and Forest Enterprise staff also represents a loss of income, this can be considered a progressive redistribution of income. Of course, unofficial logging will continue, since the subsidy is provided only to 119,000 households, while many other households outside Yerevan also consume FW.

Summary statistics

Fuel use – change over time

i)	H	
	Hs using mains gas (2003)	31%
ii)	H	
	Hs using mains gas (2010)	68%
iii)	H	
	Hs using FW (2003)	73%
iv)	H	
	Hs using FW (2010)	61%

Fuel use – consumption patterns

v)	S	
	hare of HHs who use mains gas:	67.4%
vi)	S	
	hare of HHs who use FW:	61.1%
vii)	H	
	Hs who use both mains gas and FW	31%
viii)	H	
	Hs who use mains gas exclusively (2010)	30%
ix)	H	
	Hs who use mains gas exclusively (2003)	10%
x)	S	
	hare of HHs using only mains gas (and not FW):	6.1%
xi)	S	
	hare of HHs using only FW (and not gas):	25.3%
xii)	E	
	xpenditures on FW (average AMD)	51,481
xiii)	E	
	xpenditures on mains gas (average AMD) – survey (2010)	93.275
xiv)	E	
	xpenditure on mains gas – gas statistics(2009)	37.247

Preferences

i)		1
	st preference if fuel prices are equal	mains gas: 77.7%
ii)		2
	nd preference if fuel prices are equal	FW: 14.0%
iii)		3
	rd preference if fuel prices are equal	electricity: 7.3%

Price comparisons

iv)		2
	003 average cost of FW (AMD/m3):	6,991
v)		2
	010 average cost of FW (AMD/m3)	9,083
vi)		F
	W percentage increase in price (2010 over 2003)	30.0%
vii)		M
	ains gas percentage increase in price (2010 over 2003)	158.8%
viii)		2
	003 cost of mains gas (AMD/m3)	51
ix)		2
	010 cost of mains gas (AMD/m3)	132

Annual expenditure comparisons (2010)

x)		H
	H mains gas expenditures	93.278
xi)		H
	H FW expenditures	51,481

Poverty dimensions

xii)		P
	oor HHs using gas	57%
xiii)		N
	on-poor HHs using gas:	72%

B. ELIMINATING THE FUELWOOD PERMIT PRICE

Expected impacts

i) Modest positive impact on households who purchase permits: 5,155 AMD (US$ 14) savings per year; for households who do not purchase permits, risk of being caught is eliminated.

ii) Modest reduction in corruption: through elimination of the regulation

iii) Minimal financial impact on Hayantar: loss of revenue from permit fees is 28 million AMD, less than 2% of budget

iv) Negligible impact on forest sustainability: only a minority of households not collecting wood are likely to switch from purchasing cut wood for timber

Current situation

Individuals may collect fallen wood by purchasing tickets (permits) at a cost of 1,200 AMD/m^3 from the Forest Enterprise. There is in some cases a limit to how many cubic meters they can purchase. In other cases, the amount allowed by the ticket is (unofficially) exceeded.

Proposal

Eliminate the permit price, allowing community members to collect fallen wood free of charge.

Discussion

Household survey results suggests that eliminating permit fees would directly affect the 6.5% of households in forest communities who buy permits. It would probably have an indirect impact on the 8.7% that collect without using permits, since it would remove the risk of being caught without a permit. Still others who do not collect fallen wood will also be motivated to collect.

While 15% is not a large share of the population, it would serve a positive social purpose for those who benefit. Further benefits include the elimination of another avenue for corruption, by eliminating a regulation. Elimination of the permit should be considered as complementary to other forest policy measures which reduce demand for logging of standing trees.

In 2009, Hayantar sold 23,000 m3 of fallen wood. It can be assumed that at least twice as much was collected without permits, for approximately 45,000 m3. In all, based on 218,000 ha of accessible forests, and an estimated 1 m3/ha of fallen wood, there may be 173,000 m^3(218,000 – 45,000 m^3) of fallen wood that go uncollected every year. (Under the assumption that brigades do not collect fallen wood but log trees which they cut up for FW. There are no reports or sightings of trucks transporting fallen wood).

Taking into account both households who pay for permits and those who collect fallen wood for free, the average cost of collecting fallen wood is 729 AMD/m^3, compared with an

average of 8,919 AMD/m^3 for wood collected at the gate, and 6,991 AMD for wood collected at the logging site.

The impact of eliminating the permits will be positive, but should not be overstated. In addition to the 1,200 AMD for the permit, transportation costs must be factored into the cost of using fallen wood. Transportation costs have quadrupled since 2003, from 1385 AMD to 5675 AMD. This is in part because with deforestation at the forest edge, areas where trees and branches can be reached have become more difficult to access.

There is no reason to believe that transaction costs would decrease if the permit cost for collecting fallen wood is reduced. In fact, one reason so few households collect their own wood is because the cost savings when compared to buying wood from intermediaries, once transportation costs are factored in, dissipates somewhat. Another reason provided is that many community members are elderly and do not have the strength to collect fallen wood themselves.

Since 6.5% of the sample pay for permits, among the 119,000 households, at least 7,735 households use this method for obtaining FW. Households who are now paying for fallen wood spend on average 5,155 AMD per year. This is the amount they would save.

In aggregate, they would be purchasing 39.9 million AMD worth of permits, equivalent to approximately 33.2 million m^3. There is a substantial difference between this figure and the equivalent of 9,000 to 24,000 m^3 of fallen wood sold annually, as recorded by Hayantar. There are various possible explanations for such a discrepancy, including poor recall or measurement (on the part of respondents); allowing permit holders to collect more than the amount written on the permit, as is the case with brigades, or incorrect assumptions which introduce errors into the extrapolation. In any case, in terms of forest stock, there should be no impact, since an estimated 266,000 m3 of fallen wood is produced by the forest each year, and removing fallen wood does not deplete the stock.

The majority of households that report using fallen wood also obtain wood in other ways, suggesting that for many this is part of a 'portfolio' consumption strategy. This fact, combined with the fact that the cubic meters collected are not necessarily weighed, makes measurement difficult.

Unsurprisingly, poor households are more likely to collect fallen wood. They represent 30% of the population, but 36% of those who collect fallen wood. They also represent 41% of those who do not buy permits to collect fallen wood. The fall in FW expenditures is therefore likely to be most meaningful for the poorest households who are able to collect wood themselves.

The effect on Hayantar's budget of reducing the amount would not seem to be large. In 2009, Hayantar sold 23,664 m3 in fallen wood. At a price of AMD 1,200, this is equivalent to

AMD 28.4 million, or approximately US$ 78,000. This represented 1.7% of Hayantar'sbudget in that year, of AMD 1.7 billion. Over the past decade, the amount of fallen wood sold has fluctuated between 9,903 and 24,325 m3, with little discernable pattern.

Indirect impacts can be expected. The lower effective price of fallen wood, and the removal of the risk of getting caught without a permit, will cause a certain share of households to collect fallen wood instead of buying fuelwood from trucks. As a result, demand for logged trees falls modestly, and pressure on forest stock is somewhat reduced.

Summary statistics

Households that rely on fallen wood

i)	Share of surveyed HHs collecting fallen wood:	15%
ii)	Share of all surveyed HHs who buy permits for fallen wood:	6.5%
iii)	Aggregate number of rural HHs who collect fallen wood:	17,850 - 42,750
iv)	Share of surveyed HHs who collect fallen wood who pay for permit:	41.1%
v)	Avg. amount those that pay for permits to collect fallen wood pay (AMD)	5,155
vi)	Share of surveyed HHs who collect fallen wood without a permit:	58.9%
vii)	Share of HHs who don't use permits, but still pay (for other wood)	22.5%
viii)	Transport costs to collect fallen wood (AMD)	8,528
ix)	Permit price as a share of total costs for fallen wood (including transport):	33%
x)	HHs reporting unofficial charges to collect fallen wood (2010)	1%
xi)	HHs reporting unofficial charges to collect fallen wood (2003)	15%

Reliance of poor on fallen wood

xii)	Share of surveyed HHs who are poor:	30.5%
xiii)	Of HHs who collect fallen wood, how many are 'poor':	42%
xiv)	Of HHs who don't use permits for fallen wood, how many are 'poor':	41.1%

Revenue generated by sales of fallen wood

xv)		C
	ost of collecting 1 m^3 of fallen wood (AMD)	1,200
xvi)		A
	mount of fallen wood sold by Hayantar (2009)	23,664 m^3
xvii)		2
	009 estimated value of fallen wood permits sold by Hayantar (AMD)	28.4 million
xviii)		F
	allen wood sales as share of Hayantar revenue	1.7%

C. LIBERATION OF WOOD PRICES

Expected impacts

i) P
otentially significant impact on Hayantar's budget: more revenue from wood sales to the state, less is diverted.

ii) C
orruption will fall somewhat but not be eliminated:Hayantar still will be unable to charge for all wood products sold from its forests, since many will still be off the books.

iii) N
egligible environmental impact: Since of the gap between receipted wood sales and actual exploitation levels, changing the price of wood may or may not have an impact on either exploitation or demand.

iv) U
nclear large welfare or poverty impacts from raising fuelwood price: is unclear what impact higher prices would have on intermediaries or whether higher costs would be passed on to consumers.

Current situation

The price of 'wood from State Forest Fund of Armenia' has been fixed since March 1 2004. This applies to 'construction wood' and 'fuel wood from logging.' The price differs depending on where it is sold – by the buyer, at the logging site, and at 'lower stock' (forest entrance).

Due to inflation of 39%, the real price of wood has fallen. At the same time, the market price of FW has risen at slightly below the inflation rate, by 29%.

Proposal

Increase the price at which wood is sold, in order to more closely reflect market prices, and generate more income for Hayantar. This could either be done by raising the fixed price, or holding auctions which give logging rights for specific forest lots.

Discussion

Currently, intermediaries (brigades who work either for themselves or for someone else) are able to buy at a fixed cost and reap considerable profits. They purchase wood at the fixed price and sell at any price the market will bear.

Holding prices fixed as several implications. First, it means the real price of its products has declined over the last seven years, by the level of inflation (39% over the period). This represents an arbitrage opportunity for middlemen, who are able to charge rising market prices while seeing costs, the price they pay to Hayantar, fall.

In theory, raising the price of wood sold by the state would result in a larger share of the proceeds (revenue) being captured by the government. This would increase Hayantar's budget and partially raise its capacity to manage forests (recognizing that there are institutional and political factors which limit its effectiveness).

The arguments for raising prices are that i) low prices are not compatible with treating forests as a scarce resource and ii) they create rent opportunities, since market prices are used once the wood leaves the forest. The gap between the official fixed price and the market price constitutes a lost opportunity for Hayantar, benefitting the private operators, and anyone who facilitates their activity (through payoffs of bribes).

Higher prices would only affect wood officially sold by Hayantar, (equivalent to the AAC, which was 35,000 in 2010), a fraction of all wood taken out of Forest Enterprises.

Nonetheless, the impact of allowing prices to rise would not be insignificant for Hayantar, increasing its revenue from wood product sales by the amount of the price increase. In 2009, own income from forest sector amounted to just 336 million AMD, or 20% of Hayantar's total budget of 1.69 billion AMD. The balance is covered by allocations from the state budget, ever dwindling in recent years.

Is there a risk that higher prices will *not* translate into increased revenue? As noted, in theory, Hayantar would benefit from the higher prices. Normally when prices rise, consumption decreases. However, because of invoice manipulation the relation between supply and demand is not a normal one. Thus, there only a weak correlation between the registered amount of wood sold, and actual amount sold, due to under-invoicing. It is unclear what would happen if prices were raised. The under-invoicing strategy might adjust

to factor in the higher prices. For example, if in the 'low price' era a brigade was allowed to cut 30 m^3 using a 10 m^3 permit, it might now, in the 'high price' era, purchase a 5 m^3 permit to cut down 30 m^3.

The financial impact would depend on a production-invoice relationship that may be called 'invoice elasticity of demand.' Since there is no data on what the level of under-invoicing is, it is not possible to estimate such an effect. In other words, it is possible that neither changes in prices, nor changes in the AAC level (official volume), will have effect on exploitation.

In any case, since officially sold and registered wood is a small fraction of the total wood sold in Armenia (as much as 1 million m^3), even after prices are raised, only a small share of the total value of production would be 'diverted' to Hayantar.

Poverty impacts would depend, first, on whether the price change had any effect on cost for loggers, as discussed above. Second, brigades did pay higher prices, on whether they pass on the higher cost to consumers. It is difficult to say whether this would occur.

From an environmental perspective, higher prices are welcome, in that they would better reflect the true cost of fuelwood. From a social perspective, they are less desirable. It may well be that the higher potential cost of wood is a small share of their total costs (equipment, labor, fuel, etc.) and that fluctuations in the price of fuel, for example, would outweigh changes in the cost of the raw product.

Summary statistics

Hayantar (2009)

i)	Hayantar proceeds from sale of forest products ('000 AMD)	335,752
ii)	Hayantar state budget allocation ('000 AMD)	1,353,328
iii)	Total budget ('000 AMD)	1,689,080
iv)	Share of proceeds of wood from forest products	20%

Volume (m^3, estimates)

i)	2010 AAC	35,000
ii)	2009 Hayantar recorded sales (incl. fallen wood)	57,109
iii)	2009 Forest tot. supply (incl. illegal, imports, national parks, Hay sales)	109,762

iv)		2
	009 Estimated consumption - min	646,000
v)		2
	009 Estimated consumption - max	1,245,000
vi)		G
	ap (between recorded supply and consumption) min	536,238
vii)		G
	ap (between recorded supply and consumption) max	1,135,238
viii)		S
	hare of wood that is officially accounted for	8.9 - 17.0%

D. NO ACTION TAKEN

Expected Impacts

- In the short to medium term, forest degradation will continue to decline as gas remains unaffordable for most.

- Poverty impact will be minimal in the short-term, as reliance on (relatively) inexpensive fuelwood continues; poverty impact will be significantly negative in the long-term, as environmental damage from deforestation leads to significant economic impacts.

- Under a worst case scenario, consumption will continue to exceed supply 585,428 and deforestation will continue. In approximately 20 years, all currently (easily) accessible forests will be gone.

- Under best case scenario, FW consumption gradually fall to less than the growth rate

Current situation

Institutions responsible for the forestry management are weak and underfunded.

The wood processing industry is small, fragmented and non-transparent.

Demand for fuelwood is far higher than official supply.

Exploitation of forests is exceeds growth rates.

Proposal

Change nothing in current forest policy or implementation.

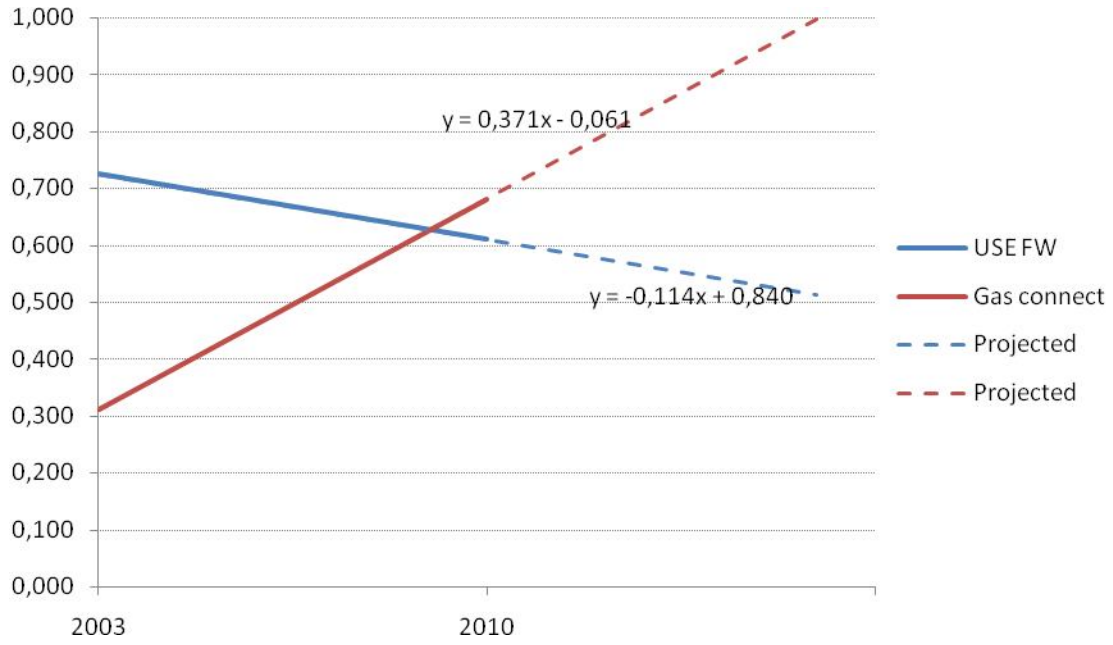
Discussion

What outcomes can be expected if no action is taken and the status continues indefinitely?

Under this scenario, the following is assumed: the gas supply program continues to be rolled out and most households eventually have access; no new limits are placed on logging; prices set by Hayantar remain unchanged; and market prices continue to rise in line with inflation.

First, consider gas availability and price and the relation to FW use. Under the (naïve) assumption that the relationship between gas use and FW is linear and the trend continues, i the following is expected: connecting all of the currently unconnected households to gas increases gas use by 32% (from 68% to 100%) and leads to a decrease in FW consumption by another 17% points. In other words, although 100% of households have gas, 50% of them would continue to use FW.

Figure 11. Projected FW use assuming linear demand and supply



Source: Authors' calculations based on socio-economic surveys (2003 and 2010)

Under this (optimistic) scenario, in a number of years all communities will be connected to gas, and gas prices naturally fall back to 2006 levels (65 AMD/m3), i.e. the price above which they began migrating back to FW use. The share of households using FW continues to fall, by approximately 17% points, and total fuelwood demand falls by about 25% over the period. If the minimum FW demand is currently 457,000 m^3 to 1 million m^3, it would fall to between 342,750 m^3 and 750,000 m^3.

However, such a projection is contingent on two key factors: i) no change in welfare, and ii) the relative costs of FW and mains gas remaining stable. More likely, if gas prices remain high or continue to rise, as expected, households will switch back to using FW, and use less gas, a phenomenon that has already begun to occur. Likewise, if poverty ratesin rural areas rise, gas will remain unaffordable to many, even if gas pricesstabilize.

From an environmental perspective, FW consumption and over-exploitation is examined. Currently, excess demand over supply of wood is estimated at between 400,000 and 1

million m^3 per year but would fall, as estimated above, to 342,750 or 750,000 m^3. Depending on what growth rate is used, the resulting demand may or may not be less than the annual increase in forest stock in accessible areas.

There are a range of estimates for the rate of forest growth in Armenia. They start at around 300,000 m3 annually and reach 600,000 m3. The estimates are based on growth rates of between 1.3 m^3/ha and 3 m^3/ha. The rate applies to areas with forest cover, not all officially designated forest areas, since much of the latter is treeless. Furthermore, it has been estimated that only 63% of the forests are readily accessible and used for logging. This means that one part of the forest is being exploited at a significantly high rate, while another part (the inaccessible area) is hardly being touched at all.

Under a worst case scenario, based on the lower level of replenishment and the higher estimate of over-harvesting, the annual loss of forest stock is up to 1 million m^3. This is equivalent to the maximum amount of annual consumption (1.23 million m^3), less the (minimum) expected increase through growth of 1.3 m3/ha (1.3 * 218,000 = 283,000 m^3). The best case scenario assumes the minimum level of current consumption (536,238) and higher levels of growth (3 * 218,000 = 654,000). This would imply growth slightly exceeding consumption, by 118,000 m^3. However, the higher level of consumption is considered far more likely.

Armenian forest stock is estimated at 35 - 40 million m^3. In accessible areas, it would be maximum 25 million m^3 (40 million * 63%) and probably considerably less, since accessible areas have been over-harvested. The share of stock in accessible areas is therefore be estimated at 20 million. The net annual loss under the worst case scenario would be 1 million m^3. It would thus imply a total loss of forest cover in accessible areas in about 20 years.

Summary statistics

Current exploitation levels in accessible areas

i)	R ate of forest stock replenishment (at 1.3 m^3/year)	283,000
ii)	R ate of forest stock replenishment (at 3 m^3/year)	654,000
iii)	B est case scenario – growth exceeds consumption	120,000
iv)	W orst case scenario - Excess annual consumption of FW over official supply	1,000,000
v)	F orest stock (m^3)	40 million
vi)	A nnual fall in demand for FW	6%

Change in supply and demand by 2020

vii)		E
	stimated number of households with gas	100%
viii)		E
	stimated fall in demand for FW	-25%
ix)		C
	hange in share of households using gas	-17%
x)		N
	umber of households which will still be using gas	50%

Scenarios

xi)		A
	nnual losses (supply minus consumption) from 2020 (best case)	0
xii)		A
	nnual losses (supply minus consumption) 2020 (worst case)	585,428
xiii)		Y
	ears until complete deforestation under worst case scenario	80

POLICY MEASURES – MAGNITUDE AND DIRECTION OF IMPACTS

Policy measure	Social	Economic	Environmental	Budget	Corruption*	Political
A. Targeted gas subsidies to forest community households	**4↑**	**1↑**	**4↑**	**2↓**	**3↑**	**?**
B. Elimination of permit price for fallen wood	**4↑**	**2↑**	**2↑**	**1↓**	**1↑**	**?**
C. Liberation of wood prices sold by Hayantar	**2↑**	**2↑**	**2↑**	**2↑**	**2↑**	**?**
D. No action taken	**3↓**	**3↓**	**3↓**	**1↑**	**1↓**	**?**

1 = almost negligible
2 = modest
3 = notable
4 = significant
5 = large
*A positive impact under corruption (↑) means it decreases, and vice versa

9. RECOMMENDATIONS, RISKS AND MITIGATION MEASURES

The following key principles underlie the recommendations in this section:

i) Transparency and accessibility of information
ii) Genuine stakeholder engagement and consultation
iii) Strong monitoring systems

Recommendation 1: Develop a strategic vision and action plan

Description:

- A coherent strategic action plan, owned by all stakeholders, should be developed to guide forest policy and investments. It should be developed domestically, i.e. by Hayantar and the Government, in close consultation with NGOs. A vision should be agreed upon and formulated first. Both vision and strategy must be developed in consultation with key stakeholders from relevant government ministries and agencies, civil society, forest communities, and industry. Consultations in the form of repeated workshops over a period of months should be held and their meeting minutes made publicly available. There should be only minimal external technical assistance, guiding the process, if necessary, not writing the draft. Recommendations should then be developed further based on the decisions taken. The plan should be given sufficient time (several months to a year) to be developed, over the course of a series of meetings/workshops.

Risks:

- The plan is developed largely externally, by consultants. As a result, there is little engagement or interest on the part of the Government. Outsourcing too often leads to abnegation of responsibility.
- The strategy is not developed in a truly consultative manner, thus side-lining one or the other key constituency.

Mitigation:

- The process is well publicized in the media, making it more difficult to disregard the process or outcome. This would have the additional benefit of demonstrating to the public and civil society that the government is taking the issue seriously. There is reason to believe that when the Government is truly interested in making changes, or pursuing a goal, it can muster the will and the resources.

Recommendation 2: Implement Forest Management Plans (FMPs)based on accurate data (AAC aligned),accompanied by an awareness raising and stakeholder engagement programme.

Description:

- The FMPs have been prepared, but focus needs to be on their proper implementation and use in the strategic management and planning of the forest resource. FMPs go beyond the AAC, detailing the full range of forest management practices to be implemented as part of a framework for sustainable forest management. FMPs contain information and data that can

be made available to all, enabling transparency and accountability across the sector. Information can be made publically available – for use in planning and investment by industry, awareness and engagement with communities, and monitoring and awareness raising by NGOs. Forest management (including planning, implementation, monitoring) should be conducted in close collaboration with all stakeholders – industry, communities, NGOs and Government.

Risks:

- An atmosphere of mistrust on all sides needs to be overcome. The mistrust and fear of potential negative repercussions too often prevents full and effective engagement between stakeholder groups – industry, government, NGOs and communities. The process of building trust is a difficult one and will take time. Without awareness raising and better communication, NGOs will continue to resist forest management activities, for example a potential rise in the AAC; communities will remain wary of Forest Enterprises, Government (Hayantar and Forest Enterprises) will refrain from engagement from apparent fear of misrepresentation.

Mitigation:

- Embark on a programme of awareness-raising, education, communications and dialogue facilitation, including conflict management. Make accurate and reliable information available with means for monitoring, reporting and verification established, that will enable all issues to be raised, discussed and dealt with in a transparent manner, with accountability for actions. Use of Independent Monitoring (IM) and technology to ensure transparent information is available. For the FMPs and sustainable forest management practices to be encouraged all stakeholders must work together.

Recommendation 3: Increase supply of forest products to meet demand for fuelwood and commercial production.

Description:

- Supply can be increased through a range of actions. Most critical is that those actions are sustainable. Options include further development of reforestation and afforestation activities, use of fiscal incentives to support imports, engagement of communities in forest management of Forest Enterprise forests and direct community forest management. By engaging communities in forest management (community forest sites but also in Forest Enterprise management practices) will install a degree of responsibility and ownership in the long-term supply of the forest resource. Likewise, engaging industry is key, to ensure that their needs and requirements for investment can be met. The right trees in the right place with the right long term management and financing are required. (See Strategic plan owned by all stakeholders).

Risks:

- Based on experience to date, the main risks include a lack of long-term funding and weak stakeholder engagement. This can result in demand not being met - the planting of the wrong tree species in the wrong place; failure to account for community livelihood needs, for example, ensuring that access to grazing and NTFPs is included in FMPs; insufficient

funds to maintain the management of reforestation areas. All of which will result in the failure to increase supply of forest products.

Mitigation:

- Engage communities and dialogue and engage with industry, ensuring all stakeholders have buy-in and an interest in the success of such programmes – long term investment in the forest resource.

Recommendation 4: Consider alternative sources for forest products, including fuelwood and raw materials for industry.

Description:

- Supplement domestic supply with legal imports to increase available supply of forest products for all uses – fuelwood and commercial and thus relieve the pressure on the forest resource. This can be done using import tariffs and fiscal incentives for fuelwood imports. This should be done in close collaboration with consumers and industry to ensure that the right products, volume and species are sourced. Ensure industry is consulted and given a voice. Provision of the wrong product is a sure way to ensure that the programme will fail and pressure on the domestic forest is restored.

Risks

- Sustainable long term supply and building an industry dependent on imports is inherently risky. A short to medium-term supply solution relying on imports, with long term supply being met domestically may be considered. Alternatively the development of the industry should be done in line with the available domestic supplies.

Mitigation:

- If a long term solution, then ensure it is included in planning and strategic visions. If short term solution, then work at how to increase supply to enable domestic production to take over from imports.

Recommendation 5A: Engage communities in the sustainable management of forests through Forest Enterprises.

Description:

- Forest Enterprise should include the practice – using some of the principles of FSC and national park management – of engaging with local communities in their management of the forest resource. By engaging with communities and including them in the planning process, the needs of communities can be taken into account, including access to grazing, NTFP collection and of fallen wood. This will ensure dialogue with communities to plan resource management is maintained and the Forest Enterprise will take into account where grazing is required, ensure access to NTFPs etc and the communities are aware of where replanting and natural regeneration is taking place so as to avoid grazing.

Risks:

- There is a risk that the perceived financial cost and managerial issues will limit the success and thus the sustainability of such actions. Conflict could arise, with a lack of transparency and accountability. However, this process is about dialogue and engagement and not about

the communities managing the forest, so this risk should be mitigated with clear information.

Mitigation:

- Engagement and dialogue
- Building on existing systems as opposed to introducing something new
- Transparency and accountability

Recommendation 5B: Engage communities in the sustainable management of forests through Community Forest Management and integration in wider watershed management.

Description:

- Community forest management can be introduced and in some cases this should be integrated into broader resource management/watershed management. Community Forest Management will result in communities taking responsibility for the management of the forest resource, in the same way that a Forest Enterprise does. This will involve extensive support, training and capacity building, to establish community level institutions with the capacity to manage forest resources. Lessons should be taken from other countries that have community forest management.

Risks:

- There is a risk that the perceived financial cost and managerial issues will limit the success and thus the sustainability of such actions.
- Local level capacity will need to be developed.

Mitigation:

- Building on existing systems as opposed to introducing something new – where local community institutions already exist, then this will provide a basis for developing a community forest institution.

Training and capacity will be required.

Recommendation 6: Improve market functionality so market prices reflect costs of production, wider economic value of the forest resource and consumer willingness to pay.

Description:

- The market needs to be able to function freely, using market prices to balance demand and supply, and ensuring costs of production are covered. Hayantar should move away from using fixed prices (set in 2004). Thus, a framework to support market prices should be developed, without interference by Government. Prices used by Forest Enterprises need to reflect demand and supply, covering costs of production while ensuring that the total economic value of the forest resource (including environmental and social services) are covered and not just the price of the standing timber. In other countries auctions have been used to determine market prices. There are a range of methods for using auctions depending on the length of contract and remit – i.e. to cut and extract or to manage the forest including the production and sale. In Armenia, contracts to cut and sell forest products are under consideration, an approach used by others in the region and in Europe. A common practice is to have a reserve price (minimum for bidding purposes) that will ensure all costs of production are covered as a minimum.

Risks

- For the market to operate freely inherent individual interest need to be removed from the market, and a supporting framework that will allow the market to function properly provided. Price auction system will only work where accountability and transparency are not issues.[25]

Mitigation:

- A basic requirement or the governing principles of any timber auction process is to have fully defined and well implemented accountability and transparent systems.
- Forest management plans implemented and supported by all stakeholders.
- Focus on legal production.

Recommendation 7: Empower and strengthen the role and responsibility of Hayantar, with a sustainable budget or income source.

Description:

- Hayantar must be empowered and given the resources required to fulfil its mandate. This means build a strong staff incentive structure, through performance-based rewards, better salaries, training programs, promotion and career development. Its status should be raised from SNCO to Government committee level to enable to raise issues at the Cabinet level. Its budget should be adequate to meet its needs.

Risks:

- Political forces are interested in keeping Hayantar's capacity low.
- Too many players will prohibit Hayantar operating in a free and transparent manner – opposition
- Lack of engagement with NGOS and communities, that will result in lack of knowledge, lack of transparency and resistance by NGOs to actions taken by Hayantar.

Mitigation:

- Engagement and awareness building programs. Improve level of dialogue with NGOs and other stakeholders by identifying and building upon areas of common agreement.

Recommendation 8: Improve monitoring, transparency, and information sharing.

Description:

- Transparency does not come naturally to the forest sector, yet it is a key requirement if accessible forests are to be saved. Improving monitoring, transparency, and information sharing is critical to better accountability. Building on the above recommendations, the basis of transparency and accountability is to have a clear strategic vision and plan for the forest sector, with open dialogue and good communication among all stakeholders, ensuring all are fully informed and consulted. To improve accountability, all actors – NGOs, private sector, communities and government – will need to be engaged constructively. To support open dialogue and engagement, however, transparent and credible information is needed. IT tools and satellite imagery. To improve accountability an Independent Monitor

[25]World Bank.(2005). *Forest Institutions in Transition: Experiences and Lessons from Eastern Europe, Europe and Central Asia Region ECSSD,* February 2005, PROFOR

providing the mechanisms for complaints and feedback of concerns and a complaints procedure should be established, drawing on lessons and experience in FLEGT/VPA countries. Together this will help to build trust between all stakeholder groups.

Risks

- Information is a source of power and experience indicates that there will be resistance to this measure, from within the institutions themselves. Withholding information can strengthen the position of the actor or institution in question (in terms of abusing its role), thus reducing accountability. It is a way of avoiding detection of illegal or informal activities. The benefits of not providing, collecting or sharing information are well known (or at least intuited) by vested interests, and it is only natural that they will resist moves toward improved monitoring, greater transparency, and information sharing. Poor information also creates uncertainty for others, reducing their ability to act and engage.

Mitigation:

- Modest, small steps should be taken at first, to build trust.
- Systems for collecting, and making information available must be agreed-upon, set up and maintained.
- Use IT information and tools that can't be manipulated and misused.

Recommendation 9: Leverage external monitoring expertise.

Description:

- A new approach to forest management monitoring, specifically addressing overexploitation by brigades, is needed. It would rely on civil society groups, with strong external backing, instead of government agencies. They would be properly trained and given the responsibility for monitoring, under the aegis of an international NGO (similar to the role played by Global Witness in other countries). Since environmental NGOs are the most interested in illegal logging, and vocal critics, this could be a way to channel their energies in a productive way. International good practice would need to be adapted to local conditions.

Risks:

- NGOs charged with managing are captured by vested interests or intimidated into discontinuing their activity.
- Insufficient resources are made available to adequately monitor.

Mitigation:

- Using the ENPI FLEG program as an umbrella, learn from other FLEG(T) country experiences on how to engage and maintain an independent monitor.

Recommendation 10: Develop a strategic plan for the industry

Description**:**

- Consider support of trade associations and give industry a legitimate voice. As the current industrial framework is ad hoc and many operators (both legal and illegal) are difficult to identify, there could be benefits from engaging with industry through the establishment of trade groups and associations. This would enable knowledge and information to be

imparted and ensure that the private sector has a voice in Government level planning and management of the forest resource.

- Production should reflect available supply. Given the required investment especially with technological advances of recent years, changing consumer preferences and low cost alternatives, the timber processing industry requires a new strategy on what to produce and what market to target. The development of the industry must reflect the long-term available supply of timber and should be focused on a total supply (e.g. 15,000 m^3) with perhaps the scope for a slight increase.
- With a focus on high value niche products, for domestic and possibly export markets, under the right circumstances there could be a role for certification, as a way to support sales in the export market. However, this would have to be on a small scale, and since certification can be costly to producers it would only be economically viable if a high value end user can be identified. In the near term, this is not considered likely.

Risks:

- Smaller companies don't get a voice as are too hard to identify and group, so the larger (more dubious) ones who perhaps already have a link to political powers monopolise – distorting the focus of this work

Mitigation:

- Engage with all companies
- Keep NGOS informed of progress to keep them on board and hold regular meetings where NGOs and industry meet – facilitated by an independent.
- Use WWF/Global Forest Trade Network as a means of building industry groups and dialogue – don't need to be focused on building a group or associate, the main thing is to identify everyone and build dialogue, share knowledge, concerns and use it is a vehicle for disseminating government policy etc.

Certification in Armenia

Certification, a voluntary initiative developed by consumer groups and NGOs in the mid-1990s, aimed to provide consumers with assurance of the legality and sustainability of forest products bought. Consumers who may demand certification are normally driven by a social desire to support sustainable use of the environment; private sector buyers interested in ensuring a long term supply and maintaining a corporate social responsibility commitments; high profile NGO pressure to change often targeted on private sector buyers/processors and governments. The introduction of the EU Timber Regulation in 2010 and the extension of the US Lacey Act in 2008 have also provided a legislative framework where assurance of legality of forest resources used in timber related products is required, and this can be provided by certification.

Certification can be costly for producers unless price premiums can be charged and costs are passed on to consumers. (However, there is limited market experience of price premiums). It is therefore mainly used when a buyer requires assurance of legality and sustainability. Unless Armenia seeks to export products or urban consumers of niche products (including Government) are willing to pay price premiums, there will be little demand for certification. Alternative means of providing assurance of legality and sustainability should be sought.

Recommendation 11: Empower consumers to support green consumerism, i.e., the purchasing of legal and sustainable wood products

Description**:**

- There has been a general

growth in awareness, in part through social media, which may translate into potential demand by end users for legal and sustainable wood products. Consumers play a vital role in providing an incentive for producers to produce only legal and sustainable timber products. As long as a market for illegal products exists, suppliers will continue to supply. Consumers for timber products (going beyond fuelwood) should be empowered to demand legal products, using tools such as certification and procurement policies. Governments are an important consumer of all wood products and this is recognised in Europe and globally, and thus they have an essential role to play. Recent years have seen the growth of public procurement policies for timber products and the successful implementation of such policies has had knock on effects to the private sector supplying the government.

Risks:

- Certified products will be more expensive for consumers, due to additional costs incurred by producers.
- The effectiveness of a public procurement policy for timber depends on how well (consistently across all departments, verified and reported) it is implemented.

Mitigation:

- Through awareness and allowing the market to function freely, consumers should be given the choice to choose legal and sustainable products.
- The Government needs to lead by example.

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INSTITUTIONS AND ORGANIZATIONS CONTACTED

1. AcopianCenter for the Environment
2. AM Partners
3. Armenia Tree Project
4. Armenian Agricultural Academy
5. ATC Agribusiness Teaching Centre
6. ATP Charitable Foundation
7. Civilitas
8. Ecolur
9. Environmental Inspectorate
10. Forest Enterprise Noyemberyan
11. Forest Enterprises
12. FREC
13. Greens Union
14. GTZ
15. Hayantar
16. HranushKharatyan
17. Ijevan veneer factory
18. International Center for Human Development
19. IUCN
20. Kanach - Environmental NGO
21. MNP – Biodiversity Dept.
22. Noyeberyan Police Dept.
23. Radio journalist
24. REC Caucasus
25. State Forest Monitoring Centre
26. Transparency International
27. UNDP
28. World Bank
29. WWF
30. Other anonymous sources