Illegal Logging – Survey and Analysis

Draft Final Report

Forest Institutional Support Project

March 2004

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Illegal Logging – Survey and Analysis

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Environmental Resources Management

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Date: _____

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ACRONYMS

AAC	Annual Allowable Cut
BMA	Bioresources Management Agency
CSJSC	Closed State Joint Stock Company
ERM	Environmental Resources Management
FISP	Forest Institutional Support Project
FMP	Forest Management Planning
FREC	Forest Research and Experimental Centre
IMT	Inter-Ministerial Taskforce on Illegal Logging
MoA	Ministry of Agriculture
MoNP	Ministry of Nature Protection
NCSO	Non Commercial State Organisation
NRMPRP	National Resource Management and Poverty Reduction Project
Sida	Swedish International Development Cooperation Agency
ToR	Terms of Reference
WB	World Bank

Acknowledgement

This report would not have been possible without the work undertaken by local experts Samvel Shahkyan, Artashes Manerseryan and Erik Grigoryan. The work of the Armenian company, Development Programs Ltd that implemented the survey of people living in the vicinity of forests is also acknowledged.

1 INTRODUCTION

This report has been produced as one of the outputs of the Swedish International Development Co-operation Agency (Sida) funded Forest Institutional Support Project (FISP), which is part of the Ministry of Nature Protection's (MoNP) Natural Resources Management and Poverty Reduction Project (NRMPRP) supported by the World Bank (WB). FISP is divided into three blocks of activities. Block II covers support to commercialisation, mitigation of illegal activities and forest certification. This report covers the results and analysis of the work undertaken on illegal logging to date. Once the results have been discussed a timetable for formulating an action plan will be prepared as a subsequent output. FISP however is not able to fund implementation of the Action Plan.

The terms of reference for the mitigation of illegal logging are as follows:

- Review the available information on illegal logging, including production and sales statistics, etc. that may indicate or confirm the existence and scope of illegal activities and familiarise with information and opinions on the subject of donors, NGOs and various Armenian authorities and institutions;
- Assist in the design and implementation of an assessment of the illegal logging problem to be carried out by an Armenian work group;
- Supervise the performance of the illegal logging assessment and assist in compiling and analysing collected data;
- Review the current monitoring and control system, and elaborate a proposal for modifications and improvements. Feasibility criteria for the design of such improvements or of the new Monitoring System should include simplicity, effectiveness and cost efficiency; and,
- Assess the inter-sectoral dimension of the illegal logging problem including recommendation for organisational restructuring and the proposal for an independent Inspection Organisation (if judged relevant).

The initial review of the currently available information on illegal logging and the monitoring systems was prepared by local consultants Erik Grigoryan and Artashes Manerseryan during 2003 and by Samvel Shahkyan in 2004. These separate reports, available from the FISP office in Armenian and English, have been referred to extensively in this document.

The approach and design of the assessment (a 3 part survey) was undertaken from July to October 2003 and is documented in the FISP report 'Illegal Logging Approach and Field Report'.

The implementation of the survey was undertaken by Development Programs Ltd of Armenia in December 2003. The survey methodology and initial results have been presented in Armenian and English in the report titled 'Illegal Logging in Armenia (survey)'.

This report is a draft compilation of the results to date, and a preliminary analysis of the situation. The final report will include the discussion of the views presented in a stakeholder workshop, it will draw conclusions, and will include the timetable for preparing the action plan. At this stage, it is anticipated that the action plan will be prepared by July 2004. There is clear overlap between the mitigation of illegal logging and other FISP activities, for example: support for institutional restructuring and commercialisation of Hayantar. As these activities are on going, it may be necessary to finalise or revise the action plan as new information and ideas are generated.

1.1 LAYOUT OF THE REPORT

The report is presented so that it can be read without continually have to refer back to the previous reports mentioned above but does not necessarily go into the details of how the data were gathered.

Firstly the current situation in terms of the forest institutions, the official production statistics, and an overview of the official system for monitoring and control of the sector are presented and analysed.

The next section presents the direct results of the survey, followed by extrapolations and analysis where appropriate.

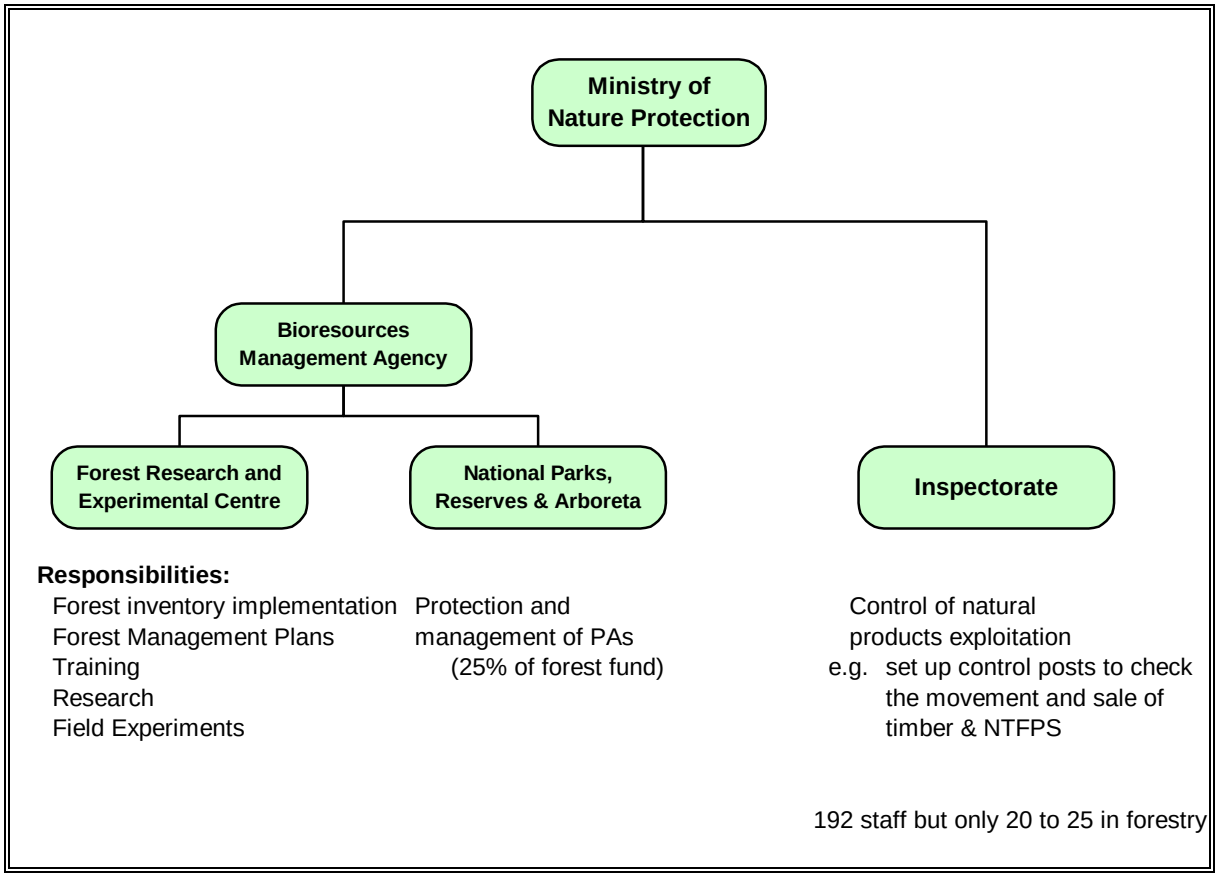
Finally a description of the next steps is made.

2 CURRENT SITUATION

2.1 FOREST INSTITUTIONS

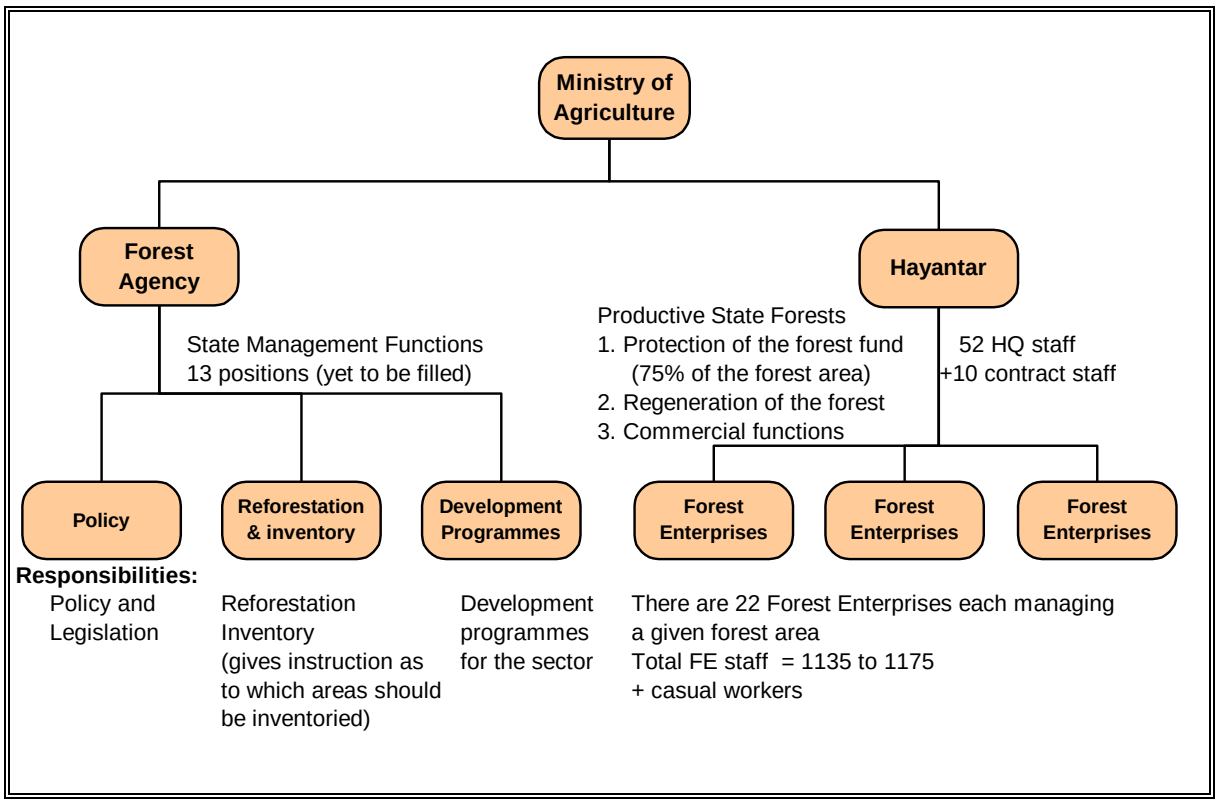
Up until 2004, the Ministry of Nature Protection (MoNP) was the state institution responsible for the forest sector. However in the beginning of 2004, the responsibility for the administration and management of forestry in Armenia was split between the Ministry of Nature Protection (MoNP) and the Ministry of Agriculture (MoA). The current institutional structures are described below in the following simplified organisation charts (the non forestry related functions have been excluded).

Figure 1 Organisation Chart of Forestry within the Ministry of Nature Protection



Following the split, the responsibility for the protected state forest remains with the Ministry of Nature Protection. The management of productive state forest land has been transferred to the Ministry of Agriculture.

Figure 2 Organisation Chart of Forestry within the Ministry of Agriculture



The split of functions between the two Ministries is still recent and the definition of responsibilities between the different Ministries, departments, agencies and companies is on going. Restructuring, particularly of Hayantar and the Forest Enterprises, is a task that is just commencing.

Under Armenian law, Hayantar is classified as a non-commercial state organisation (NCSO) but it actually functions in the manner of a state owned commercial company (closed state joined stock company - CSJSC). Hayantar has the function of controlling and co-ordinating the 22 Forest Enterprises (FEs) which are individual legal entities which operate for income generating purposes. The FEs are subsidiaries of Hayantar and are also completely state owned. The FEs are charged with the task of implementing the forest management plans in the productive state forest and the protection and regeneration of the forest fund in their areas. The FEs employ forest protection staff, whose tasks include the routing patrolling of forest and the detection and reporting of forest offences.

Before any exploitation of the forest resource can be legally exploited a forest management plan must be prepared by the Forest Research and Experimental Centre (FREC) of the Ministry of Nature Protection. This is then handed to Hayantar and the relevant Forest Enterprise for implementation.

The MoNP's Inspectorate has the responsibility to supervise and monitor the exploitation of State owned natural resources and environmental monitoring and control. They have a total staff of 192, but only 20 to 25 are appointed

specifically to control the forest sector[i]. There is a division of the inspectorate in each of the 10 Marzes. Information on the Inspectorate's resources for control of the forest sector, in terms of vehicles and field equipment was not available. It is probably safe to assume that their resources are insufficient to carry out the tasks assigned.

The Ministry of Nature Protection Inspectorate's forestry tasks include:

- Supervision of the FE's implementation of the forest management plans;
- Supervision of the FE's compliance with the forest code during operations;
- Controlling the movement of timber through check points on main roads; and,
- Inspection of sawmills and primary users of timber.

The Inspectorate's target is to check 50% to 70% of all the FE's operations in the field. However over the last two years, the inspectorate has been unable to implement its tasks properly, due to a variety of reasons but including a lack of resources and support. This means that there have not been consolidated annual reports of the inspectorates activities produced.

The control of the movement of timber includes the checking and recording details of the truck passing checkpoints and the details of the invoice for the purchase of the timber from the relevant FE. These data however are not collated and consolidated and so remain at the local level.

During 2002 the function of controlling the movement of timber and wood products was transferred to Hayantar. It was transferred back to the Inspectorate in 2003. In previous years the function of implementing the control of the movement of timber frequently used to be moved between the two organisations

Staff salaries across the sector are linked to the Civil Service pay scales. For an inspector (who should to be qualified to Bachelors degree level) for example, receive a monthly salary of AMD 35,000 to 45,000 (the equivalent of US$ 60 to US$ 80 per month). This level of salary is not sufficient to meet even basic needs. There are however, few employment alternatives.

Within the Forest Enterprises, the salary level of forestry protection staff that routinely undertake the field inspections is national minimum salary of AMD 13,000 per month (less than US$ 25 per month).

(1) Under expected organisational changes, it is expected to increase the Forest staff of the Inspectorate by 15 more inspectors.

2.2 *PROCEDURES FOR LEGALLY EXPLOITING FORESTS*

According to the Forest Code of 1994, all land under forest is considered to be state owned. As owner of the forest resource the state therefore decides how the resource can be exploited and managed.

Under the Forest Code of 1994, wood and wood products can be sold in a variety of methods:

- Forest can be allocated on a short term (up to 5 years) or long term (up to 10 years) under a forest use agreement approved by the head of Hayantar, in which forest use fees and terms are defined. Although forest use agreements were envisaged in the 1994 Forest Code none have actually been let for the exploitation of wood resources. There is no method as yet of calculating how the user would pay the state for the use of its forests;
- Forest Cutting Coupons which give the holder the right to extract a defined quantity of timber and secondary wood products (e.g. stumps), issued by the Forest Enterprise at prices agreed by Hayantar (Annex 1). Prices are set centrally by senior management and take into consideration local and international market prices. The last update was as recent as March 1st 2004. The previous price list was valid from 2001. Hayantar then pays the Nature Use Fees for the exploitation to the Government, at rates determined by Government decision. The current table of Nature Use Fees is also presented in Annex 1, set in 1998. The Forest Enterprises can also sell wood felled at stump or extracted to roadside, but the sales price would then include the cost of felling and extraction as appropriate;
- Forest Coupons are issued for the collection of fallen trees and waste wood material from the forest at half the rate for Forest Cutting Coupons. This method is frequently used for the local sale of firewood;
- An entire annual cutting area can be sold by competitive auction, under the Ministerial (MoNP) Order (N36, of 20th March 2002). However use of this system has not been extensive and participation has been so far limited to Armenian companies.

For all methods of firewood and timber production, the legal procedure is the same:

1. An official forest management plan (FMP) must be prepared by FREC and endorsed by the relevant Forest Enterprise and Hayantar and then approved by the Minister of Nature Protection. The FMP sets the annual allowable cut (AAC) for the forest area covered by the Forest Management Plan[ii];
2. The FMP stipulates the cutting areas;

(2) Most plans have currently expired but are still being used to plan the exploitation of timber. Currently there are two approved plans and another 2 pending approval

3. The FE, chose the method of sale and then select, number and hammer mark each tree (at stump and breast height) to be removed and record the details in a stock survey list;
4. From 3 above, a 'Forest Cutting Coupon' is prepared, approved by the Forest Enterprise with a copy sent to Hayantar's chief forester. The Forest Cutting Coupon is then used to prepare an invoice for sale; and,
5. On payment of the invoice fee, the buyer is issued with the Cutting Coupon which states the cutting area, the volume to be removed, the vehicle number and capacity, and value of the contract. An invoice is prepared by the FE for each truck load of timber that is transported away from the site and this is the official document which is used to verify legality of timber up to the point of delivery to a sawmill or consumer in the case of firewood.

The MoNP's Inspectorate currently has the authority to check any stage of this process apart from the preparation of the management plans.

3 OFFICIAL STATISTICS

The official timber [iii] production statistics from Hayantar and the Forest Enterprises for the years 1999 to 2003 are presented in Table 1.

Table 1 Planned and Actual Official Timber Production Statistics by Forest Enterprise, 1999 to 2003 (volume m³)

No	Forest Enterprise	1999		2000		2001		2002		2003	
		Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
1	Aragatsotn	50	44	60	35	60		50	26	70	3
2	Armavir										
3	Artsvaberd	1 550	634	2 100	1 766	1 915	1 658	1 890	1 979	1 790	1 770
4	Gyumri	30	3	50		50				20	17
5	Goris	350	79	800	792	600	457	480	480	480	420
6	Gugark	600	138	480	410	520	100	40	2	400	315
7	Dsegh	1 120	717	2 650	564	2 460	918	1 700	1 501	1 600	1 430
8	Yeghegis	30		20	2	10	13	40		50	
9	Yerevan										
10	Ijevan	1 000	506	1 800	1 801	1 215	1 050	810	818	1 170	1 190
11	Lalvar	1 000	268	1 620	1 005	2 050	1 194	2 120	1 738	1 720	1 531
12	Kapan	300	95	750	104	440	28	50	7	32	
13	Hrazdan	60	20	44	27	100	27	60	57	80	21
14	Chambarak	500	102	500	251	490	168	470	375	400	328
15	Meghri						1	50	54		18
16	Noyemberyan	1 042	1 578	3 000	2 635	1 840	1 840	2 100	2 016	1 970	1 760
17	Jiliza	800	422	1 400	410	2 060	1 206	1 210	857	1 225	1 574
18	Jermuk			20	3	20	19	40	21	3	3
19	Sisian		54			70	26	40	40	20	46
20	Sevkar	3 400	274	2 700	2 033	1 940	1 550	1 500	1 498	1 580	1 580
21	Stepanavan	1 200	339	950	802	1 010	550	500	454	540	483
22	Zikatar							900	911	710	675
	Total	13 032	5 273	18 944	12 640	16 850	10 805	14 050	12 833	13 860	13 164

Source: Shahkyan 2003

The planned volume is derived from the volume tables used in the preparation of the forest management plans. These volumes estimate the stem volume to 8 cm top diameter but exclude the volume derived from the branch wood and tops. Usually volume equations slightly overestimate the total amount of stem wood that can be achieved from harvesting operations. However in this instance the tables underestimate the amount of firewood from branches and top wood. It is therefore fair to assume that the planned volume is equivalent to solid volume of timber.

When timber is harvested the timber logs are measured individually and are thus true solid volume. However when trees are sold standing, the volumes are also calculated by the volume tables.

(3) Timber production specifically refers to sawlog production. Firewood production is sold standing and also as 'waste wood', which is where purchasers can remove fallen wood and branches left from timber felling operations.

The volume and value of timber sales by year is included as Table 25 in Annex 2.

Firewood is measured following the stack measure system. In Armenia, the conversion factor ranges from 68 to 75%. For the purposes of this study, it is assumed that 70% of 1 solid cubic metre of wood is the equivalent of 1 stack measured cubic metre. The firewood figures included in Table 2 have been converted to solid cubic metres.

Table 2 ***Total Volume and Value of Firewood Sales (standing and waste wood) by Forest Enterprise for the Period 1999 to 2003 (converted to solid m^3)***

No	Forest Enterprise	1999		2000		2001		2002		2003	
		Volume solid m^3	Value AMDx10^3	Volume solid m^3	Value AMDx10^3	Volume solid m^3	Value AMDx10^3	Volume solid m^3	Value AMDx10^3	Volume solid m^3	Value AMDx10^3
1	Aragatsotn	316	849	159	930	340	1 761	818	2 680	496	2 281
2	Armavir	0	0	0	0	0	0	0	0	0	0
3	Artsvaberd	8 792	28 434	4 499	21 044	6 336	27 928	4 135	23 527	4 479	23 914
4	Gyumri	43	110	168	554	101	231	144	695	48	259
5	Goris	1 639	6 045	2 531	8 112	3 510	10 224	5 027	17 380	5 262	20 339
6	Gugark	5 063	8 091	4 261	15 908	2 118	6 648	732	2 712	904	5 977
7	Dsegh	4 360	16 141	7 972	39 652	5 315	25 955	4 754	24 756	5 236	28 277
8	Yeghegis	190	540	277	516	106	337	777	3 657	798	4 138
9	Yerevan	0	0	0	0	0	0	0	0	0	0
10	Ijevan	11 694	18 542	7 182	23 423	7 500	27 433	5 011	27 266	9 107	53 215
11	Lalvar	4 252	12 449	4 054	16 942	2 269	10 406	4 710	21 913	7 811	39 575
12	Kapan	2 179	2 754	1 025	4 290	1 395	5 821	1 920	5 939	2 438	6 954
13	Hrazdan	931	2 903	734	2 104	617	2 173	655	3 168	524	2 238
14	Chambarak	2 525	10 774	1 279	6 699	1 732	7 655	2 281	11 468	2 511	12 800
15	Meghri	248	979	339	1 468	314	1 247	504	2 170	498	2 311
16	Noyemberyan	2 431	4 398	2 752	6 943	3 648	10 885	3 760	15 891	4 725	23 131
17	Jiliza	2 248	8 186	4 019	17 029	4 915	21 954	2 607	12 531	3 221	14 930
18	Jermuk	215	138	134	392	137	467	269	1 209	123	529
19	Sisian	312	1 748	295	1 116	50	191	274	540	222	784
20	Sevkar	1 903	3 210	5 729	22 275	5 117	18 211	3 568	18 305	5 534	28 662
21	Stepanavan	1 347	4 071	1 533	6 049	1 556	5 083	691	3 351	1 215	5 785
22	Zikatar	0	0	0	0	0	0	2 466	8 982	2 763	13 084
	Total	50 687	130 361	48 940	195 446	47 076	184 610	45 102	208 140	57 914	289 179

Source: Shahkyan 2003

The volume and value of standing firewood sales is presented in Table 26 and firewood sales from waste wood as Table 27.

The harvested wood also includes confiscated illegally harvested wood. A summary of the planned and actual production figures is presented as Table 3.

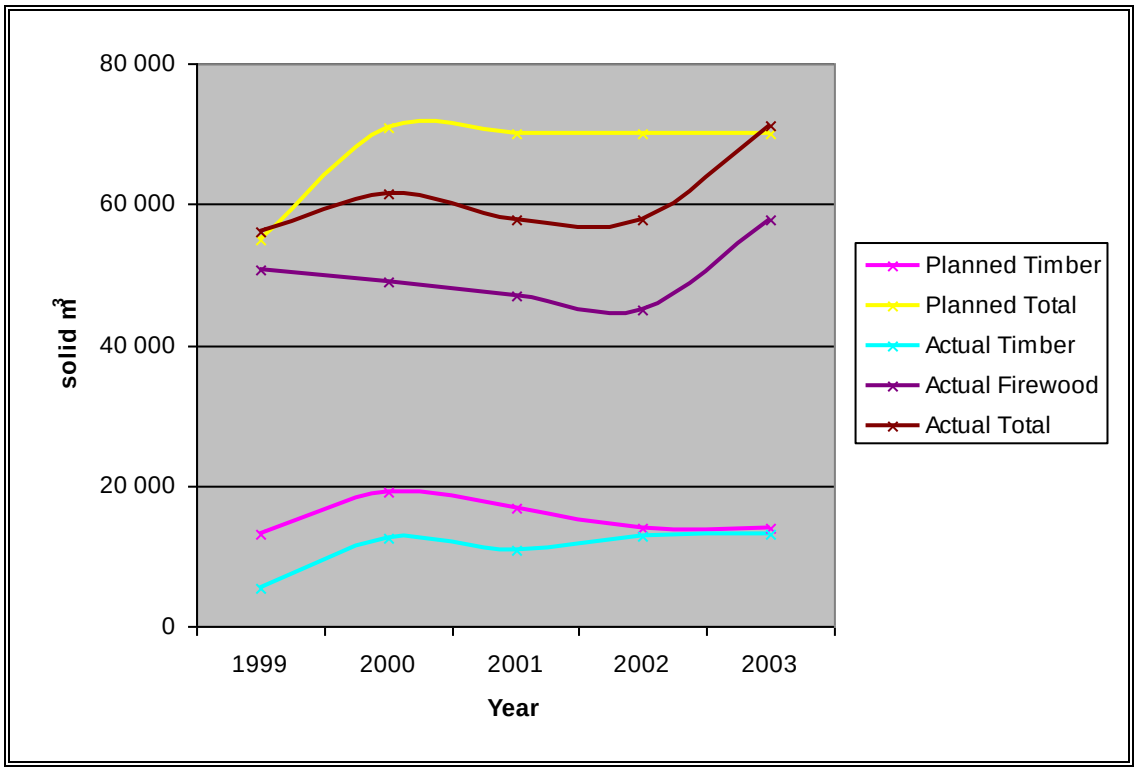
Table 3 ***Summary of Planned and Official Timber and Firewood Production Statistics for the Period 1999 to 2003***

Year	Volume (solid m^3)				
	Planned		Actual		
	Timber	Total	Timber	Firewood	Total
1999	13 032	55 000	5 273	50 687	55 960
2000	18 944	71 000	12 640	48 940	61 580
2001	16 850	70 000	10 805	47 076	57 881
2002	14 050	70 000	12 833	45 102	57 935
2003	13 860	70 000	13 164	57 914	71 078
Average	15 347	67 200	10 943	49 944	60 887

Source: Shahkyan 2003 and Manaseryan, 2002

These data are presented graphically as Figure 3.

Figure 3 ***Planned and Actual Official Timber and Firewood Production Statistics, 1999 to 2003***



This shows that officially planned production is remaining roughly constant. Firewood accounts for 83% of the official production. This proportion intuitively appears high – this may be a reflection of the quality of the forest but also of the high demand for firewood. This may also mean that timber quality wood is routinely used as firewood.

In addition to the production from Hayantar and the FEs there is limited production from the economic zones within Dilijan and Sevan National Park.

Table 4 Planned and Actual Timber Harvesting from Dilijan National Park 2003

2003	Timber	Fuelwood	Total
Standing			
Planned	580	3 420	4 000
Actual	68	3 341	3 409
Waste			
Planned	150	2 850	3 000
Actual	11	1 439	1 450
Total			
Planned	730	6 270	7 000
Actual	78	4 780	4 858

Source: Ministry of Nature Protection

3.1.1 Monitoring Results

Each year Hayantar monitor illegal activities in the forest by two main methods, by the reports from the forestry protection staff on a biannual basis when field surveys are undertaken. The Inspectorate also controls the sector and some preliminary results are available. Additionally, an estimate has been made of the number of trucks moving round the country, based on survey and expert opinion. Estimates have also been made of the number and location of sawmills.

Forest Protection Staff Reports

Forest protection staff patrol their areas on a routine basis to check the legality of all fellings, hunting, grazing and hay-making. Any violations are reported through an official protocol procedure. For each offence a protocol is prepared. If the offenders are caught they are asked to pay 3 times the official permit fee for the given product. If they decline the case can be taken to court. The data are collated and on an annual basis and are summarised in Annex 1 by Forest Enterprise and Year. Table 5 presents a summary of the detected logging offences.

Table 5 Logging Offences Officially Detected by Year

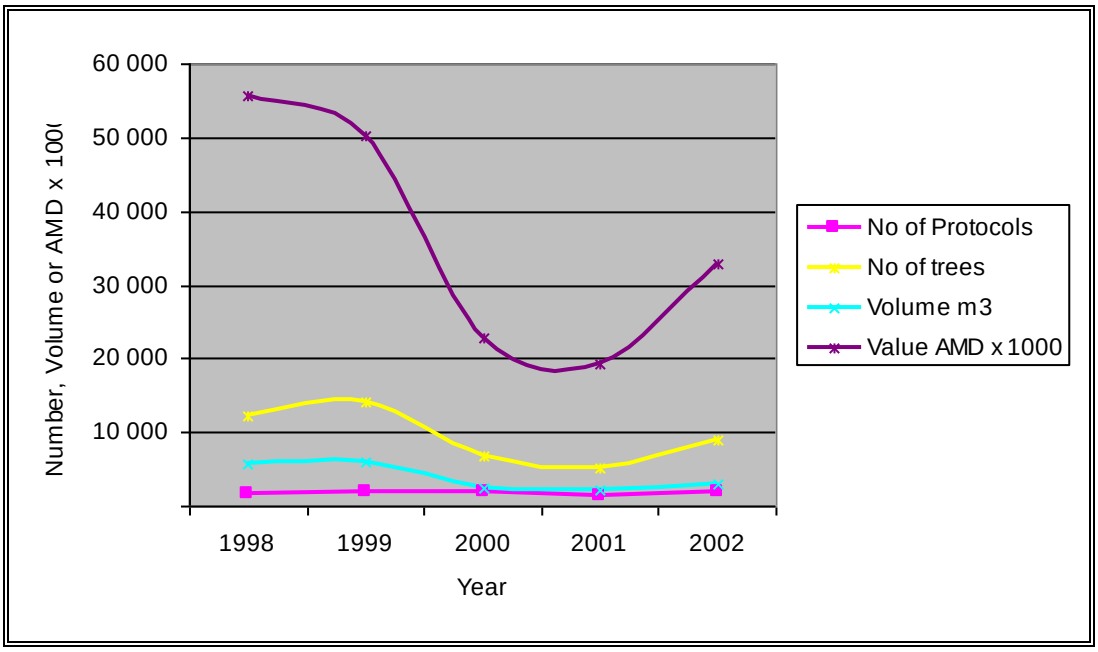
Year	Logging			
	Protocol	No of trees	Volume (m^3)	Value/[a] ($AMDx10^3$)
1998	1 542	12 094	5 723	55 702
1999	1 827	14 087	6 107	50 311
2000	1 855	6 704	2 545	22 835
2001	1 412	5 188	2 291	19 404
2002	1 820	8 869	2 904	32 918

Source: Hyantar Statistics in Manerseryan, 2003

Note: /[a] The value quoted is for three times the official permit fee as prescribed in the law.

The average volume of illegal logging detected by Forest Guards comes to just under 4000 m^3/annum. This data is presented graphically as Figure 4.

Figure 4 *Number of Illegal Logging Offences detected by Year*



From it is clear that the value and size of detected offences shows no clear trend but that the volume and number of offences detected seems fairly constant over time.

Once an offence has been detected, the offender is given the chance to pay 3 times the official permit fee for the amount of wood that has been illegally taken. If the offender declines, the offence may be sent to the court. Table 6 shows for all forest offences (including other offences such as illegal hunting, grazing, cutting of hay etc, although illegal harvesting accounts for 96% of the value) how many cases are paid voluntarily, how many are sent to court and of those how many are settled by the court.

Table 6 *Number and Value of Offences, Paid Voluntarily, Sent to Court, and Settled*

Year	Total		Voluntarily paid			Sent to legal bodies			Settled		
	Protocol	Value AMDx10^3	Protocol	% of total	Value AMDx10^3	Protocol	% of total	Value AMDx10^3	Protocol	% of sent to court	Value AMDx10^3
1998	1 776	57 445	964	54	10 072	395	22	42 142	79	20	3 898
1999	1 935	51 152	1 062	55	12 238	420	22	35 230	96	23	2 525
2000	1 987	23 778	905	46	9 619	700	35	12 644	134	19	2 142
2001	1 529	21 874	795	52	5 855	481	31	12 926	119	25	2 338
2002	1 992	35 069	1 301	65	12 959	396	20	19 087	142	36	3 000

Source: Hyantar Statistics in Manerseryan, 2003

Table 7 presents the average outcomes over the five year period.

Table 7 ***Average Outcome of the Protocols issued for the Period 1998 to 2002***

Outcome	% Of Total Number of Cases	
	Number	Value
Voluntarily Paid	55%	27%
Sent to Court	26%	64%

From this it can be seen that 55% of the cases are settled voluntarily but this accounts for only 27% of the value. This indicates that there is a certain amount of discretion used in implementing the collection of the voluntary fines.

Of the total number of protocols issued 55% are voluntarily settled and 26% go onto court. This raises the question of what happens to the remaining 19% of the cases; presumably it is considered that there is not enough evidence to proceed with the case.

However, the 26% of cases sent to the court account for 64% of the value of the offences. The regulation and tariffs for the payment of compensation for illegal logging offences is based on Government Decision N22 of 1994. A series of coefficients is developed for the type of damage, which are then multiplied by the Governments official minimum wage, which is currently AMD 13,000 per month (less than USD 25/month). A translation of this regulation is presented as Annex 3, page 42).

Table 8 ***Outcome of Cases Sent to Court***

Outcome	% Of Protocols Sent to Court	
	Number	Value
Settled	24%	11%

Of the cases sent to court, only 24% are settled and only 11% of the value is levied. Clearly the success rate in trying the case is low. The low percentage value levied by the courts would indicate that the courts are actually reducing the level of fines for illegal logging offences. This could be due to the high incidence of poverty among offenders being taken into consideration by the court as mitigation.

Dilijan National Park

In Dilijan National Park during 2003, 153 protocols registered for forest violation, which covered 335 trees with a volume of 194 m^3. Of these 111 cases (186 trees) were settled voluntarily with a value of AMD 1,414,000. The

remaining 46 cases (value of AMD 1,393,000) were forwarded for prosecution.

Results from Ministry of Nature Protection's Inspectorate from 2003

Table 9 shows the number and value of offences reported by the Inspectorate in 2003. Statistics on the numbers of log trucks that pass through the checkpoints are not collected or collated.

Table 9 The number and value of offences detected by the Inspectorate in 2003

Offence	No of Protocols	Volume (m^3)	Value of Damage (AMD)
Transport without permit	298	1 300	8 359 280
Forest Enterprise checks		571	4 280 000
Administrative penalties	190		4 131 000
	488		16 770 280

Source: Inspectorate of the Ministry of Nature Protection
Note: the total number of protocols and the value for damage given by the Inspectorate was given as 421 and AMD 15,770,840 respectively.

Biannual Surveys of Illegal Logging Sites

Biannually (in spring and autumn) field inspection of illegal logging sites is undertaken by the Forest Enterprises to estimate the volume of illegal logging. These inspections are checked by Hayantar on a sample basis. The results of this survey by year are presented in Table 10.

Table 10 Results of the Hayantar Biannual Inspection of Illegal Logging Sites (1994 – 2002)

Year	FE and Hayantar Estimate of Total Illegal Logging			Registered by protocols			Non-registered by protocols		
	Amount (pieces)	volume (solid m^3)	Nature use fee (AMD x 1000)	Amount (pieces)	volume (solid m^3)	Nature use fee (AMD x 1000)	Amount (pieces)	volume (solid m^3)	Nature use fee (AMD x 1000)
1994	454 233	65 825	98 738	92 178	9 060	13 590	362 055	56 765	81 147
1995	232 933	59 133	25 558	38 650	7 675	4 923	194 283	51 459	20 635
1996	134 861	47 556	20 786	18 323	5 236	3 180	116 538	42 320	17 606
1997	124 034	93 393	45 470	20 198	11 079	5 504	103 836	82 313	39 962
1998	86 280	62 296	30 133	12 560	5 508	2 740	73 720	56 788	27 393
1999	73 510	52 060	28 869	12 638	6 464	3 639	60 870	45 596	25 230
2000	61 219	28 063	36 579	7 800	2 445	3 362	53 419	25 618	33 217
2001	85 796	46 401	92 649	5 350	1 988	3 791	84 446	44 414	88 858
2002	102 451	25 264	51 229	7 703	2 420	4 970	94 748	22 844	46 259
Average	150 591	53 332	47 779	23 933	5 764	5 078	127 102	47 569	42 256

Source: Hyantar Statistics in Manerseryan, 2003

Table 10 shows that on average that there is just over 53,000 m^3 of illegal logging per annum but of this only 5,764 m^3 (11%) is detected by the Forest Protection staff and registered as a protocol. These results are presented graphically as Figure 5.

Figure 5 *Hayantar's Biannual Survey Estimates of Total Volume and Volume Registered by Official Protocols of Illegal Logging by Year*

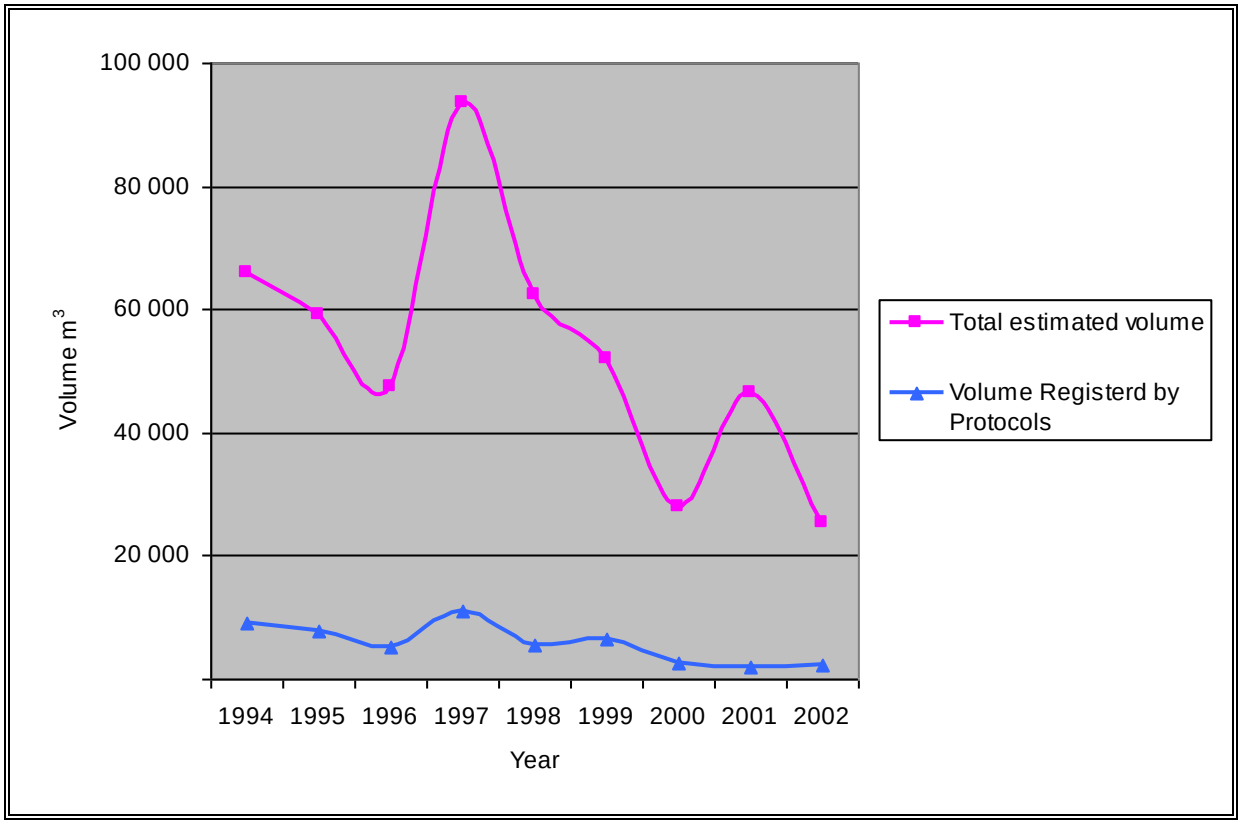


Figure 5 would indicate, with exception of 1997 and 2001 that illegal logging is decreasing over time.

Estimate of Truck Movements

From surveys of the control check points undertaken by Hayantar staff in 2002 and earlier years, and expert opinion, the average number of daily log truck movements by month has been estimated (Manaseryan, 2003). These data are presented in Table 11.

Table 11 *Daily numbers of Log Truck Movements by Month and Route (2002)*

Route	Average Number of Daily Truck Movements by Month												Total Trucks / year	Total Trucks / year by Marz
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec		
Tavush to Yerevan	2	2	2	5	10	16	25	48	48	48	48	20	8 371	
Tavush to Gegharkunik		0	0	0	0	3	5	10	15	15	10	5	1 925	10 296
Lori to Shirak		0	0	0	0	5	5	17	20	20	20	5	2 807	
Lori to Aragatsotn and Armavir		0	0	0	0	3	3	15	20	20	15	5	2 473	5 280
Syunik to Ararat		0	0	0	0	1	2	5	5	5	5	2	764	
Syunik to Gegharkunik		0	0	0	0	0	0	0	1	1	0	0	61	825
Total	2	2	2	5	10	28	40	95	109	109	98	37	16 401	16 401

Source: Manaseryan 2003

By assuming[iv] that each truck is fully loaded, and that the average load per truck is 20 stacked m^3 for all routes, apart from the trucks travelling from Tavush to Gegharkunik and Lori to Syunik which are 15 stacked m^3, then it is possible to estimate the total volume of logs (firewood and timber logs) transported each year (Table 12).

Table 12 Average Volume of Timber Transported by Month (2002)

Route	Average Monthly Volume of Timber Transported (stacked m3)												Total	Total by Marz
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec		
Tavush to Yerevan	1 240	1 120	1 240	3 000	6 200	9 600	15 500	29 760	28 800	29 760	28 800	12 400	167 420	
Tavush to Gegharkunik	0	0	0	0	0	1 350	2 325	4 650	6 750	6 975	4 500	2 325	28 875	196 295
Lori to Shirak	0	0	0	0	0	2 250	2 325	7 905	9 000	9 300	9 000	2 325	42 105	
Lori to Aragatsotn and Armavir	0	0	0	0	0	1 800	1 860	9 300	12 000	12 400	9 000	3 100	49 460	91 565
Syunik to Ararat	0	0	0	0	0	600	1 240	3 100	3 000	3 100	3 000	1 240	15 280	
Syunik to Gegharkunik	0	0	0	0	0	0	0	0	600	620	0	0	1 220	16 500
Total	1 240	1 120	1 240	3 000	6 200	15 600	23 250	54 715	60 150	62 155	54 300	21 390	304 360	304 360

Derived from Table 11

This shows that just over 300,000 m^3 was transported in 2002. This however will be in stack measured cubic metres. This gives an estimated solid volume of 213,000 solid m^3.

If the actual recorded legal volume of all timber from Hyantar's statistics, (56,585 m^3) is subtracted from this figure, the minimum estimate of the amount of illegal timber transported of 156,000 m^3 is derived which is nearly 3 times the legitimate harvest. From the available statistics it is not possible to say how much of this illegal volume is firewood or timber.

3.1.2 Comparison of the Data Sources

A comparison of the data sources for 2002 is presented in Table 13.

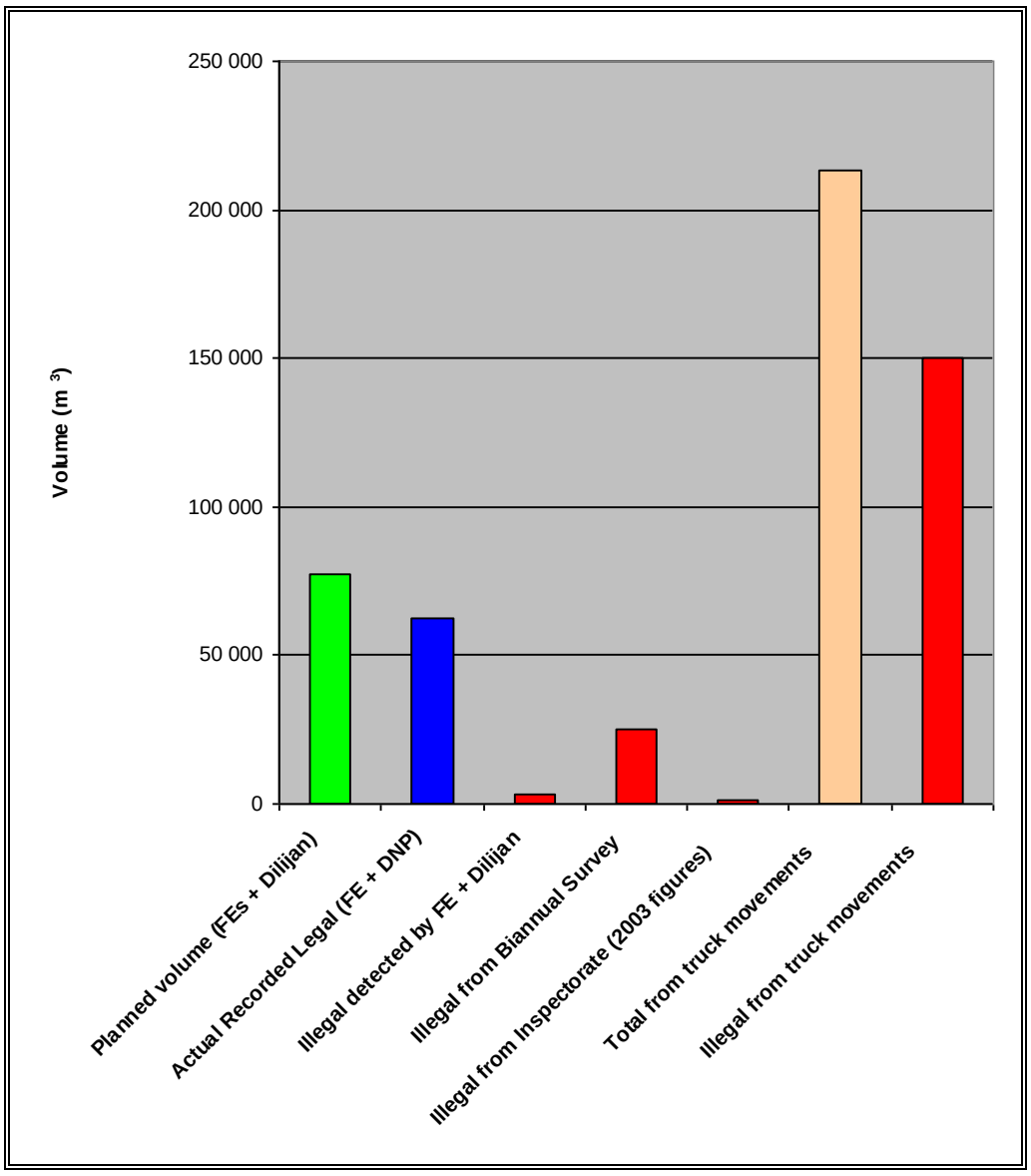
Table 13 Comparison of the Log Volume Production Statistics for 2002

Data Type	Volume (solid m^3)
Planned volume (FEs + Dilijan)	77 000
Actual Recorded Legal (FE + DNP)	62 793
Illegal detected by FE + Dilijan	3 098
Illegal from Biannual Survey	25 264
Illegal from Inspectorate (2003 figures)	1 300
Total from truck movements	213 052
Illegal from truck movements	150 259

This data is presented graphically as Figure 6.

(4) These assumptions are based on local expert opinion (Manaseryan 2003.)

Figure 6 Comparison of the Log Volume Production Statistics for 2002



It is clear that there is a big disparity from the official statistics and the estimates of timber moved by truck.

3.1.3 Sawmill Installed Capacity

A survey by Hayantar staff has estimated the number of sawmills by type and Marz (Table 14).

Table 14 Number of Sawmills by Type and Marz

Marz	Furniture factory	Frame Saws	Circular saw	Home saw for non-processed parquet	Wood-processing workshop
Tavush	34	2	57	12	0
Lori	1	18	4	0	9
Vajot Dzor	1	0	0	0	0
Syunik	19	0	0	0	0
Total	55	20	61	12	9

Source: Manaseryan, 2003

To derive an estimate of the installed primary breakdown capacity of the frame and circular sawmills (the other types are unlikely to work full time on the primary breakdown of sawlogs), it is assumed that[v]:

- only the frame saw mills and circular saws are primary breakdown machines;
- the frame sawmills would be able to cut 1.5 m^3 of logs per hour;
- the circular saws would be able to cut 1 m^3 of logs per hour;
- the mills would work an 8 hour shift (of which 7 hours would be productive time) for 250 days per year; and,
- the mills would only work single shifts.

Table 15 Estimated Installed Capacity for the Primary Cutting of Roundwood

	Installed Capacity (m^3/ year)
Annual frame sawmill capacity	52 500
Annual circular sawmill capacity	106 750
Total installed capacity	159 250

The installed capacity currently exceeds the average legal level of round wood harvest (10,943 m^3) production by just under 148,000 m^3 or 14 times.

(5) These assumptions are based on local expert opinion, (Manaseryan)

4 HOUSEHOLD SURVEY

4.1 SURVEY METHOD

To assess the current consumption of communities that live within 10 Km of forest in Armenia, a survey was designed and commissioned to ask households about their use of forests with particular emphasis on firewood cutting and consumption. This survey was implemented by, a local company, Development Programs Limited supervised by ERM.

The population to be sampled included all households located within 10 Km of forest, in the 8 forested Marzes of Armenia. In order to ensure complete geographic coverage, and coverage of the different settlement types and Marzes a stratified systematic selection of sample villages, settlements and towns was undertaken. Once in the town survey routes were randomly chosen. The households were selected systematically according to the route. Once at the household the interviewer selected the best informed member to interview[vi].

Within the 8 Marzes, a total of 62 settlements, towns and villages were surveyed with responses received from 812 households. Each survey form was long and detailed with over a 100 questions, many of which had numerous parts. Great care was taken to ensure respondent anonymity to encourage truthful responses.

4.2 RESULTS

A summary of the main results from the survey by Marz, City (or village or town) are presented as Annex 4 (page 44).

4.2.1 Firewood Consumption

From this it can be seen that for households within 10 Km of forest, the average consumption is the equivalent of 9.3 stack measured m^3 /year for those households that use firewood. This is consistent with local expert opinion and is intuitively reasonable. However 17% of households surveyed use no firewood at all and rely on other fuels such as mains gas and electricity. The average firewood consumption for all households was 6.8 m^3 / year.

A summary of the statistics for the numbers per household and average firewood consumption is presented in Table 16.

(6) For more details of the survey methodology please refer to Development Program's report

Table 16 Average Number per Household and Firewood Consumption per Year

Statistic	Number / hhld	Firewood (m^3 / yr)
Average (mean)	4.501	6.780
95 % confidence level +/-	0.158	0.460
97.5% minimum estimate	4.660	6.319

In the number per household example above, the 95% confidence level means, assuming that the statistics follow a normal distribution, there is 95% certainty that the mean lies within the range 4.501 minus 0.158 to 4.501 plus 0.158 (e.g. 4.343 to 4.660). If the minimum ends of these ranges are taken, then there is 97.5% certainty that the true values are larger.

The 2001 census[vii] lists population by Marz, City, Town and Village, and also by registered population and de facto population. The registered population includes all citizen registered in the town or village, including those living and working in other towns or countries. The number of people living permanently in the locations is given by the de facto population figures. By comparing the population figures with maps it was possible to calculate the number of people living permanently within 10 Km of the forest (Table 17).

Table 17 De facto Population by Distance from Forest

Marz		De facto Population by distance from forest						
		Total	up 5 km	%	5-10 km	%	>10 km	%
1	Tavush	121963	102936	84	14513	12	4514	4
2	Lori	253351	131489	52	58270	23	63592	25
3	Syunik	134061	41156	31	40486	30	52419	39
4	Gegharkunik	215371	14000	7	34675	16	166696	77
5	Vayots dzor	53230	7186	13	18151	34	27893	52
6	Kotayk	241337	36200	15	33787	14	171350	71
7	Aragatsotn	126278	14774	12	10355	8	101149	80
8	Ararat	252665					252665	100
Total		**1 398 256**	**347 741**	**25**	**210 237**	**15**	**840 278**	**60**

Source: derived from 2001 Census, National Statistical Service of the Republic of Armenia

From Table 17, it can be seen that the population living within 10 Km in the 8 Marzes comes to 558,000. From the household survey, minimum number of households in this population will be at least 119,748. The minimum firewood consumption within this population is therefore 756,750 stack measured m^3 (119,748 x 6.319).

This gives a solid wood equivalent of 567,563 m^3, assuming a conversion rate of 70%.

(7) The Results of 2001 Census of the Republic of Armenia, State Committee of the Organisation and Conduction of the RA Census, 2001, National Statistical Service of the Republic of Armenia

If the community firewood consumption figures are added to Table 13, the comparison shown in Table 18

Table 18 ***Comparison of Log Volume Production Statistics***

Data Type	Volume (solid m^3)
Planned volume (FEs + Dilijan)	77 000
Actual Recorded Legal (FE + DNP)	62 793
Illegal detected by FE + Dilijan	3 098
Illegal from Biannual Survey	25 264
Illegal from Inspectorate (2003 figures)	1 300
Total from truck movements	213 052
Illegal from truck movements	150 259
Community consumption	567 563

These figures are presented graphically as Figure 7.

Figure 7 ***Comparison of Log Volume Production Statistics including Community Consumption***

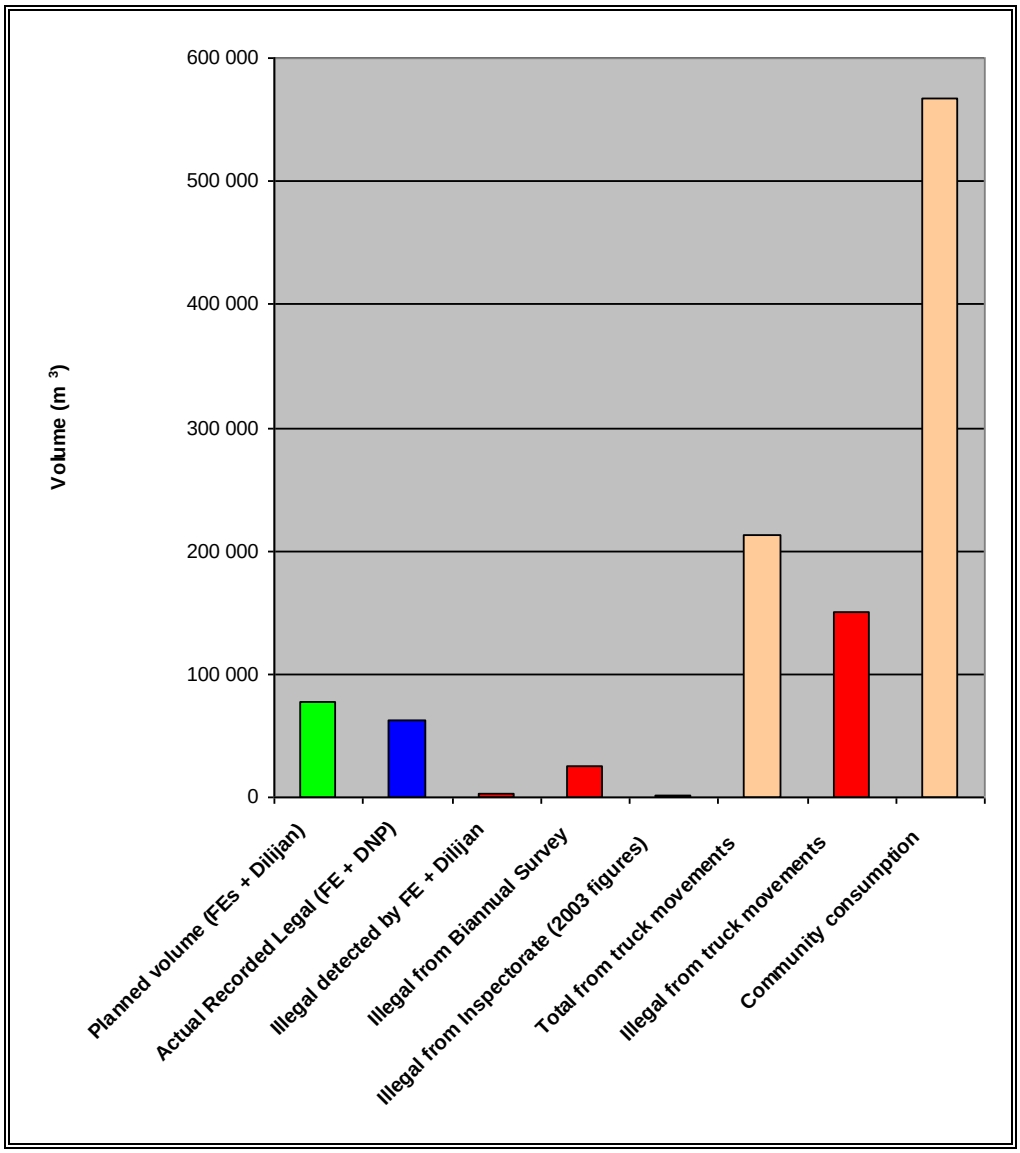


Figure 7 clearly demonstrates the extent of community firewood consumption in comparison to other uses of timber and wood products.

It is not possible to know if figures for the volume of timber from truck movements include some of this volume or not.

Of the 599 households surveyed that use firewood, 63% purchased some of their firewood from others. 3% of the survey obtained firewood free from relatives or neighbours. The remaining 37%, collected their firewood themselves. Of these, 11% collected some of their firewood from orchards and 8% from waste wood not from the forest. These results are presented as Table 19.

Table 19 *Percentage of Responses on Firewood Source*

Firewood Source	Percentage of Responses (%)
A. Firewood Purchases	
Local residents who bring from forest	15
Others who bring it from the forest	5
Local traders	7
Other traders	7
Don't wish to say	20
Others	2
From Hayantar	4
Receive free from relatives/friends	3
Subtotal	**63**
B. Collect their own firewood	
Bring from the forest	18
From orchards	11
Waste, not from the forest	8
Subtotal	**37**
Total	**100**

It is not possible to put quantities against these sources as the respondents could make multiple choices and no proportion of their total consumption was ascribed. However it is clear that a proportion of firewood does come from outside the forest.

Many questions were asked on the respondents views and perceptions. A summary of the most important questions is presented as Table 20.

Table 20 Summary of Respondents Views

Summary of Respondents Views	
Alternative Fuels	
77%	would prefer to use mains gas, given equal prices
82%	would prefer to use mains gas, if there was no firewood
Official Permits/legality	
75%	did not have an official permit to cut firewood
47%	indicated unofficial payments were made
65%	think that more than 50% of all logging is illegal
8%	had been punished for taking firewood
Awareness	
94%	know the importance of forest and the harm if it disappears
60%	did not know the defined punishment for illegal firewood cutting
60%	did not know the local forest guard
Poverty	
32%	did not have enough for basic needs
46%	have enough just for basic needs
4%	have enough for normal life
<2%	were satisfied with their income level

5 SAWMILL AND TRANSPORT SURVEYS

During the last three months of 2003, when the survey was being undertaken, there were many sawmill and truck inspections from police, the Prosecutor's Office and the President's Office, with frequent arrests and punishment. The enumeration teams reported that the sawmills and truckers were extremely reluctant to co-operate and were worried that implementing the survey would have personal safety implications. This could also mean that the few respondents who did agree to participate did not give truthful answers for fear of incriminating themselves. This meant that number of completed questionnaires was few, which in turn means will not be possible to extrapolate the data with any kind of statistical accuracy.

5.1 SAWMILL SURVEY

121 sawmills were selected for interview but of those, 61 refused to participate, 20 were non-operational and 8 were inaccessible. Information was collected for 32 sawmills

Table 21 presents the average log in take figures for the sawmills surveyed.

Table 21 Average Sawmill Log In Take by Purchase Method for 2003

Averages for all Mills Surveyed	Log Intake	
	Volume (m^3)	Percent (%)
Standing purchase	24	12
Roadside	14	7
Delivered to mill yard	125	61
Contract sawing	42	21
Other	1	1
Log Intake Total	206	100

If this is compared with the installed capacity figures the volume of actually sawed timber is very low, for the sawmills surveyed. However, the sawmills indicated that on average they could saw 5.611 m^3 per shift, if they had sufficient logs, power and no breakdowns. Assuming 250 shifts per year, this would mean an annual capacity of just over 1400 m^3 per year. This indicates that of the sawmills surveyed they are currently working at just 15% of their capacity.

On average each sawmill employs 3.28 people. The average rates of pay are presented in Table 22.

Table 22 Average Rates of Pay for Sawmill Workers

	AMD per		
	Month	Day	m^3
Labourer	27 500	1 128	840
Machine operator	45 000	1 594	1 600
Manager	55 000	1 722	1 722

84% of the respondents indicated that they knew that they needed to have official permits to run their sawmills. 78% said that they actually had the required permits. 22% indicated that they have to pay unofficial charges in order to operate. 19% of sawmills check that the roundwood coming into their mill yard has the necessary official paperwork.

The largest five biggest problems listed by respondent in descending order were:

1. marketing to international high value markets;
2. access to capital for investment and bank loans;
3. roundwood supply;
4. official bureaucracy; and,
5. continuity of roundwood supply

68% of sawmill owners/managers considered that more than 50% of logging was illegal (compared with 65% from the household survey).

5.2 TRANSPORT SURVEY

127 truck drivers were approached but only 35 agreed to participate in the survey. All interviewed drivers were carrying firewood.

A summary of some of the transport survey results is presented in Table 23.

Table 23 Summary of Transport Survey Results

Averages for	Quantity or Answer	Units
Truck size	16	stack m^3
No of trips per year	49	trips/year
Busiest time of year	Autumn/ winter	
Age of truck	21	years
Original truck purchase price	1 194 900	AMD
Truck maintenance cost	228 338	AMD/year
Truck replacement cost	2 508 579	AMD

80% of the drivers interviewed were also the owners of the truck.

Of the 35 surveys completed, 3 of the truck drivers had no permits to transport the timber and were unaware of the official permit

requirements. The average permit fee paid by the drivers that did have permits was AMD 3,570 / stacked m^3, and ranged from AMD 1000 to AMD 8000 /stacked m^3. Over 51% of the drivers claimed that there were unofficial payments requested. On average the drivers were stopped over 3 times per week.

23% of the truckers revealed that they had a permit to sell the timber at the destination. 28% stated that there were unofficial payments requested to be allowed to sell their products.

63% estimated that more than 50% of the logging was illegal (compared with 68% of sawmills and 65% of house holders).

Table 24 presents the drivers perception of their level of income.

Table 24 Truck drivers perceptions of their income

Poverty	
9%	did not have enough for basic needs
46%	have enough just for basic needs
31%	have enough for normal life
<3%	were satisfied with their income level

6 NEXT STEPS

It is intended that the findings in this report will be presented firstly to Hayantar staff and then at a multi-stakeholder workshop. Following discussion with the stakeholders, comments will be taken on board for consideration.

It is currently intended to make a presentation of these initial findings to the Inter-ministerial Taskforce (IMT) on illegal logging on March 31st. Following this meeting overall conclusions will be drawn and incorporated into the Final version of this report.

A short paper will also be prepared discussing some of the options that have been used in other countries to address illegal logging.

The next stage will then be to again meet with the IMT to discuss how the action plan should be formulated. It is proposed that a second IMT meeting is held at the end of April when the World Bank staff will also be able to attend. The Action Plan will then be drafted by the end of July. Implementation of the Action Plan will require funding from sources other than FISP.

ANNEX 1: HAYANTAR PRICE LISTS AND NATURE USE FEE TARRIFS

1. HAYANTAR PRICE LISTS

Minimal prices for giving out wood from RA forest fund starting from October 1st 2001 (for 1 cubic meter, in thousand drams) without VAT

Forest species	Standing						Felled at stump						Roadside					
	Timber (3 meter long)						Timber (3 meter long)						Timber (3 meter long)					
	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)
By species	type		type				type		type				Type		type			
	I	II	I	II			I	II	I	II			I	II	I	II		
Oak, ash, maple	28	26	25	23	18	16	30	28	27	25	20	18	38	36	35	33	28	26
Pine, lime-tree	23	21	20	18	13	11	25	23	22	20	15	13	33	31	30	28	23	21
Beech	20	18	17	15	12	10	22	20	19	17	14	12	30	28	27	25	22	20
Hornbeam and others	15	13	12	10	9	8	17	15	14	12	11	10	25	23	22	20	19	18

Fuel-wood from logging, 1 meter long (stacked cubic meter)

Forest species	Standing	In the logging area	In the lower storage places
Oak, ash, maple	4.5	5	6.6
Pine, lime-tree	2.0	2.5	4.1
Beech	4.0	4.5	6.1
Hornbeam and others	4.0	4.5	6.1

*Logging operations are done by population only under forest enterprise direct supervision
The price for giving out fuel-wood from waste should be set up as 50% of the price of standing.

Groups of organizations: The following coefficients should be used for different groups of enterprises

Group 1 1.0
Yerevan forest enterprise
Armavir forest enterprise
Gugark forest enterprise
Ijevan forest enterprise
Hrazdan forest enterprise
Dilijan National Park
Sevan National Park

Group 2 0.9
Jambarak forest enterprise
Sevkar forest enterprise
Dsegh forest enterprise
Artsvaberd forest enterprise

Group 3 0.8
Lalvar forest enterprise
Stepanavan forest enterprise
Jiliza forest enterprise
Yeghegis forest enterprise

Group 4 0.7
Noyemberyan forest enterprise
FREC State Closed Stock Company
Aragatsotni forest enterprise
Jermuk forest enterprise
Gyumri forest enterprise

Group 5 0.6
Meghri forest enterprise
Kapan forest enterprise
Goris forest enterprise
Sisian forest enterprise

Minimal prices for giving out wood from RA forest fund starting from March 1st 2004 (for 1 solid cubic meter, in thousand drams) without VAT

Forest species	Standing						Felled at stump						Roadside					
	Timber (3 meter long)						Timber (3 meter long)						Timber (3 meter long)					
	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)	Diameter more than 25 cm		Diameter 13-25 cm		Diameter up to 12 cm	Technical wood (1m long)
By species	type		type				type		type				Type		type			
	I	II	I	II			I	II	I	II			I	II	I	II		
Oak, ash, maple	84	78	75	69	54	48	90	84	81	75	60	54	114	108	105	99	84	78
Pine, lime-tree	46	42	40	36	36	22	50	46	44	40	30	26	66	62	60	56	46	42
Beech	40	36	34	30	30	20	44	40	38	34	28	24	60	56	54	50	44	40
Hornbeam and others	15	13	12	10	10	8	17	15	14	12	11	10	25	23	22	20	19	18

Fuel-wood from logging, 1 meter long (stacked cubic meter)

Forest species	**Standing**	**In the logging area**	**In the lower storage places**
Oak, ash, maple	5.0	6.0	69.0
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

*Logging operations are done by population only under forest enterprise direct supervision

Groups of organizations: The following coefficients should be used for different groups of enterprises

Group 1 1.0
Yerevan forest enterprise
Armavir forest enterprise
Gugark forest enterprise
Ijevan forest enterprise
Hrazdan forest enterprise
Dilijan National Park
Sevan National Park

Group 2 0.9
Jambarak forest enterprise
Sevkar forest enterprise
Dsegh forest enterprise
Artsvaberd forest enterprise

Group 3 0.8
Lalvar forest enterprise
Stepanavan forest enterprise
Jiliza forest enterprise
Yeghegis forest enterprise

Group 4 0.7
Noyemberyan forest enterprise
FREC State Closed Stock Company
Aragatsotni forest enterprise
Jermuk forest enterprise
Gyumri forest enterprise

Group 5 0.6
Meghri forest enterprise
Kapan forest enterprise
Goris forest enterprise
Sisian forest enterprise

2. *NATURE USE FEES*

The following table is an extract from Government Decision N 864 of December 30, 1998. It is still current.

Species	Distance from forest (km)	Tariffs (in drams)			
		Timber under bark diameter near stump (cm)			Fuel wood over bark
		More than 25	13-24	3-12	
Beech	up to 10	3,640	3,220	2,800	700
	10-25	2,800	2,520	2,240	630
	25-40	2,520	2,240	1,680	560
	more than 40	2,240	1,960	1,680	420
Oak, ash	up to 10	3,920	3,640	2,800	700
	10-25	3,080	2,800	2,240	630
	25-40	2,520	2,240	1,680	560
	more than 40	1,960	1,680	1,400	420
Hornbeam, maple, elm	up to 10	1,260	1,120	840	700
	10-25	1,120	980	840	630
	25-40	980	840	700	560
	more than 40	840	700	420	120
Others	up to 10	980	840	700	420
	10-25	700	700	560	350
	25-40	560	560	420	280
	more than 40	420	420	260	210

ANNEX 2: PRODUCTION STATISTICS AND SUMMARIES OF ANNUAL REPORTS ON FOREST OFFENCES

Table 25 The Volume and Value of Timber Sales for the Period 1999 to 2003

No	Forest Enterprise	1999		2000		2001		2002		2003	
		Volume m^3	Value AMDx10^3	Volume m^3	Value AMDx10^3	Volume m^3	Value AMDx10^3	Volume m^3	Value AMDx10^3	Volume m^3	Value AMDx10^3
1	Aragatsotn	44	528	15	96	7	21	24	395	3	39
2	Armavir					1 883					
3	Artsvaberd	749	2 218	660	8 454		35 651	2 104	45 659	1 846	46 702
4	Gyumri			11	133					25	295
5	Goris	72	893	535	24 524	457	14 623	614	30 874	564	20 116
6	Gugark	302	1 518	426	5 732	238	3 000	35	499	237	4 105
7	Dsegh	208	2 590	387	8 062	696	12 338	631	14 390	2 143	46 842
8	Yeghegis					18	247				
9	Yerevan										
10	Ijevan	607	7 761	949	16 833	1 739	25 274	1 260	21 861	1 567	30 336
11	Lalvar	573	6 275	436	8 043	1 144	14 689	1 340	40 368	1 195	37 279
12	Kapan	93	992	22	1 332	60	914	27	178	6	190
13	Hrazdan	34	332	19	201	15	153			21	168
14	Chambarak	125	1 255	111	2 940	163	2 186	139	4 872	511	19 530
15	Meghri					6	60	54	1 346	18	324
16	Noyemberyan	1 500	19 001	1 703	37 661	1 730	33 940	2 016	51 352	1 824	54 852
17	Jiliza	326	2 347	573	4 423	1 124	22 517	421	13 064	779	24 506
18	Jermuk	26	202	3	52	19	222	14	131	3	25
19	Sisian	54	1 054			26	374	40	523	46	604
20	Sevkar	316	3 512	1 968	28 230	859	14 728	2 195	41 407	1 210	28 918
21	Stepanavan	311	6 020	634	9 765	591	8 403	384	6 784	532	9 922
22	Zikatar							185	3 940	1 220	33 111
	Total	5 340	56 498	8 452	156 481	10 775	189 340	11 483	277 643	13 750	357 864

Source: Shahkyan 2003

Table 26 The Volume and Value of Standing Firewood for the Period 1999 to 2003

No	Forest Enterprise	1999		2000		2001		2002		2003	
		Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3
1	Aragatsotn	61	288					488	769	94	211
2	Armavir										
3	Artsvaberd	4 395	12 814	866	1 961	3 449	15 003	527	2 062	1 201	5 065
4	Gyumri					52	66				
5	Goris	208	177	170	170	318	364	235	273	461	550
6	Gugark	2 496	2 498	3 672	5 789	1 960	3 920	1 033	3 753	811	5 224
7	Dsegh	303	532	233	417	1 926	9 100	483	2 396	1 295	4 506
8	Yeghegis	50	127	248	310			110	293	232	669
9	Yerevan										
10	Ijevan	6 679	11 843	4 407	7 835	7 292	20 998	3 991	20 288	7 526	44 702
11	Lalvar	1 337	2 139	770	1 769	464	888	200	476	2 616	13 511
12	Kapan	1 154	1 133	472	559	381	386	701	921	1 094	1 470
13	Hrazdan	524	929	480	862	272	539	379	905	148	334
14	Chambarak	267	458	247	1 604	194	353	126	326	220	580
15	Meghri	6	6	28	40	39	54	173	372	161	502
16	Noyemberyan	1 216	1 438	463	665	495	807	336	751	628	2 083
17	Jiliza	422	857	181	394	661	2 240			24	57
18	Jermuk	120	39	95	148	45	70	69	148	10	22
19	Sisian							31	56	12	20
20	Sevkar	70	350	634	1 131	2 710	8 364	1 201	5 142	3 424	17 662
21	Stepanavan	193	230	486	867	436	951	49	116	157	361
22	Zikatar							349	743	808	2 910
	Total	19 501	35 858	13 452	24 521	20 694	64 103	10 481	39 790	20 922	100 439

Source: Shahkyan 2003

Table 27 The Volume and Value of Waste Firewood for the Period 1999 to 2003

No	Forest Enterprise	1999		2000		2001		2002		2003	
		Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3	Volume stack m^3	Value AMDx10^3
1	Aragatsotn	61	288					488	769	94	211
2	Armavir										
3	Artsvaberd	4 395	12 814	866	1 961	3 449	15 003	527	2 062	1 201	5 065
4	Gyumri					52	66				
5	Goris	208	177	170	170	318	364	235	273	461	550
6	Gugark	2 496	2 498	3 672	5 789	1 960	3 920	1 033	3 753	811	5 224
7	Dsegh	303	532	233	417	1 926	9 100	483	2 396	1 295	4 506
8	Yeghegis	50	127	248	310			110	293	232	669
9	Yerevan										
10	Ijevan	6 679	11 843	4 407	7 835	7 292	20 998	3 991	20 288	7 526	44 702
11	Lalvar	1 337	2 139	770	1 769	464	888	200	476	2 616	13 511
12	Kapan	1 154	1 133	472	559	381	386	701	921	1 094	1 470
13	Hrazdan	524	929	480	862	272	539	379	905	148	334
14	Chambarak	267	458	247	1 604	194	353	126	326	220	580
15	Meghri	6	6	28	40	39	54	173	372	161	502
16	Noyemberyan	1 216	1 438	463	665	495	807	336	751	628	2 083
17	Jiliza	422	857	181	394	661	2 240			24	57
18	Jermuk	120	39	95	148	45	70	69	148	10	22
19	Sisian							31	56	12	20
20	Sevkar	70	350	634	1 131	2 710	8 364	1 201	5 142	3 424	17 662
21	Stepanavan	193	230	486	867	436	951	49	116	157	361
22	Zikatar							349	743	808	2 910
	Total	19 501	35 858	13 452	24 521	20 694	64 103	10 481	39 790	20 922	100 439

Source: Shahkyan 2003

Table 28 Summary of Forest Offences by Forest Enterprise for 1998

No.	Forest Enterprise	Logging				Grazing/hunting and others			Land capture, hay-making			Total		Voluntarily paid	
		Protocol	No of trees	Volume (m^3)	Value (AMDx10^3)	Protocol	number	Value (AMDx10^3)	Protocol	Area (ha)	Value (AMDx10^3)	Protocol	Value (AMDx10^3)	Protocol	Value (AMDx10^3)
1	Aparan	22	390	17	367	4	122	105				26	472	14	226
2	Armavir					4	12	7				4	7	4	7
3	Byurakan	12	39	5	28	8	27	18				20	46	20	46
4	Gyumri	11	635	45	1 144	12	232	313				23	1 458		
5	Goris	47	912	259	3 232	7	104	146				54	3 378	2	35
6	Gugark	373	850	278	2 691	25	210	215	119	3	152	517	3 058	224	1 149
7	Yeghegis	20	62	8	107	3	150	80				23	187	5	42
8	Yerevan					8	26	34	2	0	4	10	38	10	38
9	Talin								1	1	50	1	50		
10	Ijevan	102	281	486	3 440							102	3 440	88	1 839
11	Lalvar	186	760	329	2 220	26	206	265				212	2 485	61	505
12	Lori	70	331	127	1 360							70	1 360	68	608
13	Khozhornadzor														
14	Kapan	77	1 115	279	3 192	3	10	30				80	3 222	4	29
15	Krasnoselsk	89	569	225	1 133							89	1 133	84	701
16	Hrazdan	137	2 597	294	3 962	1		110				138	4 072	98	1 539
17	Meghri	24	321	26	472							24	472	22	386
18	Jermuk	16	178	8	138	5	51	43				21	182	20	160
19	Sisian	8	347	64	798	4	264	158				12	957	1	20
20	Sevkar	40	83	151	1 374	1	3	5				41	1 379	27	469
21	Tavush	85	1 927	2 721	26 351							85	26 351	10	204
22	Noyemberyan	187	605	162	1 223							187	1 223	185	1 186
	Hayantar	36	92	240	2 471	1	10	8				37	2 479	17	885
	Total	1 542	12 094	5 723	55 702	112	1 427	1 537	122	4	206	1 776	57 445	964	10 072

Source: Hayantar official statistics in Manaseryan, 2003

Table 29 Summary of Forest Offences by Forest Enterprise for 1999

No.	Forest Enterprise	Logging				Grazing/hunting and others			Land capture, hay-making			Total		Voluntarily paid	
		Protocol	No of trees	Volume (m^3)	Value (AMDx10^3)	Protocol	number	Value (AMDx10^3)	Protocol	Area (ha)	Value (AMDx10^3)	Protocol	Value (AMDx10^3)	Protocol	Value (AMDx10^3)
1	Aragatsotn	24	322	11	303	5	52	45				29	348	17	159
2	Armavir					2	2	5				2	5	2	5
3	Artsvaberd	104	1 327	2 685	15 936							104	1 5936	27	332
4	Gyumri					2	85	80	1	0.70	42	3	122		
5	Goris	37	804	319	4 399	3	21	17				40	4415	4	205
6	Gugark	537	1 337	528	4 232	7	38	26	25	0.53	32	569	4290	238	1 222
7	Dsegh	54	126	52	439	1		3				55	442	32	193
8	Yeghegis	6	26	4	43	1		13				7	56	6	43
9	Yerevan					4	4	6	4	0.05	6	8	13	8	13
10	Ijevan	150	291	571	4 440	31	315	245				181	4685	146	3 097
11	Lalvar	119	480	175	1 276	8	46	33				127	1309	34	220
12	Kapan	125	4 791	547	7 509	1		88				126	7597	58	1 113
13	Hrazdan	90	1 827	213	3 179							90	3179	49	615
14	Chambarak	83	387	112	563							83	563	83	561
15	Meghri	21	321	41	565	2	12	12				23	576	15	111
16	Noyemberyan	208	838	243	1 802							208	1802	111	792
17	Jermuk	10	117	7	86	2	19	19				12	105	12	105
18	Jiliza	90	152	124	885							90	885	90	885
19	Sisian	10	588	50	883	1	61	31				11	913	1	24
20	Stepanavan	86	195	85	514	1		51				87	565	81	480
21	Sevkar	27	85	126	937	7	234	89				34	1027	18	430
	Hayantar SCSC	46	73	215	2 320							46	2320	30	1 633
	Total	1 827	14 087	6 107	50 311	78	889	762	30	1.28	80	1 935	51 152	1 062	12 238

Source: Hayantar official statistics in Manaseryan, 2003

Table 30 Summary of Forest Offences by Forest Enterprise for 2000

No.	Forest Enterprise	Logging				Grazing/hunting and others			Land capture, hay-making			Total		Voluntarily paid	
		Protocol	No of trees	Volume (m^3)	Value (AMDx10^3)	Protocol	number	Value (AMDx10^3)	Protocol	Area (ha)	Value (AMDx10^3)	Protocol	Value (AMDx10^3)	Protocol	Value (AMDx10^3)
1	Aragatsotn	13	99	3	106							13	106	5	46
2	Artsvaberd	59	248	248	1388	7		7				66	1395	28	161
3	Armavir					6	32	19				6	19	6	19
4	Gyumri	1	56	3	128	1	40	24				2	152		
5	Goris	28	662	302	2408	3	26	21				31	2429	2	49
6	Gugark	630	1293	398	3765	14	78	144	18	0.4	43	662	3952	222	1091
7	Dsegh	33	102	18	260							33	260	14	180
8	Yeghegis	12	157	15	219	5	3	34				17	253	8	63
9	Yerevan	1	1	2	16	6	19	29				7	45	7	45
10	Ijevan	101	270	443	3208	3	27	120				104	3328	63	1473
11	Lalvar	177	629	244	2111	3		87				180	2198	7	72
12	Kapan											0	0		
13	Hrazdan	118	942	163	1258							118	1258	80	659
14	Chambarak	92	343	133	584							92	584		
15	Meghri	19	127	6	145	1		12				20	157	20	157
16	Noyemberyan	197	647	270	1267	24	164	118	21	1.8	57	242	1442	121	903
17	Jermuk	10	102	5	60	1	8	5				11	65	11	65
18	Jiliza	71	155	48	621							71	621	58	498
19	Sisian	4	100	11	208							4	208		
20	Stepanavan	199	665	146	1233	5	77	42				204	1274	179	851
21	Sevkar	28	106	88	597	14	239	182				42	779	15	146
	Hayantar SCSC	62			3254							62	3254	59	3141
	Total	1855	6704	2545	2 2835	93	713	843	39	2.2	100	1987	2 3778	905	9619

Source: Hayantar official statistics in Manaseryan, 2003

Table 31 Summary of Forest Offences by Forest Enterprise for 2001

No.	Forest Enterprise	Logging				Grazing/hunting and others			Land capture, hay-making			Total		Voluntarily paid	
		Protocol	No of trees	Volume (m^3)	Value (AMDx10^3)	Protocol	number	Value (AMDx10^3)	Protocol	Area (ha)	Value (AMDx10^3)	Protocol	Value (AMDx10^3)	Protocol	Value (AMDx10^3)
1	Aragatsotn	6	79	4	121	22	2 488	1 536				28	1 657		
2	Artsvaberd	152	387	416	2 438							152	2 438	134	622
3	Armavir														
4	Gyumri					2	300	180				2	180		
5	Goris	30	459	205	2 839	1	35	21				31	2 860		
6	Gugark	402	915	363	3 182	6	46	72	23	0.5	60	431	3 314	98	555
7	Dsegh	49	157	71	851							49	851	8	110
8	Yeghegis	6	55	13	230	5	33	38				11	267	4	36
9	Yerevan	6	24	2	42	14	25	54	29	2.4	308	49	404	38	186
10	Ijevan	67	125	191	1 850							67	1 850	35	638
11	Lalvar	110	442	217	2 119	1	27	20				111	2 139	23	193
12	Kapan	23	140	37	349							23	349	13	84
13	Hrazdan	97	618	92	880	3	28	22				100	902	76	658
14	Chambarak	124	605	321	1 068							124	1 068	93	873
15	Meghri	18	174	27	300	1	13	14				19	314	19	314
16	Noyemberyan	104	364	113	953	8	34	115				112	1 068	82	672
17	Jermuk	12	91	4	59							12	59	12	59
18	Jiliza	53	60	25	353							53	353	53	353
19	Sisian	1	138	44	580	1	34	27				2	607		
20	Stepanavan	114	291	112	893							114	893	77	279
21	Sevkar	38	64	34	299	1		3				39	302	30	222
	Total	1 412	5 188	2 291	19 404	65	3 063	2 102	52	2.9	368	1 529	21 874	795	5 855

Source: Hayantar official statistics in Manaseryan, 2003

Table 32 Summary of Forest Offences by Forest Enterprise for 2002

No.	Forest Enterprise	Logging				Grazing/hunting and others			Land capture, hay-making			Total		Voluntarily paid	
		Protocol	No of trees	Volume (m^3)	Value (AMDx10^3)	Protocol	number	Value (AMDx10^3)	Protocol	Area (ha)	Value (AMDx10^3)	Protocol	Value (AMDx10^3)	Protocol	Value (AMDx10^3)
1	Aragatsotn	62	1 061	38	1 235	12	662	508				74	1 743	18	205
2	Artsvaberd	213	863	480	4 909	5		8				218	4 917	189	3 315
3	Armavir					1	4	2				1	2	1	2
4	Gyumri	1	73	7	380	1		20				2	400	1	20
5	Goris	28	585	68	947	3	82	66				31	1 013	13	339
6	Gugark	206	652	293	4 144	7	90	54				213	4 198	70	437
7	Dsegh	36	102	60	835	1		14				37	850	7	105
8	Yeghegis	2	42	5	73	1	31	19				3	92	2	29
9	Yerevan	1	3		5	9	525	269	22	2.4	298	32	571	19	121
10	Zikatar	85	224	98	683	37	114	74				122	757	107	578
11	Ijevan	230	384	408	4 056	5	38	36				235	4 092	202	2 857
12	Lalvar	179	603	171	2 152	19	107	98	1		2	199	2 252	59	422
13	Kapan	84	1 807	680	7 039							84	7 039	15	114
14	Hrazdan	175	889	116	1 492	9	86	69				184	1 560	149	1 114
15	Chambarak	78	326	61	566	5	42	20				83	586	78	540
16	Meghri	44	245	28	491	2	51	56				46	547	45	497
17	Noyemberyan	116	366	172	1 583	11	74	54	2		100	129	1 737	84	702
18	Jermuk	8	38	3	34	1		5				9	39	9	39
19	Jiliza	53	107	28	418							53	418	35	280
20	Sisian	6	63	4	80	1	2	4				7	84	7	84
21	Stepanavan	155	377	136	1 244	9	427	342				164	1 586	125	574
22	Sevkar	58	59	50	552	7	28	31	1		5	66	588	66	588
	Total	1 820	8 869	2 904	32 918	146	2 363	1 746	26	2	405	1 992	35 069	1 301	12 959

Source: Hayantar official statistics in Manaseryan, 2003

ANNEX 3: REGULATION ON COMPENSATION OF DAMAGE CAUSED TO FOREST ENTERPRISE AND STATE HUNTING FUND

Regulation on compensation of the damage caused to forest enterprise and state hunting fund and tariffs for the damage rate calculation (1994)

1. This regulation and tariffs were developed based on the Governmental Decision N 22 on the "Calculation of the damage rate caused to forest enterprise and state forest fund" from January 12, 1994.
2. Tariffs consist of 7 tables and calculated in coefficients (to be multiplied by minimal wages).
3. Sums for the compensation of the damage to forest enterprise and the state hunting fund are transferred to the "Hayantar" account N141111.
4. 50% of the sums are transferred to the state budget as forest income, 25% - to the corresponding forest enterprise, 25% - remain with "Hayantar".
5. Tariffs of Tables 1-7 can be changed, though not more frequently than once a quarter.

Agreed with the Ministry of Economics, Ministry of Finances and Ministry of Nature Protection (signatures)

Table 1

Tariffs for calculation of the damage compensation rate caused to forest enterprise by logging, damaging growing trees and bushes, use of logged and fallen trees and logging of dry trees without cutting coupon

Diameter near stump (cm)	For each tree (in coefficients)		
	High-value and rare species	Valuable species	Other species
Up to 4 cm	1,0	0,5	0,3
4,1-8	2,0	0,7	0,4
8,1-12	2,5	1,0	0,5
12,1-16	3,0	1,3	0,7
16,1-20	3,5	1,8	0,9
20,1-24	4,0	2,2	1,2
24,1-28	4,5	2,5	1,6
28,1-30	5,0	3,0	2,0
For each centimeter above	0,9	0,4	0,3

Notes

1. High-value and rare species are Greek walnut, Corylus colurna, plane-tree, fruity trees.
2. Valuable species are oak, beech, ash, lime-tree and pine.
3. For calculation of the damage compensation rate for trees broken at the root level as well as trees fallen by storms or logged dry trees the damage should be calculated as 50% of the tariffs.
4. Damage rate in specially protected areas, arboretums and forest-parks is calculated as three times the tariffs mentioned.
5. Damage rate in planted (artificial) forests is calculated as two times the tariffs mentioned.
6. Illegally logged forest products are either confiscated or their price is charged as three times the market price.

ANNEX 4: SUMMARY OF HOUSEHOLD SURVEY RESULTS

Table 33 Summary of Household Survey Results Showing Numbers per Household and Average Firewood Consumption

Marz	City / Village	Number of Households					Firewood m^3 per year		
		Surv-eyed	Average No/hhld	Total No Survey-ed	Don't use FWD	Use fwd	Total surv-eyed	Average all hhlds	Average that use fwd
Aragatzotn	Aragatz	9	5.89	53	3	6	34.0	3.8	5.7
Aragatzotn	Byurakan	10	3.80	38	0	10	68.0	6.8	6.8
Aragatzotn	c. Aparan	10	4.20	42	6	4	19.0	1.9	4.8
Aragatzotn	c. Ashtarak	24	5.17	124	14	10	42.5	1.8	4.3
Aragatzotn Total		53	4.85	257	23	30	163.5	3.1	5.5
Ararat	c. Ararat	21	3.43	72	12	9	41.0	2.0	4.6
Ararat	c. Vedi	11	4.45	49	5	6	22.0	2.0	3.7
Ararat	Shaghap	7	4.71	33	3	4	3.0	0.4	0.8
Ararat	Surenavan	8	4.63	37	1	7	38.0	4.8	5.4
Ararat	Vardashat	6	5.67	34	2	4	10.0	1.7	2.5
Ararat	Vosketap	8	4.13	33	4	4	17.0	2.1	4.3
Ararat Total		61	4.23	258	27	34	131.0	2.1	3.9
Gegharkuniq	c. Chambarak	10	4.00	40	0	10	129.0	12.9	12.9
Gegharkuniq	Dprabak	5	4.00	20	0	5	63.0	12.6	12.6
Gegharkuniq	Martuni	5	3.80	19	0	5	48.0	9.6	9.6
Gegharkuniq Total		20	3.95	79	0	20	240.0	12.0	12.0
Kotayk	c. Hrazdan	40	4.90	196	7	33	179.5	4.5	5.4
Kotayk	c. Tzakhadzor	10	5.20	52	2	8	66.5	6.7	8.3
Kotayk	Garni	14	4.36	61	8	6	21.0	1.5	3.5
Kotayk	Geghadir	15	4.33	65	11	4	10.0	0.7	2.5
Kotayk	Meghradzor	6	5.83	35	1	5	64.0	10.7	12.8
Kotayk	Solak	10	4.30	43	5	5	34.5	3.5	6.9
Kotayk Total		95	4.76	452	34	61	375.5	4.0	6.2
Lori	Antaramut	8	3.88	31	0	8	95.0	11.9	11.9
Lori	c. Akhtala	10	3.60	36	1	9	56.5	5.7	6.3
Lori	c. Alaverdi	15	4.07	61	3	12	76.5	5.1	6.4
Lori	c. Shamlugh	10	4.30	43	0	10	115.0	11.5	11.5
Lori	c. Stepanavan	20	3.85	77	4	16	173.0	8.7	10.8
Lori	c. Tashir	15	4.67	70	5	10	93.0	6.2	9.3
Lori	c. Tumanyan	10	3.80	38	0	10	98.0	9.8	9.8
Lori	c. Vanadzor	122	4.85	592	61	61	462.8	3.8	7.6
Lori	Eghegnut	8	4.50	36	0	8	124.5	15.6	15.6
Lori	Margahovit	10	5.00	50	0	10	102.5	10.3	10.3
Lori	Pambak	8	4.63	37	1	7	86.0	10.8	12.3
Lori	Sverdlov	8	5.63	45	0	8	100.0	12.5	12.5
Lori	Tsaghashat	8	3.13	25	0	8	162.0	20.3	20.3
Lori Total		252	4.53	1141	75	177	1744.8	6.9	9.9
Syunick	c. Goris	25	4.32	108	8	17	192.0	7.7	11.3
Syunick	c. Kapan	45	3.30	145	21	24	147.5	3.3	6.1
Syunick	c. Meghri	10	3.20	32	4	6	60.0	6.0	10.0
Syunick	c. Qajaran	11	5.27	58	5	6	63.0	5.7	10.5
Syunick	Kaghnut	10	4.50	45	0	10	170.0	17.0	17.0
Syunick	Khndzoresk	10	4.80	48	2	8	70.0	7.0	8.8
Syunick	Shikahogh	10	4.00	40	0	10	125.0	12.5	12.5
Syunick	Tandzaver	10	4.40	44	0	10	143.0	14.3	14.3
Syunick	Vorotan Sisian reg.	10	4.00	40	0	10	73.0	7.3	7.3
Syunick Total		141	3.97	560	40	101	1043.5	7.4	10.3

continued……

Table 18 ...Continued

Marz	City / Village	Number of Households					Firewood m^3 per year		
		Surv-eyed	Average No/hhld	Total No Survey-ed	Don't use FWD	Use fwd	Total surv-eyed	Average all hhlds	Average that use fwd
Tavush	Artzvabert	8	5.00	40	0	8	108.0	13.5	13.5
Tavush	Aygehovit	7	3.57	25	0	7	115.0	16.4	16.4
Tavush	Bagratashen	10	5.20	52	1	9	87.0	8.7	9.7
Tavush	c. Berd	10	3.70	37	0	10	90.0	9.0	9.0
Tavush	c. Dilijan	20	4.75	95	4	16	197.5	9.9	12.3
Tavush	c. Ijevan	19	4.67	84	4	15	178.0	9.4	11.9
Tavush	c. Noyemberyan	10	3.70	37	1	9	109.5	11.0	12.2
Tavush	Chinari	8	4.00	32	0	8	90.0	11.3	11.3
Tavush	Gandzaqar	9	4.11	37	0	9	108.0	12.0	12.0
Tavush	Haghartzin	8	4.63	37	0	8	127.0	15.9	15.9
Tavush	Koghb	8	9.88	79	0	8	105.0	13.1	13.1
Tavush	Odzun	10	4.20	42	0	10	82.0	8.2	8.2
Tavush	Sevqar	9	4.89	44	0	9	137.0	15.2	15.2
Tavush	Voskepar	8	4.25	34	0	8	93.0	11.6	11.6
Tavush Total		144	4.69	675	10	134	1627.0	11.3	12.1
Vayoc Dzor	Areni	6	6.00	36	1	5	28.0	4.7	5.6
Vayoc Dzor	c. Jermuk	8	4.38	35	4	4	8.0	1.0	2.0
Vayoc Dzor	c. Vayq	7	4.43	31	6	1	2.0	0.3	2.0
Vayoc Dzor	Chiva	6	3.83	23	1	5	42.0	7.0	8.4
Vayoc Dzor	Eghegis	6	5.33	32	1	5	15.0	2.5	3.0
Vayoc Dzor	Gndevaz	6	5.17	31	0	6	49.0	8.2	8.2
Vayoc Dzor	Malishka	7	5.14	36	1	6	30.0	4.3	5.0
Vayoc Dzor Total		46	4.87	224	14	32	174.0	3.8	5.4
Grand Total / Average		812	4.49	3646	223	589	5499.3	6.8	9.3

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