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Joint UNECE/FAO Workshop on Illegal Logging
and Trade of Illegally-Derived Forest Products
in the UNECE Region

Geneva, Switzerland, 16-17 September 2004

THE NATIONAL REPORT ON ILLEGAL LOGGING

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Summary

В докладе, который будет представлен на рабочей встрече, будет дана краткая характеристика лесного хозяйства Республики Армения. В нем будут представлены данные об общих объемах вырубки и заготовки вырубленного леса с разбивкой их по видам. Будут представлены официальные данные последних лет о зарегистрированных случаях лесонарушений, в том числе, по незаконной вырубке леса, о количестве вырубленных деревьев и их объемах, а также данные о количестве возбужденных уголовных дел по данным правонарушениям, об общей сумме ущерба и сумме возмещенного ущерба.

В докладе будут представлены мотивы и причины, которые сопутствовали незаконной вырубке леса, в частности, в период острого энергетического кризиса в Республике в 1991-1997 гг. со стороны значительной части наших сограждан.

В ней будет представлена также статиститечская информация об объемах производства древесины, изделий из дерева и бумаги, об удельном весе данной отрасли производства как в общем объеме обрабатывающей, так и всей промышленности.

Illegal Logging and Trade of Illegally-derived Forest Products in Armenia

Background information

The Republic of Armenia is bordered by Georgia on the north, Azerbaijan on the east, Iran on the south, the Azerbaijani exclave of Nakhichevan on the south-west, and Turkey on the west. It lies in the Caucasus Mountains between the Black and Caspian Seas. The land area is about 29 740 km^2, mostly in very mountainous uplands with an average elevation of about 1 800 m, extending as high as 4 095 m on Mount Aragats, the highest point in the republic.

Armenia is landlocked but contains about 100 mountain lakes, the largest of which is Lake Sevan, located in the north-east. It covers about five percent of the country and is a popular resort area. Many of the country's rivers flow into Lake Sevan. The main outlet is the Hrazdan River, which flows south to join the Arax River, Armenia's largest and longest river, which separates Armenia from Turkey.

Figure 1. Map of Armenia

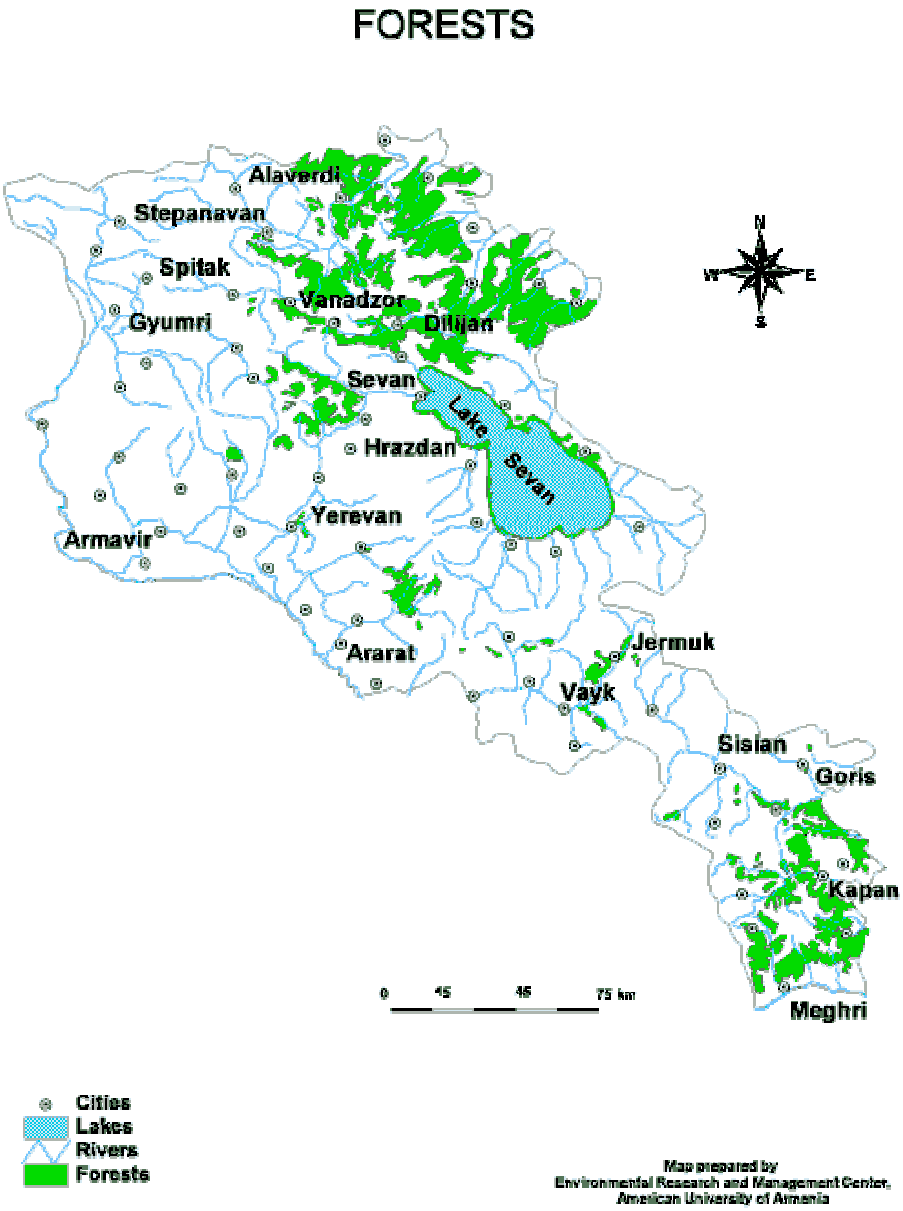
Geographical situation of Armenia, complex mountain relief and vertical zoning have caused great variety of natural conditions and landscapes. Six basic climate zone types from dry subtropical up to severe alpine exist and consequently to that five basic landscape zones have been formatted in Armenia: semi-desert with fragments of desert, steep, forest, alpine and nival. Armenia is also distinguished for extreme variety of land cover – about 15 types and 40 sub-types of land can be found here.

1. Forestry

The forests occupy only 11.2 % or 334.1 thousand ha (data from Forest Fund Inventory, 1993), including 50,2 thousand ha forest plantations in Armenia, which are unevenly distributed:

62% of forests are located on Northeast, 36% on Southeast, 2% in central regions. The forest area per capita is only 0.1 ha.

Figure 2. Map of Forest Area of Armenia

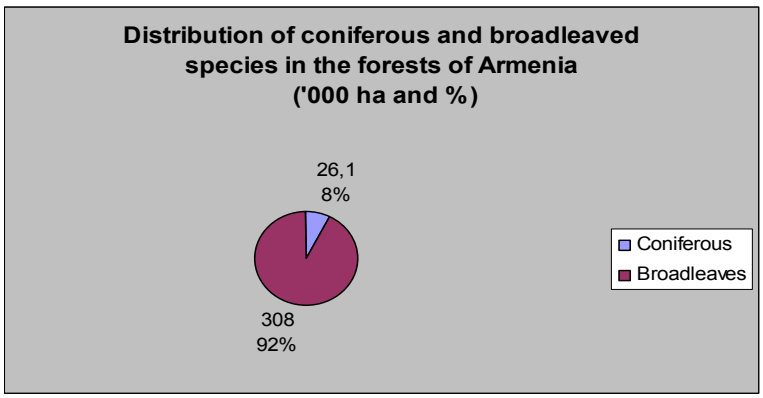


More than 262 species of dendroflora grow in Armenia, although the main forest formatting species are oak, beech, hornbeam and pine.

2.Forest formatting species distribution in Armenia

The main forest formatting species in Armenia are oak, beech, hornbeam and pine embracing together about the 86.5 % of the whole forest cover areas. Distribution of coniferous and broadleaved species is extremely unequal, thus only the 8% of lands covered by forests are coniferous.

Figure 3. Distribution of coniferous and broadleaved species



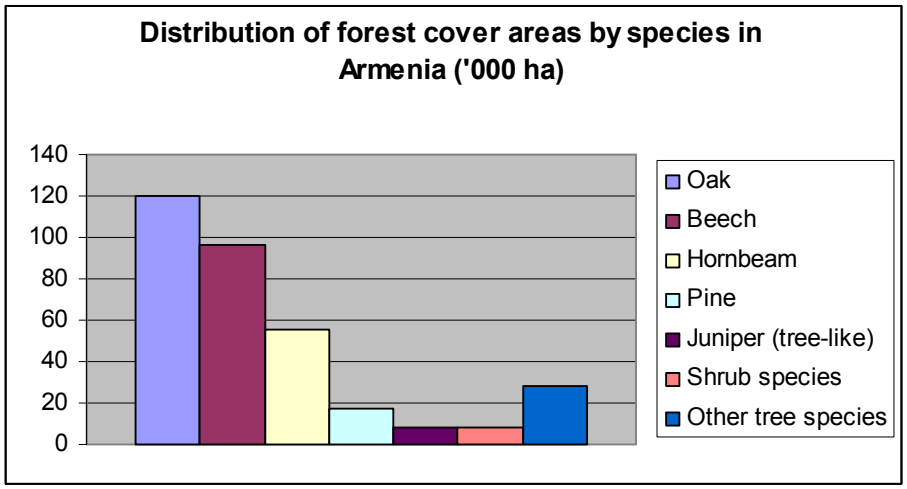
According to the national forest inventory of 1993 the oak-woods are dominating in the forest cover of Armenia occupying an area of 120 thousand ha or 35.9% of the total, beech-woods appropriately 96.6 thousand ha or 28.9%, hornbeam dominant woods are 55.1 thousand ha or 16.5% and pine-woods 17.7 thousand ha or 5.3%. These 4 major tree species together are occupying 289.4 thousand ha or 86.6 % of the total forest cover of Armenia. Meanwhile according to timber stock volumes beech is the most dominant species, 20.68 mln m^2 or 49.5%, oak appropriately 12.54 mln m^3 or 30%, hornbeam – 6 mln m^3, pine 6 mln m^3 or 14.3%.

Stock density according to national forest inventory of 1993 was 125 m^3/ha (NFI, Hayantar 1993), although stock density for different forest types is different. For instance growing stock density for oak-woods is 104.5 m^3/ha, for beech-woods- 214 m^3/ha, for hornbeam dominated forests – 108.9 m^3/ha and for pine 34.5 m^3/ha.

Table 1 Distribution of forest cover areas by species and age classes - National Forest Inventory Data of 1993

Dominant Tree/Shrub Species	Forest Cover Areas, ('000 ha)								Total growing stocks of the stands, (mln m^3)						
	Total	Including by age classes							Total	Including by age classes					
		Young Stands		Average Age		Pre-Mature	Mature and Overmature			Young Stands		Average age	Pre-Mature	Mature and Overmature	
		I Age Class	II Age Class	Total	Including inserted in accountings		Total	Including overmature		I Age Class	II Age Class			Total	Including overmature
A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Main Forest Formatting Species															
Coniferous															
Pine	17,7	13,6	2,8	0,6	0,1	0,2	0,5		0,61	0,21	0,19	0,09	0,03	0,09	
Juniper (tree-like)	8,4		0,3	3,3	0,7	2,1	2,7	1,9	0,16		0,01	0,06	0,03	0,06	0,03
Total Coniferous	26,1	13,6	3,1	3,9	0,8	2,3	3,2	1,9	0,77	0,21	0,2	0,15	0,06	0,15	0,03
Hard-leave species															
Oak high-stem	64,3	1,5	1,3	35,6	7,8	8,3	17,6	3	7	0,06	0,09	3,49	1,02	2,34	0,41
Oak low-stem	55,7	0,3	2,5	36,3	12,6	7	9,6	1,9	5,54	0,01	0,1	2,94	1,05	1,44	0,35
Beech	96,6	0,5	0,3	46,7	24,9	21,8	27,3	4,4	20,68	0,02	0,03	9,44	4,8	6,39	0,21
Hornbeam	55,1	0,2	0,6	19,1	12,2	10,8	24,4	10	6		0,04	1,84	1,32	2,8	1,83
Ash	2,5	1,3	0,8	0,3	0,1	0,1			0,1	0,04	0,03	0,03			
Maple	2,6	1,6	0,1	0,8	0,1	0,1			0,14	0,07	0,02	0,05			
Elm	3,1	1,5	0,4	0,9	0,1	0,1	0,2		0,19	0,05	0,03	0,07	0,02	0,02	
White acacia	0,8	0,1	0,1	0,3	0,2	0,2	0,1		0,3			0,01	0,01	0,01	
Total Hard -leaves	280,7	7	6,1	140	58	48,4	79,2	19,3	39,68	0,25	0,34	17,87	8,22	13	2,8
including low-stems	73,3	0,4	2,7	44,5	20,8	11,3	14,4	3,1	6,64	0,01	0,1	3,18	1,21	2,05	0,21
Soft-leave species															
Birch	1,4			0,4	0,1	0,4	0,6	0,4	0,08			0,02	0,03	0,03	
Lime	1,5			1,3	0,4		0,2	0,1	0,24			0,19	0,01	0,04	0,01
Poplar	4,1	0,6	2,5	1					0,31	0,01	0,18	0,12			
Willow (tree-like)	1	0,2	0,4	0,2		0,1	0,1		0,04		0,02	0,01		0,01	
Total Soft-leave species	8	0,8	2,9	2,9	0,5	0,5	0,9	0,5	0,67	0,01	0,2	0,34	0,04	0,08	0,01
Total by 1st paragraph	314,8	21,4	12,1	146,8	59,3	51,2	83,3	21,7	41,12	0,47	0,74	18,36	8,32	13,23	2,84
2. Other tree species	10,8	1,4	0,9	3,7	1,9	0,8	4	1,6	0,54	0,03	0,03	0,14	0,04	0,3	0,14
3. Shrub species	8,5	0,6	1,8	3,7	0,1	1,9	0,5	0,1	0,08		0,01	0,04	0,02	0,01	
Total by paragraphs 1+2+3	**334,1**	**23,4**	**14,8**	**154**	**61,3**	**53,9**	**87,8**	**23,4**	**41,74**	**0,5**	**0,78**	**18,54**	**8,38**	**13,54**	**2,98**

Figure 4. Distribution of forest cover areas by species



3.Present forest characteristics of Armenia based on expert evaluations

The last complete forest inventory in the country has been carried out in 1993. Since 90's forest resources of Armenia have been exposed to a lot of threats. However, the most serious one related to energy crisis, which lead to uncontrolled mass felling of the forests in most of the regions of the country. The absence of financial and technical sources makes it impossible to carry out a national forest inventory during many years following the last forest inventory year, meanwhile it was periodically conducting once a 5 year up to 1993.

On the other hand large extents of the illegal logging in the country, which is according to the lately conducted illegal logging survey (1999-2004) done by the Forest Institutional Support Project annually equal to 773 thousand solid m^3, divided between the household 560 thousand solid m^3 and total by truck movements 213 thousand solid m^3. These figures have been taken into account for the calculation of disturbance (not including fire, pest outbreaks, wind thrown forest etc) rates due to harvesting (both legal and illegal) for the past 10 years period.

Using the available data about damaged pine and poplar stands (appropriately 30 and poplar 200 thousand m^3), as well as species proportions among the total harvested wood volumes has been identified as following: beech 60%, hornbeam 25%, oak 15 % , based on statistic data of annual legal cuttings. Multiplying the forest cover areas of tree/shrubs species and their annual growth rates based on last forest inventory data, have been calculated the total timber increment during the last 10 years. Applied method gives us only rough estimates with the high uncertainty; however there are not any other alternatives now to estimate current forest growing stock volumes.

$$V_{2003} = V_{1993} + I_{10} - R_{10}$$

Where:

V_{2003} – Estimated timber volume by 2003

V_{1993} – Timber growing stock volume by 1993

I_{10} – Timber increment during the 10 years

R_{10} – Removals of wood total (il)legal

For the rough calculations of the present forest cover area, have been taken into account the published 1999 data about the fully and partly damaged forest areas due to energy crisis. According to it 7 thousand clear-cut and 70-80 thousand partly damaged forest area have been identified. If we assume the half of the partly damaged 80 thousand ha of forest are open wooded land, which are not accounted as a forest covered area, due to low density of stands, we will receive approximately the following picture.

Table 2 Local judgments for the present growing stock rough evaluations

Species	Occupied forest area in 1993 ('000ha)	Timber growing stocks 1993, mln. m3	Average timber volume per ha m3/ha	Current average growth rate in per ha, m3/year	Total timber increment during 10 years, ('000m3/year	Increment during 10 years, mln. m3	Removed total wood from the forest during 10 years ('000 m3)	Estimated timber volume in 2003, mln.m3
Pine	17,7	0,61	34,46	2,29	405,33	1,02	30	0,99
Juniper	8,4	0,16	19,05	0,83	69,72	0,23		0,23
Oak	120	12,54	104,50	1,04	1248,00	13,79	1125,08	12,66
Beech	96,6	20,68	214,08	1,84	1777,44	22,46	4500,31	17,96
Hornbeam	55,1	6	108,89	1,61	887,11	6,89	1875,13	5,01
Ash	2,5	0,1	40,00	1,52	38,00	0,14		0,14
Maple	2,6	0,14	53,85	1,6	41,60	0,18		0,18
Elm	3,1	0,19	61,29	1,47	45,57	0,24		0,24
Acacia	0,8	0,03	37,50	1,6	12,80	0,04		0,04
Birch	1,4	0,08	57,14	0,89	12,46	0,09		0,09
Lime	1,5	0,24	160,00	1,71	25,65	0,27		0,27
Poplar	4,1	0,31	75,61	2,52	103,32	0,41	200	0,21
Willow	1	0,04	40,00	2,46	24,60	0,06		0,06
Other tree species	10,8	0,54	50,00	1,2	129,60	0,67		0,67
Shrubs	8,5	0,08	9,41	0,8	68,00	0,15		0,15
Total	**334,1**	**41,74**	**124,93**		**4889,20**	**46,63**	**7730,52**	**38,90**

Table 3 Estimated Forest Resources Characteristics by 2003

Armenia Total area, km^2	**Forest Cover Area, ('000) ha**	**Forestation, %**	**Growing Timber Stock, million m^3**
29.800	**287.1**	**9.6**	**38.9**

4.Forest Cover Change Dynamics in Armenia

A great deal of palenological, paleontological, archeological and historical data serve us as a basis to conclude that at the beginning of anthropogenic period 40 per cent of the present territory of Armenia has been covered with forests (from 550-600 m up to 1800-2000 m above sea level).

For thousands of years, as a result of climate drainage, the upper layer of forests in North-Eastern parts of Armenia rose up to 2100-2200 m above sea level, in the middle parts of Armenia up to 2300-2400 m, in basin Sevan 2400-2500 m, in Vayq 2500-2600 m and in Zangezur 2600-2650 m.

Later, in B.C. and the first, second millenniums of A.D., because of the intensification of climate continental nature and especially because of anthropogenic factor influence, the forest coverage of Armenia has greatly subsided. In this period the massive movement of population and the natural growth requirements provision with new arable lands and pastures have been conducted at the expense of forest areas. As a result, according to the data of 1995 only 11,2 per cent of the Republic territory is covered by forests. In the anthropogenic period, as a result of non-perspective activities of human kind and of the climate significant drainage not only forests are reduced but also tree specie structure and the territory they occupy underwent considerable (often not desirable) change. The amount of stands, with the majority of Caucasian pine, yew (Taxus baccata), Corylus locurna, and other species, have been greatly reduced. Now these stands appear in small amount of groups.

In the last 100 years trees in Armenia have been twice over-harvested. First in 30-50es, when for the wild industry development by main cuttings annually 450 000 cubic meter timber was harvested. According to the permitted order there should be conducted three phase gradual and selective cuttings, and on the first stage trees with diseases and standing dead trees should have been harvested. But actually just on the first phase of harvesting the density of the forests was usually reduced up to 0,2-0,4 and mainly the best trees are harvested. For that reason trees in Armenia are presented with uneven-aged low productivity stands.

Till the beginning of 1990 all cities and the majority of the villages in Armenia had natural gas supply. Alternative heating resources (electricity, gas) were quite cheap and available for population. As a result only minority of the population were using wood as a source of heating. In 1980s Armenia had well developed timber production, about ten huge furniture factories, wood veneer producing factory, where about 20 per cent of wood veneer production of previous Soviet Union were made. Mentioned factories were annually consuming more than 500 000 cubic meter round wood, out of which only 5 per cent were taken from Armenian forests, 95 per cent (high value ash, oak, pine etc) from previous Soviet Union and from abroad. In those years the volume of illegal cuttings were minimum in Armenia, by official statistics it was 1-2 thousand cubic meters.

In 1992-1994 because of economic blockade the gas supply to Armenia was almost stopped. Electricity production was highly reduced because the atomic power station was closed, as a result the only heating source for the population was wood. In order to survive people attacked forests without distinction cutting and firing even trees in city-parks. As a result the great majority of the forests suffered: about 2700 ha territory totally or partially have been deforested. As a result erosion and desertification processes became active. But it should be noticed that illegal harvesting didn't come up to business level. And only starting from 1995 when energetic crisis weakened and economic life became more active, in Armenia timber business was

initiated, destroying forests. And if in the years of energy crisis in the regions with many forests for heating low value tree species were mainly harvested, then after 1995-s selective cuttings were mainly conducted. The best trees in the form of logs were illegally taken to the central region of Armenia, to Yerevan and to the habitats in its vicinity where woodwork and apartment building was being developed.

Cities and villages, in the vicinity of forests, where there is no problem of energy and in some there is also no problem of natural gas, the majority of the population is illegally using wood for heating purposes. This can be explained by bad social conditions of population. In the above-mentioned territories industrial factories don't work, unemployment is high. In 1991 the villages are given agricultural lands for free, but they don't show the expected result. Thus, for heating purposes people have to use timber, very often they sell it illegally.

Table 4.The number of forest enterprises which use different heating sources is given below:Households by the Main Source of Heating

Main Source of Heat	Dwelling Unit Type	Urban	Rural
RA	779230	520620	258610
Gas	55413	36795	18618
Electricity	155617	149543	6074
Coal	2448	1340	1108
Firewood	338881	193444	145437
Dung	87492	12410	75082
Oil	4509	4058	451
Other	23922	19759	4163

Source: National statistical service of the Republic of Armenia

As it is seen from the above mentioned data that 7 per cent of households in Armenia are using natural gas, 20 per cent is using electricity, 11,2 per cent is using dung mainly in regions without forests developed in cattle-breeding, in primitive way /natural gas production in Armenia has lately been initiated/. 43,5per cent of population is using wood for heating purposes.

5. Procedures for Legally exploiting forests

According to the Forest Code of Armenia 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.

- An entire annual cutting area can be sold by competitive auction, under the Ministerial (MoNP) Order. However use of this system has not been extensive and participation has been so far limited to Armenian companies.

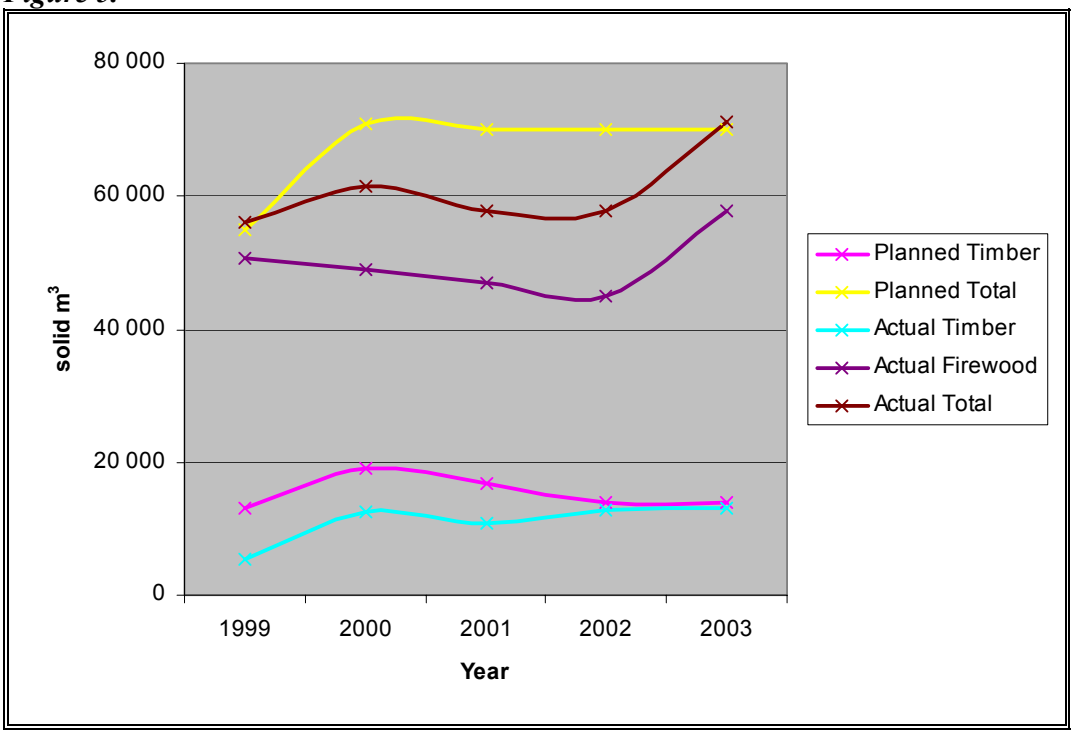
6 Official Statistics

Table 5. 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/Hayantar/

Figure 5.



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 special preservation areas /Dilijan National Park/.

Table 6. Planned and Actual Timber Harvesting from special preservation areas.

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

Table 7. Exploiting volume of firewood from waste wood.

1999	2000	2001	2002	2003	Average
Volume reserve m^3	Volume reserve m^3	Volume reserve m^3	Volume reserve m^3	Volume reserve m^3	Volume reserve m^3
19500	13450	20700	10480	20920	17000

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 felling, hunting, grazing and haymaking. 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. Table 8 presents a summary of the detected logging offences.

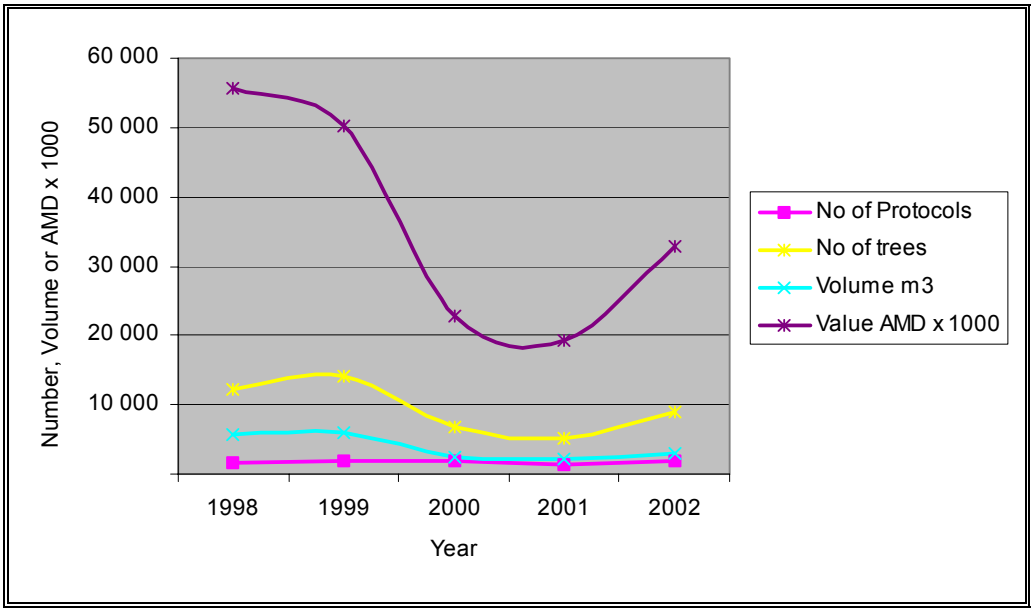
Table 8. Logging Offences Officially Detected by Year

Year	Logging			
	Protocol	No of trees	Volume (m^3)	Value/ USD [a] ^{3})
1998	1 542	12 094	5 723	101
1999	1 827	14 087	6 107	91
2000	1 855	6 704	2 545	41.5
2001	1 412	5 188	2 291	35.3
2002	1 820	8 869	2 904	60

Source: Hyantar Statistics in Manerseryan, 2003

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 6

Figure 6. Number of Illegal Logging Offences detected by Year



It is clear that the value and size of detected offences show no clear trend but that the volume and number of offences detected seem 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 8 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 9 presents the average outcomes over the five year period.

Table 9. Number and Value of Offences, Paid Voluntarily, Sent to Court, and Settled

Year	Total		Voluntarily paid			Sent to legal bodies			Settled		
	Protocol	Value USD [3]	Protocol	% of total	Value USD [3]	Protocol	% of total	Value USD [3]	Protocol	% of sent to court	Value USD [3]
1998	1 776	104400	964	54	18200	395	22	76600	79	20	3 898
1999	1 935	93000	1 062	55	22200	420	22	64000	96	23	2 525
2000	1 987	43200	905	46	17500	700	35	23000	134	19	2 142
2001	1 529	39800	795	52	10640	481	31	23200	119	25	2 338
2002	1 992	63700	1 301	65	23560	396	20	34700	142	36	3 000

Source: Hayantar Statistics, 2003

Table 10 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 table 10 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 less than USD 25/month.

Table 11 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.

National Parks

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 2600 USD. The remaining 46 cases 25700 USD were forwarded for prosecution.

Results from Ministry of Nature Protection's Inspectorate from 2003

Table 12 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 12 The number and value of offences detected by the Inspectorate in 2003

Offence	No of Protocols	Volume (m^3)	Value of Damage (USD)
Transport without permit	298	1 300	15200
Forest Enterprise checks		571	7800
Administrative penalties	190		7500
	488		30500

Source: Inspectorate of the Ministry of Nature Protection

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 13.

Table 13 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)	Amount (pieces)	Volume (solid m^3)	Amount (pieces)	Volume (solid m^3)
1994	454233	65825	92178	9060	362055	56765
1995	232933	59133	38650	7675	194283	51459
1996	134861	47556	18323	5236	116538	42320
1997	124034	93393	20198	11079	103836	82313
1998	86280	62296	12560	5508	73720	56788
1999	73510	52060	12638	6565	60870	45596
2000	61219	28063	7800	2445	53419	25618
2001	85796	46401	5350	1988	84446	44414
2002	102451	25264	7703	2420	94748	22844
Average	150591	53332	23933	5764	127102	47569

Source: Hayantar Statistics, 2003

Table 13 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 7.

Figure 7. Hayantar's Biannual Survey Estimates of Total Volume and Volume Registered by Official Protocols of Illegal Logging by Year

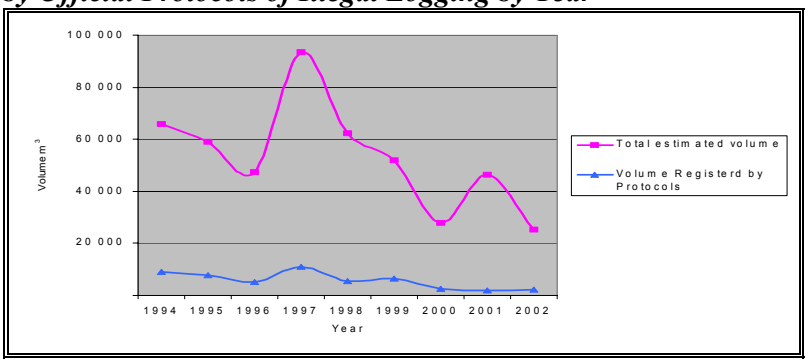


Figure 7 would indicate, with exception of 1997 and 2001 that illegal logging is decreasing over time.

Comparison of the Data Sources

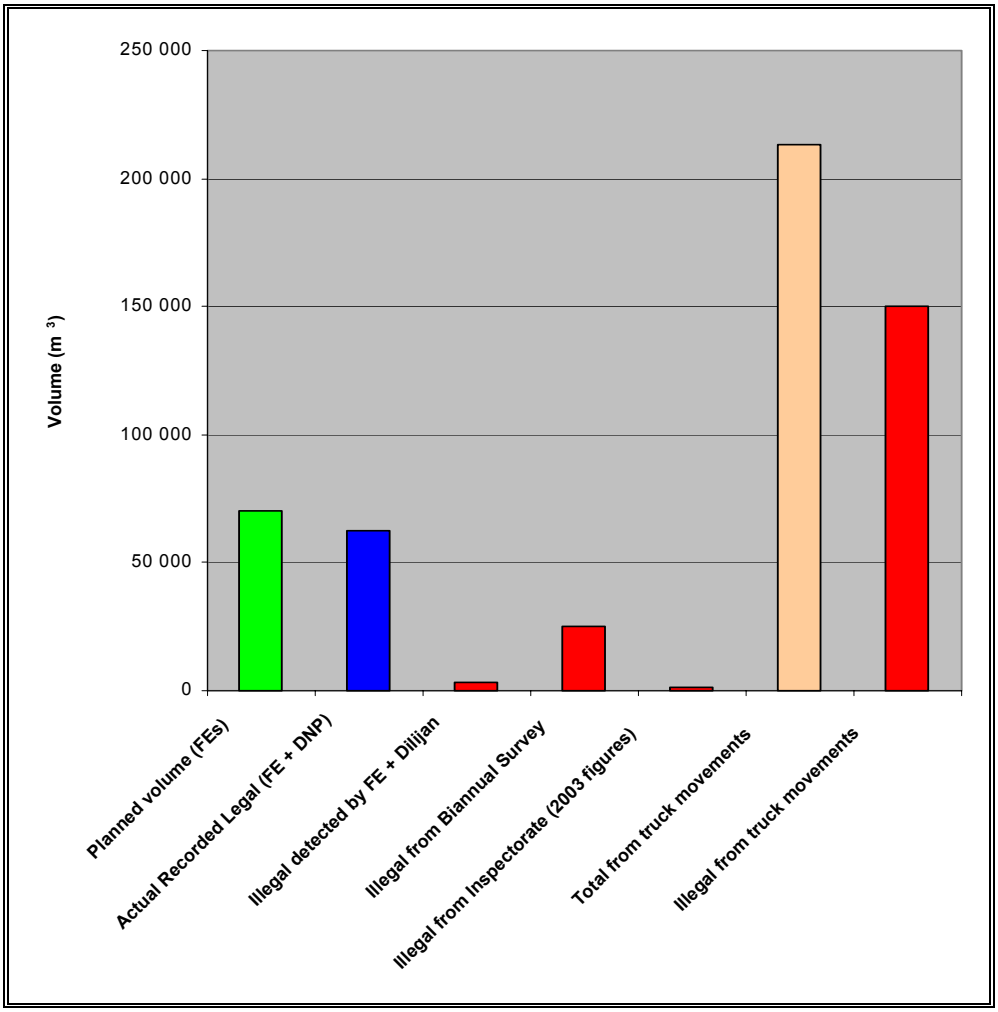
A comparison of the data sources for 2002 is presented in Table 14.

Table 14 Comparison of the Log Volume Production Statistics for 2002

Data Type	Volume (solid m^3)
Planned volume (Dilijan NP)	4 000
Planned volume (FEs)	70 000
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 8.

Figure 8 Comparisons 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.

7. Household Survey

To assess the current consumption of communities that live within 10 km of forested area in Armenia, a survey in the subcomponent of illegal logging reduction and trade component of "Natural Resource Management and Poverty Reduction" Project to implement the surveys in households about their use of forests with particular emphasis on firewood cutting and consumption. This survey was implemented by a local company and 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. City Yerevan, Shirak and Armavir Marzes were left out of the survey target, where totally live 1,663,000 people /51.7% of total population of Armenia/. 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[1].

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.

Results

A summary of the main results from the survey by Marz, City (or village or town) are presented as Table 15.

Table 15. Summary of Household Survey Results Showing Numbers per Household and Average Firewood Consumption

	Number of households					Firewood m^3 per year		
	Surveyed	Average No/hhld	Total No/Surveyed	Don't use FWD	Use fwd	Total surveyed	Average all hhlds	Average that use fwd
Grand total/ average	812	4.49	3646	223	589	5499.3	6.8	9.3

From the above table it is seen that out of 812 surveyed households 72.5 per cent use only firewood for a heating purposes, and in more forested areas like in Tavush Marz it consists almost 93 per cent. The presented data varies from official statistics of Armenia 2001, by which it was only 43.5per cent. This can be explained with the fact that Yerevan city where 33% of the total population lives and uses mainly other sources of heating` electricity, natural gas.

Firewood Consumption

From this it can be seen that for households within 10 Km of forested area, 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.

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.

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 of forested area 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%.
If we add the used wood from surveyed communities and forests 10km far from habitats, which can be seen from the data of cargo highway transportations, solid wood will be 780,615 m^3.

Table 18. Comparison of Log Volume Production Statistics

Data Type	Volume (solid m^3)
Planned volume (Dilijan NP)	4 000
Planned volume (FEs)	70 000
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

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 neighbors. 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 18.

Table 19. Percentages 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.
Very interesting results were received from the summary of the interviews.

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

8. Export and Import of Timber

Export and import of timber (logs and saw-timber) generally is monitored, it is controlled and monitored by customs service. The economic life enlivening, the increase of construction and furniture production demand has lead to the initiation of that process. Coniferous tree species timber is imported from neighbor country Georgia and partially from Russia and broad leaved-

mainly beech, with small volumes of oak and other species are exported to Iran, Germany and other countries.

The exported and imported volumes are almost equal, approximately some thousands of cubic meters and there is seen a positive tendency of an import volumes increase.
Firewood export and import is carried out in forest vicinity borders between Armenia and Georgia; out of the State border control points it is done by the residents of the forest vicinity habitats, exact data about which is missing.

9. Country policy towards the reduction of illegal logging

During the last decade the big volume of illegal logging in the country, which exceeds the total annual growth of the forest, causes anxiety to the Armenian governmental and non-governmental organizations and to the whole society. Periodically in higher authorities' level and in community level discussions are held concerning that problem.

Starting from 2002 the Natural Resource Management and Poverty Reduction Project (NRMPRP) is implemented in the country, with a mission of poverty alleviation and towards natural resource management sustainability.
One of the components of the Project involves Forest, and one of the subcomponents refers to forest illegal loggings and trade.

According to 2003 governmental decree an interdepartmental commission supervised by the minister of Nature Protection of RA was formed for the struggle towards illegal logging. Authority officials of some ministries, representatives of scientific and non-governmental organizations are included in the commission; periodically during sessions commission listens reports concerning the problem, and makes corresponding decisions.

The subcomponents of illegal logging and trade of above-mentioned project has presented project on illegal logging reduction activities, which is currently in developmental stage.
Recommended components of the action plan include:

1. Increasing public awareness;
2. Alleviating rural poverty;
3. Community forestry programmes;
4. Alternative fuel supplies;
5. Increasing supply of legitimate wood products;
6. Restructuring forest institutions and capacity building;
7. Improved monitoring and control;
8. Forest Certification.

The Illegal Logging Action Plan is designed to have an impact on illegal logging at the national level. It is specifically targeted at forest areas heavily impacted by unofficial removals by changing behaviour through increased awareness, improving management and creating alternative income opportunities.

The first activity to be undertaken should be a widely publicized announcement by Government of i) recognition of the size of the problem, ii) the launching of the implementation of the illegal logging action plan, and iii) a statement of commitment to addressing the problem. Much of the illegal logging is driven by rural poverty. The illegal logging action plan (ILAP) will therefore

build on the poverty alleviation activities of the Natural Resources Management and Poverty Reduction Project and will replicate income generating activities to targeted communities.

Experience from other countries with similar conditions (e.g. Albania and Nepal) has shown that often the best opportunity to slow forest degradation lies with the communities themselves. Community forestry programs will therefore be encouraged in targeted areas based on the lessons learned from the community forestry management component of the NRMPRP.

The ILAP will encourage a switch from firewood to other sources of fuel such as natural gas, biogas, and electricity. In areas where this is not feasible, the increase of efficiency of use of firewood through improved wood burning stoves and improved insulation will be supported.

At the same time increasing sustainable production from the nation's forests, reducing the cost of legitimately produced firewood in targeted communities, and the establishment of firewood plantations on bare-land near areas of large firewood demand will increase the supply of legitimate firewood and hence reduce the demand for illegal wood.

Good forest governance depends on appropriate forest institutions that have adequate resources to undertake the necessary tasks. The plan will therefore further support the institutional change process begun during the NRMPRP and FISP. A significant investment will be required in terms of practical and technical training for the new specific tasks required under the illegal logging action plan (ILAP). New systems of monitoring and control of the sector are required. It is proposed that an international verification company sets up a new system under a build, operate, train and transfer basis.

Forest certification can also help reduce the impacts of illegal logging. It is therefore proposed that under this plan the national standard is developed and that at least 2 Forest Enterprises should attain certified status during the ILAP lifetime.

10. Conclusions and commentary

- Current utilization of firewood and round wood /legal and illegal/ more than ten times exceeds the planned sizes of procurement.
- There is no one single solution or 'quick fix' for the issue of illegal logging. It is unlikely that it will ever be eliminated completely. However significant reductions can be made with the right investments and commitment. The overall objective therefore is to reduce illegal logging to levels that do not cause significant environmental impacts and that the economic and social aspects have been alleviated to an extent that makes widespread illegal logging unnecessary.
- The consumption by the local communities is by far the largest proportion of the problem. The survey indicates that this is linked to poverty and lack of affordable fuel alternatives. The communities are aware though; of the importance forest has for environmental protection, so it is likely that people only take firewood in this uncontrolled manner as a last resort. As this volume is likely to be located close to the communities, it is also highly probable that there is considerable over cutting in the proximity to the communities. At the same time the prevalence of grazing in these areas will mean that regeneration will be sparse with ensuing environmental degradation.
- A large part of the problem is driven by the current demand for firewood both in the cities and villages. One way to make to illegal logging less attractive is to increase the amount of wood being produced legally. Although Armenia is currently over harvesting according to the

levels set by the management plans and, locally around villages and settlements, forests are being over cut and are not regenerating, there are significant areas where harvesting could be increased on a sustainable basis. Once the Forest Enterprises can increase their production more firewood will be brought onto the market. In areas away from communities, this can be sold to traders for transport to urban centers with no forest resources thereby decreasing the demand for illegally harvested wood products. It is also suggested that quantities of firewood are sold to communities at lower prices. This will have the benefit of increasing the likelihood of payment and undercutting illegal supplies. However lower prices must be only sold for strict volumes supplied in accordance with an approved management plan.

- There are areas of abandoned and degraded land that may be suitable for establishing forest plantations. Establishing plantations, particularly in and around villages/towns is in line with the First National Communication of the Republic of Armenia under the United Nations Framework Convention on Climate Change 1998, which recommends increasing forest cover from 11.2% of the land area to 20.1% by 2050. This target would require an annual planting rate of over 5000 ha per year.
- It is also apparent that the official system of monitoring removals from the forest is not working properly. A key part of good forest management is the accurate recording of removals, both official and unofficial.

The establishment of an independent monitoring system will play a significant role in the struggle towards the illegal logging.

- The fact, that forest management plans activities deadlines of the majority of forest enterprises were expired in 1997-1998 and during last 5-6 years forest utilization was carried out without management plans, promotes the illegal loggings and makes impossible its supervision.