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Supply Forecasts for Timber from the Russian Far East and Links with the Pacific Rim Market

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Approved by

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Abstract

This report is based on a presentation made at the meeting "Commercial Forestry in the Russian Far East: Opportunities for Sustainable Trade, Conservation, and Community Development" on 18-20 September 2001 in Yuzhno-Sakhalinsk, Russia, which was co-hosted and co-supported by Forest Trends.

The report uses earlier analysis by IIASA's Forestry Project on possible and sustainable supply of industrial wood from the Russian Far East and links this supply with the demand situation in the Pacific Rim Market.

Structural changes are taking place in the Pacific Rim Market with a dramatic increase in the consumption of wood in China and a changed demand structure in Japan. The export of industrial roundwood from the Russian Far East to China has increased substantially in recent years and is expected to continue to increase in the future.

The potential demand from the Pacific Rim Market on industrial roundwood from the Russian Far East is assessed to be 30–35 million m^3 in 2010.

About the Author

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Sten Nilsson

1 Introduction and Objectives

The objectives of this paper are to present a quantitative outlook on the sustainable wood supply from the Russian Far Eastern region and to try to validate the sustainability of the current supply from the region. In addition, the aim is to try to identify possible future demands on the Far Eastern wood.

Most of the forests in the Far East can be classified as boreal forests and are dominated by coniferous forest types. More than half of the forests are growing on low productivity soils with permafrost. There is a surprising level of diversity in the region. More than 140 different tree species have been identified in Far East Russia (Ageenko, 1995; Krankina and Ethington, 1995). The historical fate of forests in Far East Russia, from an exploitation perspective, has been closely tied to the infrastructure of roads and railways and the proximity to rivers. Forests within a reasonable distance of the transportation infrastructure have been extensively harvested unless protected by legislative or administrative statute. Forests well beyond the transportation system remain relatively untouched, although severe recurrent fires constantly impact them. Harvesting levels generally increased through the 1980s began to decline in the early 1990s and continued to decline during the 1990s but with a recent increase in 2000 (Table 1). These are the official harvesting figures. We also know that illegal logging is taking place (e.g., Friends of the Earth–Japan, 2000). Anecdotal figures on the extent of illegal logging are in the size of 30–50% (e.g., Gareyev *et al.*, 1997). But, even assuming an illegal and unreported harvest of 50%, leaves the total harvest level of some 16 million m^3 in the Far East region, which is less than half of the harvest in the late 1980s.

Even during the periods of high harvesting levels, less than 50% of the official annual allowable cut was actually harvested. Thus, the majority of the growth remained unharvested. While removals have been considerably lower than growth, the distribution of growth and removals has been of major concern. Forest resources have been depleted in accessible areas, but other more remote areas have never been harvested. Clearcutting has been the most frequently used harvesting technique, which has served early successional species well but did not serve the regeneration of later successional species. The result has been a dramatic shift in species distribution. On a regional or local level, commercial losses due to natural disturbances (fire, insects, diseases, droughts, etc.) can be significant and can destroy the local economic base of communities. In addition, the environmental degradation on a local level is of serious concern.

Table 1: Harvest for Selected Years in Far East Russia (in thousand cubic meters).

	Actual Harvest															
	10 year average				Annual harvest											
Harvest type	1948–1957	1958–1967	1968–1977	1978–1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Final	21,322	24,854	32,662	34,882	35,992	34,951	32,647	28,380	24,224	19,242	13,571	13,095	11,247	11,150	8,228	11,195
Regeneration	9	115	204	247	276	371	212	190	211	0	0	0	0			
Thinning/ Selective	575	469	906	1,336	1,488	1,403	1,427	1,328	1,285	918	873	794	850			
Other	374	884	1,140	1,978	2,545	2,009	2,122	2,047	1,223	1,216	931	644	677			
Total harvest	**22,281**	**26,322**	**34,912**	**38,443**	**40,301**	**38,734**	**36,408**	**31,945**	**26,943**	**21,376**	**15,375**	**14,533**	**12,774**			

2 Forest Resources of Far East Russia

In Far East Russia the following administrative units are considered: Amur Oblast, Kamchatka Oblast, Khabarovsk Kray, Magadan Oblast, Primorski Kray, Sakhalin Oblast, and the Republic of Sakha (Figure 1).

The distribution of the different forest types is presented in Figure 2. This is a new map produced by IIASA for our analysis of the full carbon account of Russia (Nilsson *et al.*, 2000).

The development of the forest resources (forested areas) in aggregated Far East Russia during 1961–1988, based on official statistics, is presented in Table 2. In this Table the areas, total growing stock and average growing stock/ha are presented for forested areas under state forest management. The information is also divided into exploitable and nonexploitable forests and is also presented for major forest forming species (MFFS).

It can be seen that the dominating part of the forested areas is in nonexploitable forests (million ha) but the total growing stock (billion m^3) is somewhat similar at exploitable and nonexploitable forests respectively. There is an unexplainable increase in the growing stock of MFFS between 1961 and 1988. This is probably the result of the definitions used in the 1988 inventory. The latest available inventory (1998) reports a growing stock of 9.8 billion m^3 of MFFS. There is also a substantial drop in the average growing stock of MFFS between 1961 and 1988. This is probably the result of improved inventory methods.

The development of the growing of mature and overmature forests of MFFS on exploitable areas is rather informative (Table 3). The overall and aggregated figures presented in Table 2 do not cause major reasons for concern but the figures in Table 3 show that the growing stock of mature and overmature forests of MFFS on exploitable forests has declined by some 1.6 billion m^3 during 1961 and 2000.

This is a clear indication that so-called “creaming” has taken place in the harvest by concentrating the operations in mature and overmature forests resulting in a decline of the growing stock by some 20% in this category.

Figure 1: Map of Far East Russia with Administrative Units.

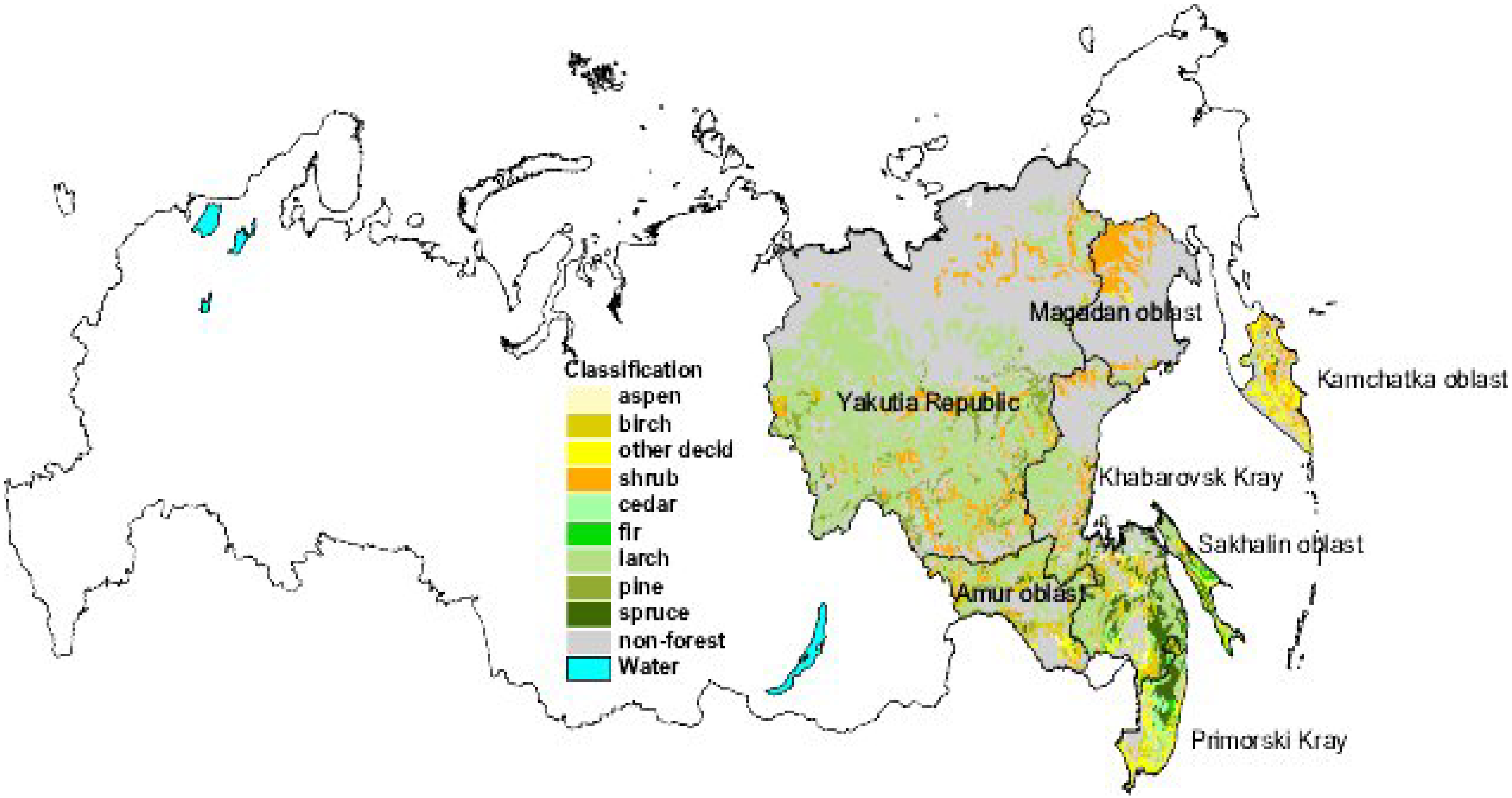

Figure 2: Distribution of Forest Types in Far East Russia.

Table 2: Development of the Forest Resources of Far East Russia (in million ha, billion m^3 and m^3/ha respectively).

	1961		1988		1998	
	Total	**MFFS**	**Total**	**MFFS**	**Total**	**MFFS**
Forested area, mln. ha	243	216	275	227	278	224
Exploitable	92	79	n.a.	107	101	98
Nonexploitable	151	137	n.a.	120	177	126
Growing stock, x10^9 m^3	23	21	21	20	20	19
Exploitable	9.4	9.0	n.a.	11.2	9.9	9.8
Nonexploitable	13.7	11.5	n.a.	8.5	10.4	9.4
Average GS m^3/ha	95.1	95.2	75.5	87.0	73.2	85.4
Exploitable	102.7	114.5	n.a.	104.8	98.1	99.5
Nonexploitable	90.5	84.0	n.a.	71.1	59.1	74.4

Table 3: Growing Stock of Mature and Overmature Forests of MFFS on Exploitable Forests in Far East Russia (in billion $m^{3)}$.

1961	7.1
1966	6.7
1973	5.9
1978	5.9
1983	6.5
1988	6.8
1993	6.2
1998	5.7
2000	5.5

3 Quantitative Wood Supply Analysis

The Russian Annual Allowable Cut (AAC) is calculated and regulated by the Russian authorities. The AAC calculations consider only the final harvest (clear cuts) and are expressed in commercial wood, which includes industrial wood and commercial fuelwood. A sustainable harvest level is the guiding principle for the AAC calculations. The calculations also take into account some ecological constraints, the allowable harvesting age (which is regulated), forest management regimes, harvesting methods, and timing. The constraints on harvest possibilities are expressed in dividing the forests into so-called groups (three groups) and protective categories. The methods to be used for the AAC calculations are described in official documents. However, the used AAC approach does not include the real impact of forest management on forest development and the harvesting level, does not take any economic considerations into account, and does not select the final AAC level in any objective way (Moshkalev, 1990; Synitsin, 1990).

Several models were developed in the Soviet Union in order to improve the AAC calculations (Moiseev, 1974, 1980; Nikitin *et al*., 1978; Djalturas *et al*., 1986). There were also attempts to include economic dimensions (Moshkalev, 1985) and a multiple-use forestry concept (Kashpor, 1995). However, none of these model developments were implemented in forest practice or in the official AAC calculations in Russia.

Currently, there are only two independent full-blown and quantitative analyses based on consistent databases and models carried out with respect to Russia's future wood supply. The first deals with the supply of European Russia (Nilsson *et al*., 1992) and the second deals with Siberia and Far East of Russia (IIASA, 1998).

The second analysis uses a model developed under IIASA's auspices by a Russian team in collaboration with western scientists and harvests from earlier model efforts in the Soviet Union (IIASA, 1998). The model used for the analysis can be classified as an area matrix model with discrete optimization. It is a biological model without explicit economic content. The state of the forests is given as distribution on different forest management classes and age classes with transitions between different classes over time. The ecological processes taken into consideration are: transition between different species in natural succession, the transition to bare land by mortality due to disturbances, and the time lag of species composition after natural regeneration. The management regimes taken into account are: periodicity and intensity of selective harvest, periodicity and intensity of gradual harvest, minimum age for final felling, final harvest with protection of undergrowth, minimum growing stock for each management and age class. The model tries to achieve a high harvest level under the constraints of certain distribution of harvest of different species, certain species composition at the end of the time horizon, and certain proportion of artificial and natural regeneration.

The analyses are carried out for 10-year periods encompassing a total of 180 years with 1988 as the starting year. A number of different management scenarios were analyzed but the most relevant for discussion in this case are:

- <u>No change in management</u>. This scenario provides the baseline scenario and includes historical levels of forest management.
- <u>Increased regeneration</u>. This scenario considers increased regeneration through both natural and artificial methods.
- <u>Increased environmental restrictions</u>. This scenario considers increased environmental restrictions based on a derived end-state of the resource and consider the maintenance of species density, threatened species, ecological sensitivity, and also includes increased regeneration efforts.
- <u>Increased fire protection</u>. This scenario considers increased fire protection beyond historical levels.
- <u>Increased regeneration and fire protection</u>. This scenario considers increased regeneration and fire protection beyond historical levels.

The model generates numerous data. Among the results are large logs (top diameter under bark ≥25 cm), medium logs (13–25 cm top diameter), small logs (7.5–13 cm top diameter) and fuelwood (3–7.5 cm top diameter). The scenarios are carried out for ecoregions (sub-divisions below the administrative unit level) and aggregated to the administrative unit level (Amur Oblast, Kamchatka Oblast, Khabarovsk Kray, Magadan Oblast, Primorski Kray, Sakhalin Oblast, and the Republic of Sakha) respectively the economic region (Far East) for all of Siberia and the Far East.

The basic data for the analysis is the State Forest Account, the only existing forest inventory data for Russia.

4 IIASA's Wood Supply Scenarios

In discussing the results for Far East Russia I will concentrate on the baseline scenario (no change in management) and the scenario with increased environmental restrictions combined with improved regeneration. I limit the time horizon to 2028.

4.1 Aggregated Far East Russia Results

For aggregated Far East Russia the development of the growing stocks is presented in Table 4.

Given the rather long rotation periods in the Far East the time horizon of 30 years is a rather short period. But it can be seen that the more environmental oriented management will create an additional growing stock of some 200 million m^3 by 2028 compared with historical management. If we expand the time horizon to 100 years the gain will be some 500 million m^3. It can also be concluded that the growing stock on nonexploitable forests (no harvest) is larger than the growing stock on exploitable forests. The increase during the 30-year period on nonexploitable forest is also about 200 million m^3.

In Table 5 the biologically sustainable volume annually available for harvest (possible felling volumes) over species groups is presented for exploitable forests.

In the environmental oriented scenario the total volume available for harvest (felling volume) is 68.9 million m^3 in 2008 and 75.9 million m^3 in 2028. This is about 5 million m^3 less than in the traditional management scenario. The largest amounts of wood are available in the species groups of larch (40–44 million m^3) and spruce (14–16 million m^3).

These volumes can be compared with the historical harvesting figures in Table 1 and it can be concluded that there is no lack of biologically sustainable harvestable wood (felling volume) in the Far East region. The total identified possible harvestable volume (Table 5) is some 20 million m^3 lower than the official AAC for the region (Backman and Zausaev, 1998).

So far we have discussed the felling potential based on biologically sustainable harvest volumes. It is known that substantial amounts of the wood felled are left on site and not removed (e.g., Nilsson and Shvidenko, 1998; Friends of the Earth–Japan, 2000) and that the removed wood is of different qualities/sizes. In Table 6 we assess the potentials for removals.

Table 4: Development of Growing Stocks in Far East Russia (in thousand cubic meters).

	Forest Type	No Change in Management (Baseline)	Environmental Restrictions
1988 Exploitable	Pine	725,767	725,767
	Spruce	1,685,972	1,685,972
	Fir	212,643	212,643
	Larch	5,965,862	5,965,862
	Cedar	425,679	425,679
	Birch	634,337	634,337
	Aspen	82,275	82,275
	Other deciduous	516,686	516,686
	Subtotal	*10,249,221*	*10,249,221*
1988 Nonexploitable	Pine	553,430	553,430
	Spruce	718,903	718,903
	Fir	83,261	83,261
	Larch	7,517,212	7,517,212
	Cedar	287,023	287,023
	Dwarf Pine	592,645	592,645
	Birch	193,407	193,407
	Aspen	22,143	22,143
	Other deciduous	597,408	597,408
	Subtotal	*10,565,430*	*10,565,430*
	1988 Total	***20,814,651***	***20,814,651***
2008 Exploitable	Pine	764,723	792,057
	Spruce	1,625,174	1,649,400
	Fir	237,364	240,456
	Larch	5,757,005	5,758,613
	Cedar	425,856	424,510
	Birch	687,353	715,210
	Aspen	77,774	77,140
	Other deciduous	503,618	505,986
	Subtotal	*10,078,866*	*10,163,372*
2008 Nonexploitable	Pine	645,324	645,324
	Spruce	825,340	825,340
	Fir	91,296	91,296
	Larch	7,552,932	7,552,932
	Cedar	303,152	303,152
	Dwarf Pine	609.898	609,898
	Birch	234,459	234,459
	Aspen	27,821	27,821
	Other deciduous	603,177	603,177
	Subtotal	*10,893,400*	*10,893,400*
	2008 Total	***20,972,266***	***21,056,772***
2028 Exploitable	Pine	799,147	859,348
	Spruce	1,655,824	1,675,389
	Fir	256,042	262,484
	Larch	5,633,428	5,744,975
	Cedar	429,523	429,132
	Birch	778,215	782,036
	Aspen	110,399	100,432
	Other deciduous	498,831	502,206
	Subtotal	*10,161,409*	*10,356,003*
2028 Nonexploitable	Pine	754,889	754,889
	Spruce	1,00,529	1,00,529
	Fir	95,851	95,851
	Larch	7,394,614	7,394,614
	Cedar	326,799	326,799
	Dwarf Pine	614,508	614,508
	Birch	275,941	275,941
	Aspen	34,144	34,144
	Other deciduous	584,244	584,244
	Subtotal	*11,081,517*	*11,081,517*
	2028 Total	***21,242,927***	***21,437,520***

Table 5: Annual Biologically Sustainable Volume Available for Harvest on Exploitable Forests in Far East Russia (in thousand cubic meters).

Year of Harvest	Total	Species Group							
		Pine	Spruce	Fir	Larch	Cedar	Birch	Aspen	Other deciduous
	All Administrative Regions				**No Change in Management (Baseline)**				
2008	72,210	5,785	15,398	1,288	39,616	1,246	5,768	1,191	1,918
2028	79,313	5,935	17,641	1,533	43,298	1,400	6,407	1,102	1,998
	All Administrative Regions				**Environmental Restrictions**				
2008	68,876	4,932	13,987	1,066	40,462	1,285	4,245	1,128	1,772
2028	75,932	5,081	16,243	1,253	44,194	1,355	4,988	984	1,837

The removal potential of industrial wood is assessed to be 42.5 (in 2008) and 47.2 (in 2028) million m^3 per year respectively under the environmental restricted conditions, which is about 2 million m^3 loss per year than the historical management regimes. This means that the gross available volumes discussed in Table 5 are reduced by 25–29 million m^3 from an industrial point of view.

The dominating industrial removal potential is dominated by the harvest in larch (24–26 million m^3) and in spruce (8–9 million m^3). The dominating part of the industrial removal potential is constituted by medium sized logs (13–25 cm top diameter).

The total removal potentials of industrial wood of 42.5 (in 2008) to 47.5 (in 2028) million m^3 can be compared with the current official AAC for industrial wood of some 62.5 million m^3 (Kukuev, 1997). Thus, the Russian assessment is some 20 million m^3 higher than the IIASA assessment.

Most of the Republic of Sakha, Khabarovsk Kray, and Magadan Oblast have a density of developed transportation network of less than 0.03 km per square kilometer. Stocking levels in some areas of these units are below the level necessary to economically justify a harvest. The same is also valid for the northern portions of Amur Oblast and Kamchatka Oblast. Taking these realities into account will reduce the removal potentials. We have tried to do a rough adjustment for the economic accessibility and the assessment we obtained of the potential for industrial wood removals is presented in Table 7.

Table 6: Potential of Removals Distributed Over Log Sizes in Far East Russia (in thousand cubic meters).

Species Group	**Commercial wood**						**Residue**	**Total harvest**
	Industrial wood			Total industrial	Fuelwood	Total commercial		
	Large	Medium	Small					
	No Change in Management (Baseline)					**2008**		
Pine	765	2,621	797	4,183	966	5,149	692	5,841
Spruce	2,844	4,706	1,095	8.645	1,479	10,124	1,603	11,728
Fir	478	889	271	1,748	321	2,968	352	2,421
Larch	5,432	14,541	3,734	23,706	5,868	29,574	7,893	37,467
Cedar	715	238	115	1,067	180	1,247	133	1,380
Birch	574	2,011	539	3,124	2,698	5,822	1,248	7,071
Aspen	165	351	98	614	788	1,402	167	1,569
Other deciduous	694	465	117	1,275	2,911	4,186	547	4,733
Total	***11,664***	***25,923***	***6,776***	***44,363***	***15,210***	***59,573***	***12.636***	***72,209***
	No Change in Management (Baseline)					**2028**		
Pine	797	2,679	811	4,287	978	5,265	707	5,972
Spruce	3,578	5,156	1,174	9.907	1,626	11,533	1,857	13,390
Fir	619	1,143	310	2,072	369	2,441	409	2,850
Larch	6,404	15,623	3,925	25,951	6,166	32,117	8,431	40,547
Cedar	849	255	121	1,225	224	1,448	151	1,600
Birch	817	2,207	577	3,601	3,018	6,618	1,417	8,035
Aspen	207	345	85	637	787	1,424	172	1,597
Other deciduous	768	528	133	1,428	3,282	4,709	613	5,322
Total	***14,038***	***27,935***	***7,135***	***49,108***	***16,448***	***65,556***	***13,756***	***79,312***
	Environmental Restrictions					**2008**		
Pine	653	2,211	666	3,531	805	4,335	568	4,904
Spruce	2,639	4,333	1,020	7,992	1,373	9,365	1,485	10,849
Fir	446	862	240	1,548	272	1,820	301	2,121
Larch	5,483	14,789	3,827	24,099	5,971	30,070	8,032	38,102
Cedar	691	235	114	1,039	172	1,211	130	1,341
Birch	505	1,622	420	2,547	2,223	4,770	1,065	5,835
Aspen	151	309	79	540	694	1,234	146	1,380
Other deciduous	639	423	109	1,171	2,674	3,846	501	4,346
Total	***11,207***	***24,783***	***6,476***	***42,466***	***14,185***	***56,651***	***12,227***	***68,878***
	Environmental Restrictions					**2028**		
Pine	685	2,268	680	3,633	817	4,450	583	5,033
Spruce	3,378	4,790	1,101	9,268	1,520	10,789	1,739	12,528
Fir	591	1,008	267	1,865	317	2,182	358	2,540
Larch	6,454	15,892	4,024	26,369	6,276	32,645	8,580	41,225
Cedar	788	249	119	1,156	203	1,359	143	1,503
Birch	749	1,836	463	3,048	2,568	5,618	1,244	6,859
Aspen	183	295	69	548	680	1,227	150	1,377
Other deciduous	708	476	123	1,306	2,996	4,302	555	4,857
Total	***13,535***	***26,813***	***6,844***	***47,193***	***15,376***	***62,569***	***13,352***	***75,922***

Table 7: Rough Estimate on Economic Accessibility of Delivered Harvest of Industrial Wood in Far East Russia (in million m^3).

No Change in Management	
2008	***2028***
17.3	18.2
Increased Restrictions and Increased Regeneration	
17.0	18.4

The delivered harvest potentials presented in Table 7 are close to the current harvest level if an illegal harvesting factor of 50% is included, namely some 16 million m^3 per year. If the illegal harvesting factor is excluded, the current harvest level is substantially below the assessed economically delivered harvest potential of industrial wood.

The distribution of the potentials on administrative units and the distribution of the current harvest are presented in Table 8.

Table 8: Percentage Distribution of Economically Delivered Harvest Potentials of Industrial Wood and Distribution of Current Official Harvest Over Administrative Units of Far East Russia.

	Removal Potential	**Current Harvest (Average for 1990s)**
Amur Oblast	24.0	17.9
Kamchatka Oblast	2.2	2.3
Khabarovsk Kray	18.6	41.8
Magadan Oblast	negligible	negligible
Primorski Kray	22.7	15.9
Sakhalin Oblast	10.3	11.9
Republic of Sakha	22.2	10.2
	100%	100%

Table 8 illustrates that currently Khabarovsk Kray is having a much higher proportion of the harvest compared to the proportion of the actual delivered harvest potential and the share in the Republic of Sakha is not utilized.

5 So Where is the Problem?

The aggregated analysis does not really show a serious problem at the aggregated level. In the worst case (including a high illegal harvest factor) there seems to be a tight but acceptable total wood balance. However, we can conclude that there has been an overharvest in mature and overmature coniferous forests and that the harvest is not distributed in a sustainable manner.

The first problem can be identified by looking at the official harvest figures distributed over species. We know that the official harvest figures are not correct by excluding illegal harvests and some other harvest is not reported in addition. This issue will be discussed later. However, the official harvesting figures already identify a serious problem, even if the figures are very uncertain (Table 9).

Table 9: Distribution of Economically Delivered Harvest Potential of Industrial Wood Over Species and Rough Average Harvesting Profile During the 1990s (in percentage).

	Pine	Spruce	Fir	Larch	Cedar	Birch	Aspen	Other deciduous
Amur Oblast								
Delivered harvest potential	3.2	3.5	0.2	76.2	-	14.7	1.9	0.3
Harvesting profile	-	30.0	10	50.0	-	10.0	-	-
Kamchatka Oblast								
Delivered harvest potential	-	21.2	-	26.6	-	18.7	1.5	32.0
Harvesting profile	-	20.0	-	60.0	-	20.0	-	-
Khabarovsk Kray								
Delivered harvest potential	-	46.1	2.2	38.7	2.2	6.4	2.4	2.0
Harvesting profile	-	60.0	10.0	30.0	-	2.0	2.0	6.0
Magadan Oblast								
Delivered harvest potential	-	-	-	95.6	-	-	-	4.4
Harvesting profile	-	-	-	95	-	-	-	5
Primorski Kray								
Delivered harvest potential	-	46.1	3.9	14.3	10.5	10.0	3.3	11.9
Harvesting profile	-	40.7	21.5	2.2	1.2	20.8	-	10.7
Sakhalin Oblast								
Delivered harvest potential	-	49.5	18.0	29.2	-	0.8	-	2.5
Harvesting profile	-	60.0	10.0	30.0	-	2.0	2.0	6.0
Republic of Sakha								
Delivered harvest potential	22.3	-	-	72.4	-	5.3	-	-
Harvesting profile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

From Table 9 it can be seen that the official statistics show, in the most important supply regions, a substantial overharvest in spruce and fir and a substantial underutilization of larch and aspen. This is a strong signal that so-called “creaming” is taking place in the harvest — an overharvest of the most valuable species and the most accessible areas.

Based on the analysis so far we can conclude:

- we are not really facing a forest resource problem in Far East Russia,
- even in a worst case scenario there is currently a balance between the sustainable delivered harvest potential and the current harvest levels at an aggregated level,
- areas and growing stocks on nonexploitable forests are larger than on exploitable forests,

- the management regimes used in the IIASA scenario is rather conservative and with a more intense forest management the sustainable delivered harvest potential can be substantially increased in the future but
- the problems in Far East Russia are the classical ones,
- the administration and the industry have only used the most valuable species and areas with low access costs instead of trying to develop a much more evenly distributed utilization of the resource and to develop the markets for underutilized species (like larch) and
- this results in serious overharvesting of certain species and areas, which are far beyond any sustainability.

6 Illegal Harvest

It is common knowledge that there is a substantial illegal harvest taking place in the Far East of Russia. But nobody knows how large it is in reality. The illegal harvesting is taking place in the form of logging without a license, forged logging licenses, logging in protected areas, logging of protected species, incorrectly classified species, under-grading timber (pulp logs instead of saw logs), etc.

A special feature is that a long-term decline in governmental funding has left former Forest Service Departments and Districts without increasing funds for the management and protection of the forests. Therefore, Forest Service Districts have increased the so-called salvage harvests by selling “salvage logging licenses” to local logging companies or doing this kind of logging themselves. The purpose of the salvage/sanitary/maintenance logging is to remove overmature and old trees as well as trees causing fire threats — the income from which is not taxed by the federal government. In many areas the dominating part of the current logging is “salvage logging” of commercial grade timber. Therefore, this form of harvest seems to maximize current profits instead of maximizing the sustainability of the forests, which was the original purpose of this logging form (World Bank, 1997; Friends of the Earth–Japan, 2000). The logging is taking place mainly in valuable species (and, to some extent, protected), like ash, oak, cedar (Korean pine), and spruce as well as in easily accessible areas. This logging is in direct contradiction with the stated mission of the Forest Service.

The rate of unemployment in the Forest Service is high; many people have started their own logging companies and many people are operating on an illegal basis with the “creaming” behavior of harvesting the most valuable species and in areas easily accessible. In Far East Russia there are many more logging companies today compared to the Soviet era.

All of this is worsening the picture that has already been discussed in Section 5. There are also arguments floating around that the impact of Chinese traders located in Russia stimulate the illegal logging for Chinese destinations (Friends of the Earth–Japan, 2000). The situation is critical. The lack of respect for legislation has now been established in the Far East with respect to the forest. This will make it very difficult for serious companies to operate on a competitive basis.

7 Forest Management and Forest Inventory

It was stated above that the Forest Service is not in the position to manage and protect forests due to limited financial resources. The discussed wood supply scenarios build on the assumption that the forest resources are managed on a sustainable basis. If a sustainable forest management is not in place the wood supply scenarios are of low value for guiding the future direction of the Far East Russia forest sector. The same can be stated about the inventory information. During recent years the quality of the inventories has declined substantially and there is a need to urgently establish an efficient inventory system delivering accurate and transparent data. This inventory system should be centered on the problems to be solved and the objectives to be achieved in the forest sector and society — it should not merely replicate the current system of primarily collecting data. The inventory data must enable each interest group in the forest sector to gain data for its own analysis.

We think that our IIASA scenarios are based on consistent data but after the analyses were carried out the mismanagement and the illegal harvesting have increased and the quality of the inventory has decreased — all of this affecting the future wood supply possibilities.

8 So What is the Problem?

I stated earlier that the problem in Far East Russia is not the lack of forest resources. For many years IIASA has studied the Russian forest sector (see publications available on the Internet: http://www.iiasa.ac.at/Research/FOR/) and the problems are in principle the same in the whole country. There is a lack of a sustainability concept and, mildly expressed, there is a confused institutional framework. Based on our experiences we have come to the conclusion that there are limited possibilities to reach sustainability without significant changes in these frameworks. Figure 3 illustrates the components required for an efficient sustainability concept.

8.1 Policy Framework

The policy framework should consist, in one way or the other, of the following components: Overall Societal Goals for the Forest Sector, Overall Forest Policies, Detailed Sector Goals for Sustainable Forestry, and Regional Detailed Goals. The development of the policy framework is the process where we formulate what the society wants from the forest sector and forestry in the future. It is in this component that society should have an intense debate on setting conflicting and balancing goals. Balancing of goals is required both within the forest sector and between forestry and society. To a large extent, this balancing act is missing. We argue that a consistent policy framework is missing both in Russia as a country and in Far East Russia (Nilsson and Shvidenko, 1998).

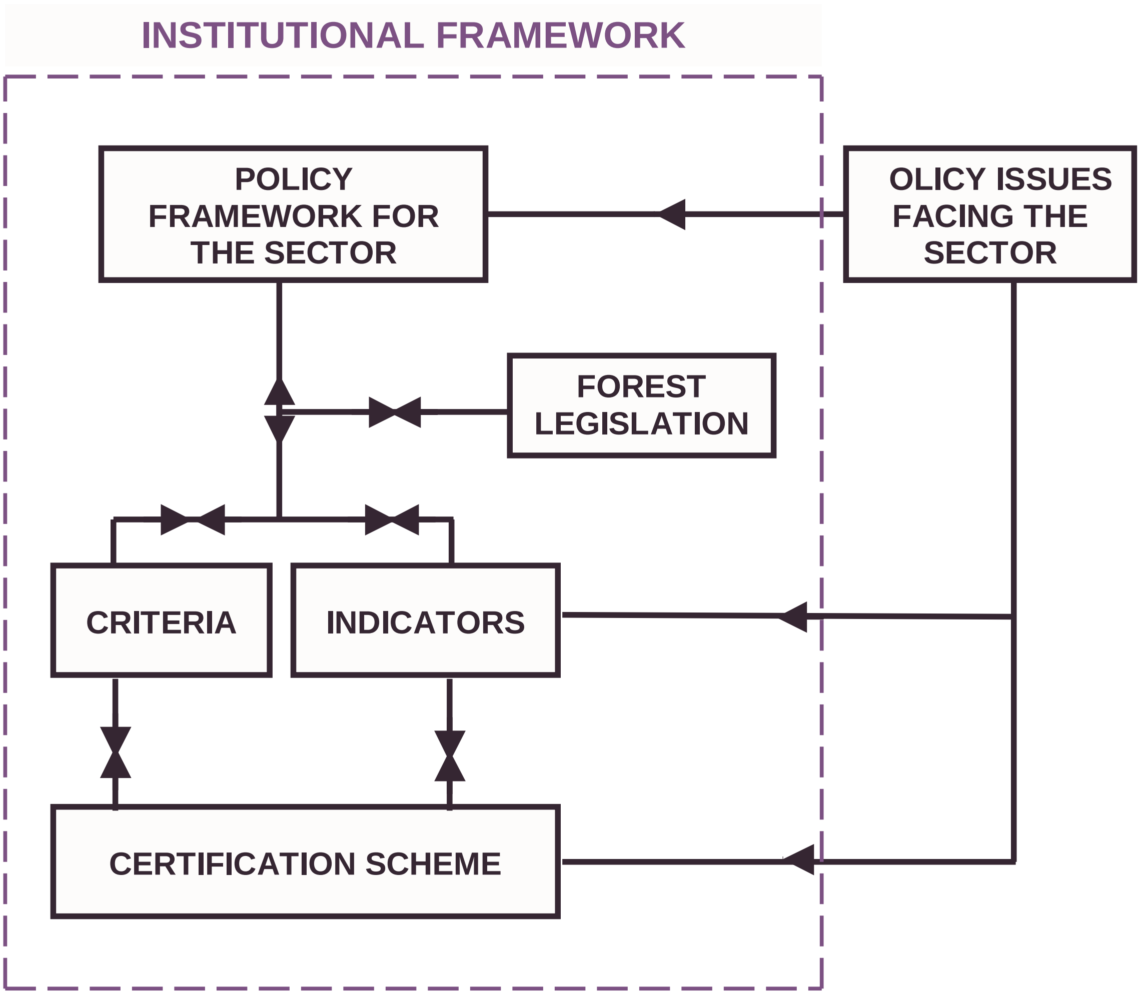

Figure 3: Framework of the Sustainability Concept. Source: Nilsson (2001a).

8.2 Forest Legislation

Forest legislation is a tool that tries to move development towards the goals set in the policy framework. Thus, there should be a strong link between the policy framework and forest legislation. Forest legislation alone is not sufficient in order to reach the objectives of the policy framework.

There is forest legislation in Russia and Far East Russia, which stipulates the organization of the forest management, forest management principles, rules for forest utilization, rules for and organization of protected areas, rules for and organization of forest reproduction, rules for utilization in protected areas, regulation of trade, etc. In addition to the Forest Code, there are about 15 laws at the federal level influencing the forest sector. But the links to the policy framework are missing ("what do we want the forest sector to produce in the future?").

In addition, the deficits of the Russian legislation are well known. The development of constitutionalism and federalism is unsatisfactory (Nysten-Haarala, 2000). The persistence of property rights is not protected and law changes all the time (Nysten-Haarala, 2001a). There are deficits in the Russian company law (Nysten-Haarala, 2001b). Pappila (1999) identifies that the Russian federalism and legislative powers affect the forest sector in a negative way. The same is stated about legislation regulating the working environment of enterprises on a general level in relation to the State. The legislation relating to relations between forest enterprises is not clear. And finally, the insufficiencies of nature protection are also partly due to the general legislation.

The Russian Federal Forest Code approved in 1997 (Lesnoi Kodeks, 1997) is not taking regional specifics into account and has many deficits (e.g., see World Bank, 1999; Efremov *et al*., 1999). In 1999, the regional Duma of Khabarovsk Kray approved the Kray Forest Code (for a summary see, Efremov *et al*., 1999). But there are still unsolved problems with the Kray Code and a substantial number of stakeholders in the forest sector of the Kray identify the Local Forest Code as a hindrance for development (Efremov *et al*., 1999).

From my point of view, the most important issue is that both the federal and regional codes are missing the link to the policy frameworks (which, in fact, are non-existent).

8.3 Criteria and Indicators

Over 150 countries are currently involved in one or more international process that aims at the development and implementation of criteria and indicators for sustainable forest management (Palmberg-Lerche *et al*., 2001). The ultimate goal with this system is to promote improved forest management practices over time taking into consideration the social, economic, environmental, cultural, and spiritual needs of the full range of stakeholders in forestry. The Federal Forest Code stipulates the establishment of "Criteria and Indicators for Sustainable Forest Management in the Russian Federation", as coming into force in July 1998. The Russian Criteria and Indicator system is officially based on the Pan-European system for European Russia and the Montreal list for the rest of the country. The fulfillment of implementing the criteria and indicator system rests with the Ministry of Natural Resources (formerly the Federal Forest Service). We have tried to follow up in the field on how regions are reporting on the criteria and indicators to the Ministry. Through our sampling we have not been able to detect any reporting on the criteria and indicators to the responsible authority (Nilsson, 2001b). Therefore, there are high probabilities that the established Russian criteria and indicator system is just a paper product. The criteria and indicators implemented must be in harmony with the established policy framework.

8.4 Certification

The original purposes of certification of forests are: (1) to improve the quality of forest management, and (2) to provide market advantage or improved access for products from sustainably managed sources (Bass and Simula, 1999). The certification of forest management is defined as an established and recognized verification procedure that results in a certificate on the quality of forest management in relation to a set of predetermined criteria based on an independent (third-party) assessment. Verification takes place through an audit.

In the Federal Forest Code, Article 71 states that a *mandatory* certification system should be established in Russia. Strakhov and Miettinen (2001) have described the mandatory system under establishment in Russia. In Russia, the administration of certification and standardization is carried out by the Russian Federation's Committee on Standardization, Methodology and Certification (Gosstandart). The Ministry of Natural Resources is the authorized federal body of executive power of forest certification. The system of State Forest Inventory and Planning Enterprises provide the premises and data to the Central Forest Certification Body and Forest Certification Centers. The current set of criteria comprises of 24 normative documents (resolutions by government, president, orders of the former Russian Federal Forest Service, etc.).

Thus, we have a system under development, which more or less ends up with the forest owner, forest manager, and certifier in one and the same body. In addition, the system is based on normative legal documents with respect to forestry. As illustrated earlier, respect for the law is currently highly questionable and there is no third-party involvement. Therefore, it is quite plausible that certification documents will exist in Russia in the future but they will have little relevance to the international debate on sustainable forest management.

8.5 Institutional Framework

In all of IIASA's work with regard to the Russian forest sector one conclusion is always apparent. The existing institutional framework is a major bottleneck for sustainable development of the Russian forest sector.

Institutions or the institutional framework should be understood as "the rules of the game" in a society, not as organizational entities (North, 1990; Crawford and Ostrom, 1995). Thus, an institutional framework consists of those formal and informal rules that are de facto used by a set of actors. Institutions can be defined "*as the legal, administrative and customary arrangements for repeated human interactions, …the prevailing institutional framework in a society consists of formal and informal rules*" (Pejovich, 1998). Thus, the institutional framework of a society is composed of a large number of institutions. The aspects of the institutional framework are coordination between organizations, legislation, property rights, tenure policies, revenue policies, land-use policies, transparency, reliable information and data, etc. Stiglitz (1999) states: "*economic development and transition to something new is more a matter of institutional transformation than economic management*".

IIASA has carried out tremendous efforts in analyzing the institutional framework of the Russian forest sector (reports are available on the Internet: http://www.iiasa.ac.at/Research/FOR/).

In the following paragraphs, I am only able to discuss some of the results and especially our case studies in Khabarovsk representing the conditions in Far East Russia.

Carlsson *et al*. (2000) and Vasenda (2001) illustrate some of the institutional problems in the Russian forest sector (Table 10).

Table 10: Examples on Institutional Problems of the Russian Forest Sector.

Constitutional Level:

Contradictions and inconsistencies in legislation,
Unspecified, unclear property rights,
Draconian tax code,
Political instability.

Collective-Choice Level:

Artificially low timber prices,
High interest rates (penalize forest enterprises that lack working capital to support their activities during periods between production),
Increase in instances of barter,
Prevalence of corruption and criminalization,
Evolution toward a virtual economy,
Lack of investment in secondary wood industries.

Operational Level:

Increase in illegal harvesting,
Increased evidence of degradation and devastation of the forest,
High transaction costs,
Lack of funding for forest management operations,
Forest enterprises run at a loss,
Timber shortages.

Table 10 illustrates that the institutional problems are present at all levels in society affecting the Russian forest sector. Carlsson *et al*. (2000) convincingly show from our case studies that informal constraints embodied in customs, traditions, and codes of conduct constrain the development possibilities towards sustainability in the Russian forest sector and that an "institutional deadlock" is at hand. Fell (1999) also concludes that the Russian forest sector is severely affected by the lack of trust between its actors. Table 10 illustrates three layers of institutional problems (or three layers of rules of the institutional arrangement) that have to be coordinated within the public authorities (the visible hand) and the market (the invisible hand) in harmony.

To illustrate the situation in Far East Russia I will use the results from Khabarovsk Kray presented by Mabel (2000).

Despite nine years of sweeping reforms, meaning decentralization of the government's administrative and management responsibilities to the regions and the provincial state's broad legislation efforts to gain direct control over the territory's forest wealth under its jurisdiction, there is a diffuse system of power and multiple locations of state institutional authority that govern access, use and control over the forest resources.

Mabel (2000) concludes: "*despite the legislated disempowerment of the local state, the old institutions have largely persisted in their prior authority and continue to control* *the relationships of access and exploitation at the point of interaction with the forest users. What has emerged in practice, are multiple locations of authority manifested in multiple processes of authorization, overlapping jurisdiction, a flexibility and negotiability of terms at every level of decision making, and a labyrinth of relative power relationships that govern the process of participation. The consequent tensions among institutions has fostered an environment of political-economic instability in the forest sector".*

Efremov *et al*. (1999) carried out a second case study on the institutions in Khabarovsk Kray and they identified the following malfunctions in the forest sector:

- Discrepancy between nominal and factual rights and powers and distribution respectively between various management levels;
- Ongoing struggle on redistribution of rights and powers;
- Corruption of the management machinery;
- Demolition of field inventories and control systems; and
- Insufficient legislation and no compliance with laws.

These five groups do not encompass *<u>all</u>* of the institutional problems in Khabarovsk Kray but illustrate the general environment in which the managements system is embedded. Without solving these problems, the management system will remain inefficient for a long time and we have an "institutional deadlock".

Carlsson *et al*. (2000) emphasize that the constitutional, collective choice, and operational choice levels of actions constitute a totality and if this is not in place the possibilities for sustainable development is limited.

It is obvious that without radical changes of the institutional framework in the Russian and Far East Russia forest sectors sustainability and wood supply analyses are rather irrelevant issues in the political debate.

8.6 Policy Issues Facing the Sector

The political, social, and economic conditions are changing rapidly. In order to cope with these changes the framework of the sustainability concept has to be adaptive and regularly revised in order to deal with these changes. *<u>Without an adaptive concept with regular revisions</u>*, the Policy Framework, Forest Legislation, Criteria and Indicator System, Certification Scheme, and Institutional Framework *<u>will be counter-productive from a sustainability point of view</u>*. Thus, it is important to establish an efficient *<u>adaptive mechanism for updating</u>* all of these components. This mechanism is not in place neither in Russia nor in Far East Russia.

One of these policy issues strongly impacting the future of the Far East Russia forest sector is the future possible international demand on forest products from Far East Russia, which will be discussed in the next section.

9 Outlook on Future International Demand on Far East Russia Forest Products

In this outlook I will concentrate on the countries closest to Far East Russia. However, it should be underlined that the identified foreign demands cannot only be supplied by Far East Russia but also by East Siberia.

9.1 China

China's domestic demand for wood products is growing rapidly due to the growth of the economy and rising living standard of its 1.25 billion population. The implementation of the Natural Forest Protection Program has caused a sharp decline in domestic roundwood production. The shortfall in domestic harvest volume is being replaced by imports. Since 1998, by value, forest products have been the largest commodities imported by China. The major applications of wood products have moved from the construction industry to interior design and the furniture industry in the last ten years. This trend has caused hardwood demand to increase rapidly.

A comprehensive statistical system is not yet established in China and Chinese statistics do not reflect the actual situation and reports normally lower than actual production and consumption. The Chinese official statistics are worse than the Russian statistics. A schematic of the forest resources is presented in Figure 4.

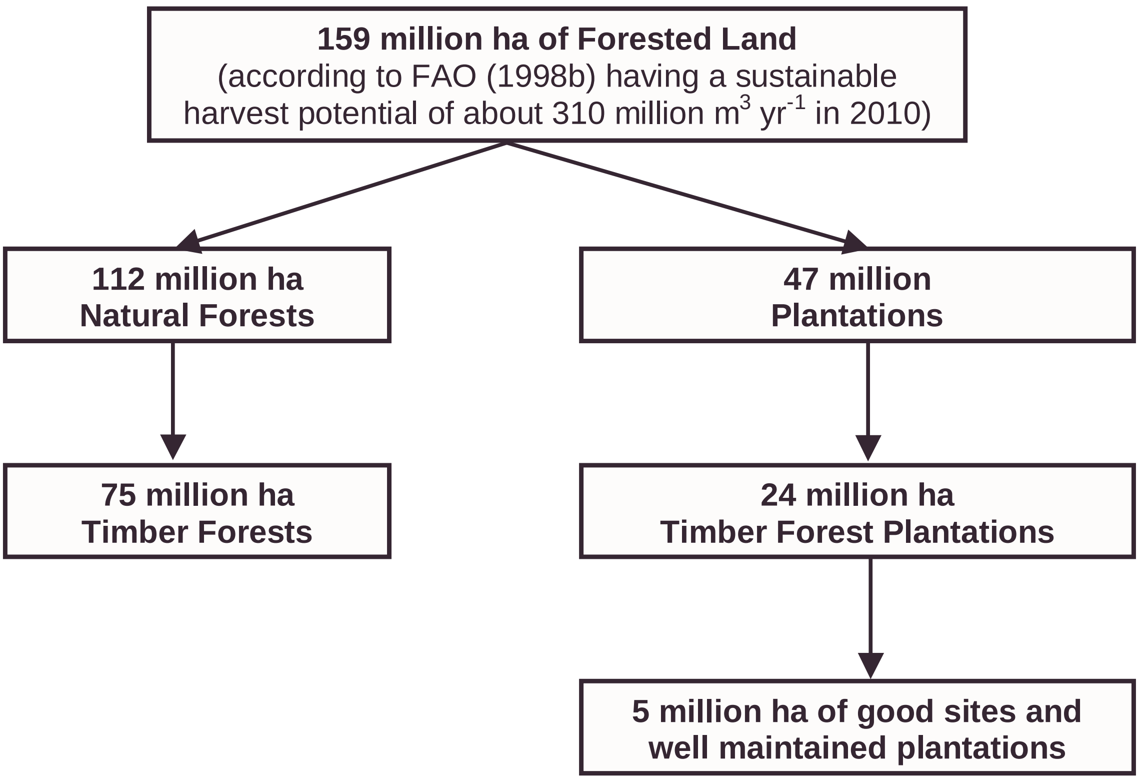

Figure 4: Forest Resources of China.

I have tried to produce a wood balance for China in identifying future demand and supply (Table 11). This Table is complicated and difficult to read and I will try to summarize it. In this summary I lean towards the recent Jaakko Pöyry study (2001), which is based on substantial fieldwork and the fact that nearly all official statistics is biased.

The total yearly depletion of the forest is huge in China and reaches some 370–400 million m^3. But only 175–185 million m^3 of this harvest reach the market. Of this latter volume, some 80+ million m^3 stem from real timber forests. The current demand on wood from the timber forests is some 90+ million $m^{3,}$ which means China currently imports 10+ million m^3 of logs of which nearly 6 come from Russia. The sustainable harvest level in the timber forest is about 100 million m^3, meaning that the current production can be increased in the timber forest by some 20 million m^3.

If we look into the future (2010), the need of imported logs will increase from the current 13.5 million m^3 to some 30 million m^3. The total import to China of all forest products, expressed in roundwood equivalents, will increase from the current 60 million m^3 to some 110 million m^3 by the year 2010. This development can be turned into a positive development for Eastern Russia or a disaster depending on whether Russia will be able to solve its institutional and policy problems.

In addition to this domestic Chinese picture we also have the latest development with production in China for the Japanese and other markets. If the Chinese operators continue to be more efficient on the markets than the Russian operators this production can increase substantially in the future and add to the demand on Russian wood. In 2000, China exported 0.7 million m^3 of lumber and 0.6 million m^3 of plywood.

9.2 Japan

Japan is one of the world's biggest importers of forest products. It is a highly forested nation and 68% of the land is forested, of which about 40% with plantation production forests. Most of the forests are located on steep mountains and in small blocks with mixed species. Due to these factors, wet conditions, and increased environmental concerns harvesting is difficult and very expensive. The current harvest of industrial logs is around 20 million m^3 and the government assess the sustainable yield of logs to be 60 million m^3 and the current log equivalent usage in Japan is around 95 million m^3. Due to the harvesting conditions and environmental concerns it is assumed that harvesting will decline further in the future (Staples, 2000). In order to compensate for unsatisfactory production domestically, Japan has currently established 380,000 ha of plantation projects overseas (Neilson, 2000) and Japan expects to have 550,000 ha planted plantations by 2010 (FAO, 1999). Different international outlook studies have been carried out with respect to the future of the Japanese forest sector, which I have tried to summarize in Table 12.

Table 11: Wood Balance for China (in million m^3).

	1996	1998	1999	2000	2010
Total Depletion					
(official statistics)	302				
(Jaakko Pöyry, 2001)				370	
(FAO, 1998a)				409[a]	449
Sustainable Supply from Forested Land					
(FAO, 1998b)					310
Harvested Wood Reaching Markets					
(ECE/FAO, 2001)	175				
(Jaakko Pöyry, 2001)	184				
(FAO, 1997)				140[a]	140
(FAO, 1998a)				165[a]	182
Sustainable Harvest in Timber Forests[b]					
(Jaakko Pöyry, 2001)				100	100
(FAO, 1997)				99	99
(WRI, 1999)		107			193
(Hagler, 2000)					110
Production of Timber in Timber Forests[b]					
(official statistics)		60	49		
(Sun, 2000)	67	60	53		
(Jaakko Pöyry, 2001)		83	82		
Demand on Timber from Timber Forests[b]					
(Jaakko Pöyry, 2001)		87.7	92.3		130
Import of Logs					
(Jaakko Pöyry, 2001)		4.7 (Russia 1.6)	10.3 (Russia 4.3)	13.5 (Russia 5.9)	30 (Russia ?)
(WRI, 1999)					35
(FAO, 1997)					19
Total Import (in roundwood equivalents)					
(Jaakko Pöyry, 2001)				60	107
(Zhang *et al.*, 1997)					120–160

[a] Forecasted numbers.

[b] Excluding roundwood for rural construction, mining, mushroom cultivation, fuelwood, and four-sides wood.

Table 12: Wood Balance for Japan (in million m^3).

	1990	1994	1997	1998	1999	2000	2010
Industrial Roundwood Consumption							
(FAO, 1997)		71					73–79
(FAO, 1998c)						104[a]	115
(WRI, 1999)							76
(Staples, 2000 and PERC, 2001)	110					95	85
Sustainable Supply of Roundwood							
(FAO, 1998b)							26–30
(WRI, 1999)			44				41
(Japanese Government)						60	60
Industrial Roundwood Production							
(FAO, 1997)		26					25
(FAO, 1998a)						27.5[a]	44
(FAO, 1998c)						29.0[a]	31.0
(Staples, 2000 and PERC, 2001)	28					20	
Imported Roundwood Equivalents							
(FAO, 1997)		46					38–45
(FAO, 1998c)							84
(WRI, 1999)			36				40
(Staples, 2000)	82					74	
Import of Logs							
(ITTO, 2000)			20.5	15.2	16.5		
(Staples, 2000)	27.5		15.0		15.2		
Import of Logs from Russia							
(FAO, 1998c)							5.3
(Friends of the Earth–Japan, 2000)				4.8	5.8		

[a] Forecasts.

These studies are pointing in all directions. I make the following interpretations of Table 12. The total roundwood consumption is currently around 95–100 million m^3 and by 2010 it will decline to 75–85 million m^3. The possible sustainable supply for 2010 seems to be in the range of 25–40 million m^3 (with a biologically sustainable supply of 60 million m^3). The domestic industrial roundwood production in 2010 seems to be in the range of 20–30 million. This results in a needed import of roundwood equivalents of 45–65 million m^3 in 2010, of which 10–15 are imported as logs.

I find that Staples (2000) has made the most insighted analysis of the Japanese situation and the conclusions are:

- The population is assessed to decline in the future with a dramatically increased share of older people.
- The Japanese saw log import has declined from 27.5 million m^3 in 1990 to 15.2 million in 1999.
- The Japanese lumber consumption has decreased from 37.5 million m^3 in 1990 to 25 million in 1999 and the lumber import has been flat during this period (the decline is caused by less housing starts and less wooden houses).
- Plywood consumption is declining and reconstituted panel consumption increasing and a continuous erosion with substitutes exported.
- Japan is nearly self-sufficient in paper and paper; the deficit is normally supplied from Japanese owned overseas mills.
- Pulp production is nearly constant at 11 million tons.
- Hardwood chips import is increasing (own plantations) but softwood chips import is decreasing.
- Increase in recycled fiber.

Based on this picture and the estimates discussed in Table 12, I end up with our earlier estimate (Nilsson and Shvidenko, 1998), based on end-use analysis for Russian wood in Japan, that the potential demand on Eastern Russian wood by 2010 will be in the range of 6–10 million m^3.

9.3 South Korea

The Republic of Korea has been short of domestic wood supply for a long time,. Presently, the domestic timber supply is about 20% of the total demand and large amounts of timber are imported to face the rapid economic development of the country. The lack of suitable lands limits plantation programs. Korea is also investing in plantations overseas as a way to secure future supplies. In Table 13 I have tried to make a wood balance for South Korea.

Table 13: Wood Balance for South Korea (in million m^3).

	1994	1995	1997	1998	1999	2000	2010
Industrial Roundwood Consumption							
(FAO, 1997)	12.5						12–16
(FAO, 1998c)						12	14
Sustainable Supply							
(FAO, 1998b)							1
Industrial Roundwood Production							
(FAO, 1997)	2.0					1.8	1.6
(FAO, 1998c)						1.9	1.8
Import of Industrial Roundwood							
(FAO, 1997)	10.5						10–13.5
(FAO, 1998c)						10	12.5
Log Imports (dominated by hardwood)							
(ITTO, 2000)			8.3		6.6		
(Lee, 2000)					6.6	7.4	10
Russian Log Exports							
(Friends of the Earth–Japan, 2000)				0.7	0.9		

A summary of Table 13 is in line with the following. In 2010 the industrial roundwood consumption seems to be in the range of 12–16 million m^3. The sustainable supply is around 1 million m^3 and the production of industrial roundwood is foreseen to be in the range of 1.6–1.8 million m^3, which would threaten sustainability. If we use the sustainable supply as the basis, the need to import industrial roundwood is 11–15 million m^3 of which 10 million would be imported in the form of logs (mainly hardwood).

Based on Table 13 and analysis in Nilsson and Shvidenko (1998) I assess a potential demand on Eastern Russian wood of 2–3 million m^3 by the year 2010.

9.4 Other Countries

Historically, North Korea has been dependent on Russian wood resources. Recent information relating to the North Korean forestry sector is rather limited. Forests are important as a source of fuelwood. The standing volume is low due to overexploitation. FAO (1997) assess the current consumption of industrial roundwood to be 0.5 million m^3 and an increase in consumption to be around 0.7 million m^3 in 2010. Parts of this consumption are bound to be covered by Russian wood. Nilsson and Shvidenko (1998) have summarized analyses on potential demand on Russian wood in Central Asia and Kazakhstan respectively. To my knowledge there are no more recent analyses carried out on this issue. The study identified a potential demand on Russian wood from Central Asia of 4 million m^3 per year and from Kazakhstan of 3 million m^3.

9.5 Summarized Potential Demand on Russian Wood

If these potential demands on wood from Eastern Russia in 2010 are summarized the magnitude would be 30–35 million m^3.

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