OUTLOOK OF UNDERLYING CAUSES OF DEFORESTATION AND FOREST DEGRADATION IN SOUTHERN PART OF THE RUSSIAN FAR EAST

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PART 1: BACKGROUND

1. Introduction

One of the cornerstones of the Russian Far East (RFE) economy is the use of natural resources. Among natural resources, the forest sector has played a significant role, especially in the central and southern parts of the RFE. The forest resource potential is very high, with a large area of forest and an enormous volume of timber. As a result, the forest sector is a crucial part of the RFE economy. From one perspective, it is the basis for much of the region's social structure, since it is a driving force behind regional development, a reason for establishing and maintaining new production plants, infrastructures and settlements. The forest sector is also an organizational backbone for local town and village life. From another perspective the industrial part of forest sector often has negative impact on the territory by depleting its bio-diversity, water and soil resources, because the regional forests are the basis of the local ecosystems and their disturbance influences landscape status.

The development of the regional forests began from the 17th century in the northern part of the RFE and from the 19th century in the southern part. It was and is a very complicated process that manifests itself today different results in the forest coverage status. Various patterns of development were followed, f but resource exploitation was dominant. As a result, although So the forests which before development were mostly virgin are transformed now to 38 percent in average. Together with big forest tracks, the vast unforested areas have appeared.

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Primorskiy and Khabarovskiy Krais are two main and the most economically developed provinces of the RFE. They are located in the southern part of the RFE, so in the following text they will be referred to as "S-RFE".

2. General Geographical and Economic Description

Territory and Population

Primorskiy and Khabarovskiy krais are located on the extreme southeast of Russia, close to Sea of Okhotsk and Sea of Japan that belongs to the Pacific basin. They have large territory but not a large population (Table 1.1).

Territories of both krais are mostly mountainous, with the highest peak being 1,685 m in Primorskiy and 2005 m in Khabarovskiy Krai. The climate is full of contrast: warm moist Pacific monsoons in summer and dry frozen Siberian anticyclones in winter.

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The S-RFE has rich resources of fresh water. The majority of rivers belong to the great system of the Amur River, one of the ten largest rivers in the world. They ultimately empty into the Pacific Ocean.

The S-RFE is abundant in energy, fuel, mineral, recreational and other resources. Some of them are unique for Russia and the world.

Table 1.1. Territory and Population, 01.01.97

Indices	Krais (Provinces)		Total
	Primorskiy	Khabarovskiy	
Territory, thousand square kilometers	165.9	788.6	953.5
Proportionate share in the Russian Federation territory, percent	1.0	4.6	5.6
Population, thousand persons	2236.2	1557.1	3793.3
Proportionate share in the Russian Federation population, percent			
Population density, person per 1 square kilometer	13.5	2.0	4.0
Proportionate share of the urban population in the total population, percent	77.6	80.6	78.8

Source: Data Base, Economic Research Institute, 1998

Demographic and Social Situation

The population of the S-RFE is highly urbanized (look at Table 1.1). In Primorskiy krai there are 11 cities with more than 25,000 inhabitants, in Khabarovskiy Krai there are 5. The largest cities are Vladivostok (638 thousand inhabitants), Khabarovsk (611), Komsomolsk-on-Amur (310), and Nakhodka (165).

Since most of the local population originated from migrants of many former USSR regions, the region now has a very complicated mixture of people. The aboriginal population is represented as 0.8 percent of the total in Primorskiy Krai and 3.1 percent in Khabarovskiy Krai.

After 1992 in both *krais* the population decreased mainly because of emigration to other regions of Russia and the Commonwealth of Indepenedent States (CIS) where the living conditions are better. By 1997 the population had decreased in Primorskiy Krai by 3.1 percent and in Khabarovskiy Krai by 3.8 percent.

The population of the S-RFE has a very unique age structure. This economic region of Russia has the smallest proportion of people above and below working age (12.6 percent and 26.7 percent, respectively) and the largest working-age population (60.7 percent).

The monetary income per capita in the S-RFE usually was above the national average by a factor of 1.4 to 1.5. Such level is required to compensate for the greater costs and expenses, which are due to the higher price levels and specific structure of demand that is linked with inclement climate, long distance from cultural centers and low level of infrastructure available.

However real income per capita decreased in pace with economic reforms because of high inflation and changes in the structure of consumed goods. Real income per capita in Khabarovskiy Krai from 1991 to 1996 decreased by 2 times. After 1994 of the extent of local income above Russian average becomes less. Income per capita in Primorskiy Krai after 1995 became less than the Russian average income and in Khabarovskiy Krai it is very close to the Russian average. The S-RFE lost its advantage over other Russian regions.

In pace with reform unemployment has arisen as a new phenomenon for Russia. In Khabarovskiy Krai in 1996 it amounted to 11.0 percent of economic active population, and in Primorskiy Krai - 12.3 percent.

The social stratification based on income of the population increased many times. The population with the lowest 10 percent of incomes are 13.7 times more numerous than the top 10 percent. Distribution of the population based on per capita income is shown in Table 1.2.

Table 1.2. Distribution of population according to average per capita income, 1995, percent

Income per capita, US dollars	Krais (Provinces)	
	Primorskiy	Khabarovskiy
Under $25	3.1	6.3
$25 - $50	41.6	22.2
$50 - $200	44.6	59.3
$200 - $400	10.1	10.6
Over $400	0.6	1.6
Total	**100**	**100**

Source: Data Base, Economic Research Institute, 1998

Economic Situation

In 1997 compared to 1991 the volume of industrial output in Primorskiy Krai came to 47.8 percent, in Khabarovskiy Krai - 27.2 percent. During the same period the Russian total output manifested 53.5 percent. So the economic slump in both of the *krais* was deeper than in Russia as a whole, being especially dramatic in Khabarovskiy Krai. The share of the S-RFE in Russian the economy also decreased.

The most part of the recession took place in the primary and especially secondary sectors. The tertiary sector had positive developments, in 1996 its share in the gross added value rose in Primorskiy Krai to 59.4 percent, in Khabarovskiy - to 47.0 percent. Still the rise could not compensate for the overall economic decline. As a whole the structure of local economy has become more "heavy" because now the primary sector plays the main role.

The investment index in 1995 in comparison with 1990 was 18 percent. Further, in 1995-1997, investments decreased by 37.0 percent in Primorskiy and by 11,7 percent in Khabarovskiy Krai. As against former planned economy the structure of investments also changed, from belonging to the state in former times, to now being mainly private (Table 1.3).

Table 1.3. Sources of investments, 1997, percent

Sources	Krais (Provinces)	
	Primorskiy	Khabarovskiy
Federal budget	12.9	17.8
Krais' and municipal budgets	5.1	10.0
Firms' own financial means	53.4	58.8
Loans	28.6	13.4
Total	**100**	**100**

Source: Social-Economic Situation in Russia. 1997. Moscow, State Statistic Committee.

Primorskiy Krai is the main RFE recipient of foreign investments; in 1997 it received $89.7 million, while Khabarovskiy Krai received only $34.6 million.

One of the main features of the S-RFE economy was a sharp rise of transport and energy rates. For example, during 1990-1997 the transport costs in the S-RFE increased by 22,107 times for railroad, 12,030 times for motorcar transport, 11,525 times for marine, and 19,462 times for air transport. Transport and energy costs are the most influenced factors that have brought local economy to their non-profitability. In 1997 49.8 percent of all enterprises in Primorskiy and 54.5 percent in Khabarovskiy Krai had negative profit (dead loss). These figures are increased during the current financial crisis.

One consequence of the financial system disorder is wide insolvency among all economic agents. It grows steadily and from 1993 to 1996 it increased by 19.1 times. Debt in 1996 in Primorskiy Krai was equivalent to 58.5 percent of gross regional product and 55.9 percent in Khabarovskiy Krai. The market of promissory note and other debt papers has grown.

As a whole one can conclude that the economy of the S-RFE is in very deep economic crisis today. Withdrawal from crisis is possible only after growth of sound demand and investment. However the S-RFE economy maintains its large industrial capacity and when the crisis ends it can, on one hand, become again an effective producer, on the other hand, represent a big consuming market.

3. Forest Resources, Forestry and Forest Products

Forest Resources

The area of forest lands in the Primorskiy and Khabarovskiy Krais accounts 69.4 million ha, and its extensive timber reserves are equal to 7.0 billion m^3 (Tables 1.1 and 1.2). The total area that is allocated for forest land use covers 85.6 million ha.

The structure of lands that are allocated for forest land use is very different in each *krai*. In Primorskiy Krai, lands covered by dense forests accounts for 95.6 percent, and in Khabarovskiy Krai - only 71.3 percent of total area. The share of afforested area in the first case is 1.6 percent, in the second case - 7.3 percent. Especially different are areas of non-forested lands: 2.9 percent and 21.5 percent, correspondingly.

According the Russian land classification such category as "lands not covered with forests" includes young man-made forests before crown closing, nurseries, sparse forests, burnt area, dead forests, cut area and waste lands. "Non-forest lands" include farms, roads, agricultural lands, but mainly swamps, sands and mountain deserts.

In both *krais* the majority of timber stock volume (66.8 percent in Primorskiy and 84.8 percent in Khabarovskiy Krai) accounts for forests dominated by coniferous species. Three of the most broadly distributed dominant species are: in Primorskiy Krai - spruce (26.6 percent of all stock volume), cedar (Korean pine - 24.9 percent) and oak (12.1 percent); in Khabarovskiy Krai - larch (53.8 percent), spruce (25.2 percent) and creeping pine (4.4 percent).

Forest density and timber volume increase from north to south of the S-RFE (Table 2.3) and vary among different species. They peak in Korean pine - broadleaf deciduous forests (over 700 m^3 of trunk timber per ha in the best tree stands). Average timber stock in all stands depends upon age structure and is about 1.1-1.4 times less than the average volume of mature forests. The ratio of lands covered by density forests to total geographical territory is about the same in both *krais*. Annual timber growth in Primorskiy Krai (1.5 cu.m/ha.year) exceeds that in Khabarovskiy Krai (1.2).

Table 2.2. Distribution of the Timber Stock According to dominant Tree Species, 01.01.98, million cubic meters.

Predominate Species	Krais (Provinces)		Total Stock Volume
	Primorskiy	Khabarovskiy	
Pine	0,3	116,7	117,0
Spruce	471,3	1329,3	1800,6
Fir	60,0	71,7	131,7
Larch	209,4	2833,7	3043,1
Cedar (Korean Pine)	440,9	114,3	555,2
Subtotal Coniferous	*1181,9*	*4465,7*	*5647,6*
Oak	214,4	32,2	246,6
Ash	41,0	12,0	53,0
Maple	0,7	0,9	1,6
Elm	15,0	3,2	18,2
Stone Birch	100,1	99,6	199,7
Walnut	0,6	0,2	0,8
Subtotal Hardwood Deciduous	*371,8*	*148,1*	*519,9*
White Birch	112,4	217,7	330,1
Aspen	23,8	53,2	77,0
Alder	3,0	4,6	7,6
Basswood (Linden)	62,3	40,2	102,5
Poplar	7,3	39,3	46,6
Willow	5,1	21,0	26,1
Subtotal Softwood Deciduous	*213,9*	*376,0*	*589,9*
Creeping Pine	3,0	231,4	234,4
Others	*	44,0	44,0
TOTAL	**1770,6**	**5265,3**	**7035,9**

* Less than 0.05 million m^3

Source: Data Base, Economic Research Institute, 1998

Table 2.1. Forest Lands in the S-RFE Based upon Forest Type,
01.01.98, 1000 ha

Forest Lands	*Krais* (Provinces)		Total area
	Primorskiy	Khabarovskiy	
Forest lands:			
Covered by density forests	*11335.3*	*52503.5*	*63838.8*
including man-made forests	52.4	145.4	197.8
Afforestated lands:			
young man-made forests before crown closing	9.0	86.4	95.4
Nurseries	0.3	0.5	0.8
sparse forests	47.5	2105.1	2152.6
burnt area	41.4	1461.1	1502.5
dead forests	21.0	392.5	413.5
cut area	25.3	388.6	413.9
waste land	41.4	928.5	969.9
Subtotal	*185.9*	*5362.7*	*5548.6*
Total forest lands	*11521.2*	*57866.2*	*69387.4*
Non-forest lands	*341.2*	*15822.8*	*16164.0*
TOTAL FOREST LAND USE	**11862.4**	**73689.0**	**85551.4**

Source: Data Base, Economic Research Institute, 1998

Table 2.3. Percentage of Forest Lands and Forest Productivity,
01.01.98

Indices	*Krais* (Provinces)		Average
	Primorskiy	Khabarovskiy	
Percentage of forest lands in whole geographical territory	68,3	66,6	66,9
Average timber stock, cu.m/ha:			
all forests	156	100	110
mature and overmature stands	178	143	149
Annual timber growth, cu.m/ha*year	1,5	1,2	1,3

Source: Data Base, Economic Research Institute, 1998

All forests of the S-RFE belong to mountainous category. Approximately two-thirds of Khabarovskiy Krai's forests grow on permafrost. The remainder in Khabarovskiy Krai and all forests in Primorskiy Krai grow where there are extended, seasonally frozen soils and accounts for relatively low average annual growth increments.

Distribution of forest area according age categories is about similar in both *krais* (Table. 2.4) though Khabarovskiy Krai's forests are some younger. About 42 percent of the forests in both *krais* are mature or overmature, so they are suitable for commercial harvest.

Table 2.4. Age structure of the area of forests, percent

Age category of stands	Krais (Provinces)		Average
	Primorskiy	Khabarovskiy	
Young	6,0	17,8	15,7
Middle Age	35,3	30,4	31,2
Premature	16,2	10,0	11,1
Mature and Overmature	42,5	41,8	42,0
Total	**100,0**	**100,0**	**100,0**

Source: Data Base, Economic Research Institute, 1998

Annual allowable cut (AAC) is aimed at sustainable forest management and appropriate harvesting methods (Table 2.5). In both S-RFE provinces coniferous stands are the primary harvest target although harvest practices are very uneven: some stands are over exploited and some are not harvested at all. When logging was the most intensive (1986) the figure reached 44 percent in Primorskiy Krai and 41 percent in Khabarovskiy Krai. But given the economic slump the current figure is much lower.

Table 2.5. Annual Allowable Cut and its Use, 1997

Indices	Krais (Provinces)		Total
	Primorskiy	Khabarovskiy	
Annual allowable cut, thousand cubic meters:			
Total	9674	27554	37228
coniferous forests	6009	22554	28563
Actual logging, thousand cubic meters	1189	3832	5021
Use of annual allowable cut, %	12,3	13,9	13,5

Source: Data Base, Economic Research Institute, 1998

From1965 to 1985 the AAC has decreased by 15 percent, in the next 11 years (1986-1997) it decreased by 40 percent. This is accounted for in part by a smaller volume of mature forest available for exploitation and in part by a growing awareness of social and ecological functions of the S-RFE forests.

The forests of the S-RFE play important environmental roles [Forests of the Far East, 1969]. They are a stabilizing factor on both the regional and global level: 26.3 percent of the total forest area in Primorskiy Krai and 12.5 percent in Khabarovskiy Krai are in protective status (1st group of forests), 0.8 percent and 1.0 percent, correspondingly, in commercial-protective (2nd group) forests. The remaining is commercial forests (3rd group). There is a growing awareness of the social importance of forests and of the role they play in recreation and public health [Glovatskaya, 1998]. These latter functions, as a rule, are provided in 1st group forests. From 1991 the forests with dominating Korean pine are regarded as specially protected forests.

A traditional view of the forest as a source of raw materials is now being questioned. Timber resources in the S-RFE are still great. Most species have been harvested at various levels and this led to a significant transformation of pristine forests into second growth forests. Although the forests are developed to a great extent they still retain natural features: artificial manmade forests make up only 0.3 percent, their age is not more than 50 years.

The forests of the S-RFE, however, can provide sustainable volumes of timber till now.

An important share of the RFE forest resources is presented by non-timber raw resources. About a thousand of vegetation types are medicinal, over 350 edible, and 240 melliferous and pollen providing. Over 400 of mushrooms are edible. Annual average rate of vegetative non-timber resources use is: nuts (Korean pine, creeping pine, hazelnut) - 1.3 million tons; berries (mainly cranberries, blueberries, red berries) - 1.5 million

tons; forest vegetables (fern, ramson and others) - 0.3 million tons; mushrooms - 0.25 million tons; medicinal-technical raw resources (eleuterococcus, aralia, wild roses and others) - 0.25 million tons [Sukhomirov, Izmodenov, 1995].

The S-RFE forests are inhabited by 39 species of fur bearing animals, 10 species of hoofed wild animals and about 100 species of hunting birds with total live-stock of 13 million pieces including 6 million pieces of wild animals and 4 million pieces of forest birds.

Russian Far East forests are of great nature protection value, they are main stabilizers of the region environment, and they play a leading role in water protection and soils maintenance. This is especially important for the unique Far East salmon school preservation.

The S-RFE forests endure still growing social pressures. Their resources use is linked with many centuries of aboriginal way of life. Almost complete rural population and significant portion of urbanites go in for berries (for both commercial and no-commercial use), mushrooms and nut-picking and also hunting. Forest recreation is very popular, especially in the vicinity of such big cities as Vladivostok, Khabarovsk, Komsomolsk-on-Amur, Ussuriysk, Arsenev and others.

4. Forest Policy and Administrative Organizations

Organization structure of the forest resource management was elaborated during period after the World War II and had before economic reform rather a clear and relatively simple scheme. It remains basically the same but with the reforms it became more complicated.

Horizontally it is divided into legislative, common executive and departmental verticals (Table 3.1). Juridically these three verticals covered all levels existing in the Russian Federation. However in fact the depth of their influence varied. Each vertical is divided according territory: the Federal levels the level of a Federation Subject (*krai*), a municipal level (*raion*, city, town, district, and village).

Leskhozes were and are the lowest independent units, which have some rights for forest use management. Further they are divided into forestry sub-units ("lesnichestvo") having no rights of forest use management.
As to the scope of given rights all the management verticals are similar to the upside down pyramids. The highest set of rights and the most differentiated distribution of functions executed by the personnel of the staff are characteristic to the highest level. With levels lowering the rights set decrease they are concentrated in hands of still fewer employees.

For example, in the most developed departmental vertical the wide pyramid bedding located at the top is the Federal Service of Forestry and its staff has many rights. On the contrary the peak of the overturned pyramid is a forester (the head of "lesnichestvo") who alone executed all management functions in real forest sites however practically he/she has in this relation no self-dependency except a choice of specific use areas. And even his choice became final only after approval by the higher instance - *leskhoz*.

A distinctive feature of the competence sharing between the levels in all relations including forest ones is a paradigm of powers delegating only from the top down. It means it is considered that the higher level of authority always has more powers as compared to the lower levels and includes in its competence all the powers of the lower levels. At the same time there exists no powers given exclusively only to lower management levels. The higher levels can always interfere into decisions of lower levels, to change the decisions or to cancel them, especially in the department vertical. In the executive vertical there is strong rivalry between the Federal Government and the *krai* administrations, so intrusion into responsibility of latter is not so easy as into department one.

The responsibility distribution among different levels and verticals is fixed by the Federal Forest Code that was adopted in early 1997. However this distribution is not very exact that makes gaps or cover plates, which used as by federal as by *krai* authorities for their preference.

Now the *krai* administrations and local legislative bodies - "Dumas" - try to usurp so big power as possible for forest disposal. The process is continuing especially in the endless weakening of federal authority.

Table 3.1. Structure of the Forest Resource Management

Horizontal level	Authority verticals		
	Legislative	Executive	
		Common	Departmental
Federal	Federal Assembly (2 chamber): State Duma and Federation Council[1]	The President of the Russian Federation[3]	-
		The Government of the Russian Federation[4]	Federal Service of Forestry ("Rosleskhoz")[5]; The State Committee of the Natural Environment Preservation ("Goskomecologiya")[6]; Ministry of Natural Resources ("Minpriroda")[7]; Department of Forest Industry as part of Ministry of Economy[8]
Krai	*Krais'* Legislative Duma[2]	*Krai* Administration: Head (Governor); Deputy Heads; Departments or committees of natural resource use and forest industry[9]	*Krai* Directorate of Forestry Service ("Upravlenie Lesami"); *Krai* Committee of Environment Protection; *Krai* Committee of Minpriroda
Raion (district), city	Municipal councils can establish local regulations in full accordance with federal and *krai* laws	*Raion* Administration: Head, Deputies, Divisions	*Leskhozes* (Primary Forestry Service units); *Raion* Committees of Environment Protection

[1] In case of law net gap the President of the Russian Federation can give a decree that has law force till elaboration this problem by the State Duma as law act.

[2] *Krai's* Duma works out any law however latter cannot contradict federal laws. In some cases the governor decrees have the power of law.

[3] He deals with forest and other natural resources not often. His last crucial decisions were made about the Federal Forest Code in early 1997 and about the Concept of Sustainable Development of the Russian Federation in April 1996.

[4] It has 4 kind of sub-units: 1) Ministry, 2) State Committee, 3) Committee, 4) Service and Agency.

[5] 4th rank. It has full competence and responsibility in respect of forest resources.

[6] 2nd rank. In the sphere of forest resources it only controls use and participates in AAC adoption.

[7] 1st rank. It has responsibility only in mineral and water resources.

[8] 3rd rank.

[9] The latter there is only in Khabarovskiy Krai administration.

5. Forestry

The Forest Service is in charge of a major share of forestry work and supervises work implemented by leaseholders (table 2.6). The local directorates of Federal Forest Service controls 98.5 percent of the total area forests in the Primorskiy Krai and 99.7 percent - in Khabarovskiy Krai. At the municipal level ("raion") the Forest Service is represented by the *leskhozes* that are the Forest Service units.

The volume of forestry work listed in Table 2.6 (that is thinning, salvage cutting, forest planting, fire and pest control, etc.) is inadequate to fully regulate the status and dynamics of the forest resources. Decades old Russian forestry practices and recent experience under the Soviet regime led to the formation of a well-defined forest resource use work (i.e. strong planning, financing and fulfillment of planned measures) and regulatory system. Though it has undergone certain conceptual and organizational changes in the last eight years, the system has remained basically intact. The main features of the system are:

- state ownership of forest lands;
- state distribution of forest resources (i.e. any allocation of forest resource use can be made only according decision of special state bodies);
- use of forest resources by production structures, often corporate or private ones in recent times;
  state inventory and control of forest resource use

Table 2.6. Forestry Indices, 1997

Indices	Krais (Provinces)		Total
	Primorskiy	Khabarovskiy	
Number of:			
Leskhozes	31	44	75
Lesnichestvos	126	161	287
Forest fees and penalties:			
Total, billion rubles	22.1	15.0	37.1
Average dollar per 1 ha of forest lands	0.33	0.04	0.09
Average stumpage price:			
Rubles per 1 cu. M	7.0	8.0	7.8
USD per 1 cu. M	1.2	1.4	1.2
Forest planting, thousand hectares	4.1	8.0	12.1
Transfer of young growth into forest covered lands, Thousand hectares	27.1	125.5	152.6
Thinning and salvage cutting, thousand hectares*	23.1	28.1	51.2
Thinning of young forests, thousand hectares	10.0	17.0	27.0
Aerial forest fire control, million hectares	8.4	52.6	61.0
Forest inventory, million hectares*	0.9	2.7	3.6
Forest plantations, total area, 01.01.98, thousand hectares:			
Forest plantations transferred into forest covered areas	52.4	145.4	197.8
Non-density plantations	9.0	86.4	176.4
Length of:			
Fire control barriers, thousand km	2.6	20.1	22.7
Fire control roads, km	143	22941	23084

* 1996. Source: DataBase, Economic Research Institute, 1996.

Earlier, the forest was a source of raw material mainly and this implied timber extraction. Now there is a call to manage the complex for all its functions, including social and environmental ones, to meet the multiple use mandates. However, most of the attention, as earlier, is placed on timber harvest. There is some of timber harvesting, hunting and fishing regulations. Forest use fees should function as a regulator binding the social, ecological and raw material functions of the forest [Pankratova, 1998]. These have, however, failed to serve such a purpose because of their insignificant amount.

New market relationships mean that *krai* administrations have now (in comparison with the Soviet era) more power. The very new phenomena are local legislation [Sheingauz, Nilsson, Shvidenko, 1995]. In both *krai*s certification and licensing of forest users has been introduced at the first on the local level and after federal Forest Code (1997) - on the federal level. However there are often violations of forest use rules, sometimes serious ones. The Forest Service has been reformed twice in the last ten years, the meager salaries paid to forest guards, salary insolvency and staff reductions perpetuate the lack of forest control.

Forest fire patrolling, which depends upon leased aircraft, is a problem. Due to limited budgets, more damage occurs from natural fires. Despite nearly 50-years of artificial regeneration efforts, the share of man-made forests remains very low in both of the *krai*s.

Such crisis situation is leading to disorder of the S-RFE forest management, is manifesting as a distressing tendency in spite of the value of forest resources and its products continues to grow in Pacific Rim countries.

In general, favorable growth conditions and successful natural regeneration is a natural basis to shift to multiple use management that is accompanied by ongoing maintenance and rehabilitation of forest potential to increase productivity. This is the only way to guarantee a sustainable forest sector. Regional Forestry Service dynamics in the last ten years have not, however, brought the industry any closer to sustainable management. Much of what was earlier achieved in forest protection and control is now, in situation of crisis, lost, noticeably undermining the local forest resources potential.

6. Forest Industry

The forest industry is the leading one in both *krai*s, especially in Khabarovskiy Krai. In many country localities it is the major factor in creation and support of towns and villages. The work of many sectors of the *krai*s' economy is dependent upon the services and manufactured goods provided by the forest industry. It also accounts for a large portion of *krai* exports. That is why a local authority paying special attention to the forest industry that is largely neglected by central authorities.

The structure of the S-RFE forest industry is typical for a raw material producing region. Timber production is best developed, commercial timber is almost always extracted to the detriment of forest resource conditions. This strategy is at odds with both the strategic goals of industry development and environmental demands.

The specific features of current forest industry in the S-RFE economy are [Pilipenko, 1998; Problems of the Forest sector Development, 1984; Sheingauz, Karakin, Tyukalov, 1996]:

1) an end to the most easily accessible, commercial exploitable forest tracts and a significant transformation of forest resources in developed areas;
2) growing disparity between methods and technologies for commercial forest resource exploitation and new approaches to forest land use, including growing awareness of the environmental value of forests;
3) radical changes in the system of ownership and management in the industrial sector, the rise of new contradiction between private production and the state-owned forest resource base;
4) long and repeated reorganization process;
5) dramatic increases in operating expenses; the loss of competitiveness for regional forest industry products;

6) rapid shrinking of inter-regional market;
7) loss of the all-Russia market;
8) decreasing of world market share due largely to an inconsistent timber export regulation policy that was accompanied by a drop in prices in the principal foreign market - Japan;
9) a nearly complete halt in reforestation efforts;
10) increased environment constraints.

In 1992 organizational restructuring of the forest industry management was initiated. Almost all state forest industry enterprises have been transformed into joint stock companies. This led to formation of numerous, full-fledged entities operating in market conditions. As a result the forest industry decentralization process had occurred. At present about total industrial output is produced by enterprises with private and mixed ownership: in 1997 the private share in total forest sector output was 97.8 percent for Primorskiy Krai and 98.0 percent for Khabarovskiy Krai.

Economic reforms and the crisis in 1992-1997 forced changes in the production structure of the forest industry. Prior to 1992, round wood output were 40.3 percent of total industry production; wood processing was 41.3 percent; pulp and paper production was 16.0 percent and the forest chemical industry contributed 2.4 percent. In 1997, round wood was 85.3 percent of total production (Table 2.7). All forms of production especially processed wood, declined in this period to a large degree.

Table 2.7. Forest industry production in the S-RFE, 1997

Products	Krai		Total
	Primorskiy	Khabarovskiy	
Commercial timber, thousand cubic meters	898	3160	4058
Lumber, thousand cubic meters	45	206	251
Chipboards, thousand cubic meters	-	89	89
Fiberboard, million square meters	-	3	3
Plywood, thousand cubic meters*	0.5	-	0.5
Cardboard, thousand tons	-	3	3

* 1996. Source: Data base, Economic Research Institute, 1998.

The rapid obsolescence of production assets was not the least factor of the slump. Investments for refitting, remodeling and expanding enterprises have been very limited in the past few years. Construction of additional timber extraction capacity has virtually halted, except for joint ventures with foreign partners.

Forest enterprises currently operate almost exclusively on a self-financing basis. However cost increases make timber production less profitable. Operators now find it more profitable to export round wood abroad than to sell it to local sawmills since that latter are unable to buy timber due to its high price. High timber prices have shut down the most part of wood processing facilities and sawmills.

The wood products are highly dependent upon transportation costs and price of motor fuel. These factors add additional costs to the price of wood products. The abolition of state support to purchase primary production facilities (machinery, equipment, etc.) and a lack of enterprise funds for plant modernization, for scientific and experimental construction work, is slowing the technological progress of the timber industry. In this case modernization means change of old technologies and equipment for new ones.

A lack of possibility to convert raw timber into high quality wood products to meet consumer demands hinders structural reorganization of the industry. Fixed assets of most enterprises are dilapidated and obsolete, rolling stock is worn out and are a danger to both employees and the environment. Obsolete technologies and equipment prevent reduction in labor and material expenses. Labor productivity in the best firms remains 2-3 times and in the average firms 10 times less than in competing countries.

Very new moment for local forest industry is presence of foreign capital that was prohibited former time. At first step it penetrated through joint venture establishing and at present time it is based on enterprises with pure foreign investments. Unfortunately as joint venture as pure foreign enterprises couldn't escape Russian economy crisis and many of them either shut down or have so small profitability that are near bankruptcy.

The current production slump is structural in character. The character of the industry is shifting away to "heavy" products; the resource extraction increases with a simultaneous decreasing in raw material processing. The latter has traditionally been low in the forest industry of the S-RFE.

Former large logging firms - "lespromhozes" - are being replaced with many small firms. The number of logging operators has increased by 3.5 times. At the same time structural modifications and a decline in forest industry production caused a loss of jobs.

As a whole the local forest industry is in very deep economic crisis. It decreased the press on forests during last 10 years. However in operation places the forest destruction became more intensive.

Three major issues must be resolved for the forest industry to come out of its current production slump: capital investments, reduction in transportation tariffs and price cuts for energy and energy carriers. These challenges can be addressed in a context of the total economic and financial stabilization in the S-RFE as part of Russia. At the same time, the forest industry, as a specialized branch, can be used to contribute, once a favorable climate has been created, to regional economic growth.

7. Timber Trading

Before the economic crisis 40-45 percent of total wood products were consumed within *krai* borders, 25-30 percent were removed in other regions of former USSR and 30 percent were exported abroad. The inner trade in that time under planned economy used allocated prices and allocated linkages, so it was not real trade. On the contrary timber export existed under real international market conditions [Kakizawa, 1994; Sheingauz, Selyuga, 1998].

In pace of crisis the transportation in other Russian and CIS regions have became impossible because sharp rise of transport tariffs. After that the inner regional market very shortened first of all because stoppage of construction. So now the main market for the S-RFE forest industry is foreign one especially Japanese market. Now there are not exact figures for share of wood commodity that are exported abroad. According different estimation it is about 50-60 percent and others are consumed within *krai* territories. The export of forest products is a single way that many forest sector enterprises are able to maintain production (Table 5.1).

Table 5.1. Export of Wood Commodities, 1996 and 1997

Commodities	1996			1997		
	Krais		Total	Krais		Total
	Primorskiy	Khabarovskiy		Primorskiy	Khabarovskiy	
Commercial timber, th. cu.m	1428.6	4582.4	6011.0	1607.8	3901.2	5509.0
Lumber, th. cu.m	14.9	185.6	200.5	14.5	78.6	93.1
Technological chips, th. tons				50.5	19.5	70.0
Cellulose/pulp, th. tons	-	3.2	3.2	-	-	-

Source: Statistical handbooks for Primorskiy and Khabarovskiy Krais, 1997.

Exports have a very simple structure and consist primarily of round wood (80 percent of total exports) and sawn lumber. The main importers of the Russian timber are the Northeastern Asian countries: Japan, China, Republic of Korea, etc. Japan consumes about 60-70 percent of the S-RFE exports.

The main changes linked with economic reforms (after 1992) and the economic crisis are:

1. Inner market of wood products became free market in reality.

2. Long current downward trend in the S-RFE timber exports is partly explained by increase of domestic costs, transport costs and unwarranted competition among exporters. As result timber produced in Siberia, where energy is less expensive, is successfully displacing S-SRFE timber exports to Northeast Asia. The other explanation is cutting down the Northeast Asian timber market.
3. The creation of enterprises with foreign investments (EFI) in the form of joint ventures (JV) or full foreign ownership. The number of EFI is not big. In 1997 in Khabarovskiy Krai only 5 harvesting and 13 wood processing EFI were really active. In 1996 in Primorskiy Krai the share of EFI in total wood exports was 8.5 percent.

The JVs with Japanese capital are the foreign trade leader among EFCs in the S-RFE. These enterprises boast modern machinery, expand and diversify regional exports and their operations are more stable in comparison to other JVs. In 1991-1993, a quantitative growth in the number of registered EFI was achieved mainly due to an increased number of enterprises with Chinese capital. The activity of South Korean companies in the S-RFE competes with China and Japan. US investors have of late stepped up their activity in the S-RFE forest sector. They appear interested in implementing a number of large-scale projects in export and infrastructure areas mostly in the S-RFE. There are also JVs with Finland, the Philippines, Australia, Great Britain, Hong Kong, Liechtenstein, Singapore, etc. Two big lots were leased in 1996-1997 in Khabarovskiy Krai by a Malaysian company.

PART 2: UNDERLYING CAUSES OF DEFORESTATION AND FOREST DEGRADATION IN THE RUSSIAN FAR EAST

1. Historical Perspective of Forest Use

If one makes an overall review of the S-RFE forest sector the following general features emerge [Krechetov, Chelyshev, Sheingauz, 1975]:

Positive factors

- large-size forest resources and large AAC that aren't used;
- successful natural reforestation, self-rehabilitation;
- large areas that can be used only for forest productivity because their mountainous relief;
- features of old-growth in the most part of forests, big share of mature and overmature stands;

Negative factors

- relatively low natural forest productivity;
- non-effective forest management, especially fire control;
- lack of forest infrastructure;
- unsustainable type of forest use, implementation of outdated techniques and technologies.

It is possible to conclude that both *krai*s have a good natural capacity to develop the forest sector, increase output of timber as well as non-timber products, social and ecological services. But as in the past investment is needed. Unfortunately the current Russian financial system and situation in the forest sector don't promote any investment. However there is no doubt that after crisis ends one can expect multiple growth of the forest sector activity, because in those situation the domestic market will demonstrate large demand.

2. A Historical View and Present State of Forest Resource Transformation

Agricultural Development

The S-RFE is a region of not very bygone development. During the Middle Ages only aboriginal tribes inhabited the territory. In most cases their household level was similar to that of late the paleolithic era. Siberian Russian people penetration began from the middle of 17th century but it was sporadic. From 1854 planned and constant development of the territory was realized.

One of the primary goals of migration was agricultural development of the vast land resources. Agriculture was not absolutely new phenomenon for the S-RFE territory. It originated late in Neolithic and in medieval states Bohai (5-7th centuries) and Dzhurdzhen (7-13th centuries). That time agriculture was developed in some valleys and flatlands. Limited by the territory agriculture influenced the forests greatly: many stands were burned for new fields, frequently fire escaped control and large areas appeared enveloped in flames. The scientists relate multiple oak stand establishments just with this phenomenon.

Those time husbandry caused primary anthropogenization of all landscapes and first of all forest landscapes in Prikhankaiskaya flatland (southwest of the Primorskiy Krai) which remained and even increased nowadays. The anthropogenization meant that virgin landscapes especially forests lost they virgin flora that gradually substitutes for secondary and then tertiary vegetation.

After medieval states were defeated by Chingis-han up to the mid of 19th century agriculture, practically disappeared and Russian agricultural development commenced at that time became a powerful factors in land utilization and regional natural resources alteration.

Settling directions from mid 19th century went along the Amur River, the Ussuri River and along the Sea of Japan mainland rim. Consequently the railroad appeared to adjoin the Amur and the Ussuri rivers.

At that time forested lands were considered as unused. In official documents they were frequently named as "deserts" or "waste lands". It conformed to the main development goal and widely spread view that the only valuable land use was agricultural one.

The first settlements were established on open forestless lots. But it immediately became evident that during summer monsoon period those lots were overmoistened and even flooded and product output was not guaranteed. It appeared necessary to move residential areas and the fields onto more elevated lots occupied by forests. And certainly this caused forest demolishing.

Gradually it became evident that the most suitable sites for agricultural fields are gentle knolls with southern exposure. It is natural that the stands on those sites were rich and productive. Thus agriculture immediately caused forests rooting out which was spreading constantly.

Shifting agriculture was the most common. It involved clear-cutting the stand, wood drying on the ground and wood burning to provide arable land. In some years of field utilization it was left for "rest". A site burning was implemented to provide fields and also dry grass on hay-moving areas. As usual it took place in the late autumn or early spring when forests are full of dry grass and fallen leaves. Very often it went from field to surrounding forests and initiated forest fires[2]. In most cases they occurred in springtime when peasants were busy with sowing and impossible to mobilize them for fires controlling.

The continuous process of ploughing up fields, leaving them and ploughing up new ones resulted in relatively vast area development. Gradually they underwent into degradation and in some case settlements were abandoned and people moved to other places because the productivity of surrounding lands decreased significantly.

The lay land system gradually (before the World War I) was replaced by three-field system and further by multiple-field, but finally it disappeared only in 1920th.

The Migration Board aspirations for lands agricultural development coincided with goals of the very migrants. Migration mass structure began to change quickly the list of exodus points increased more and more. This is turn defined migrants attitude to the forest.

Primary migrants from Siberia brought with them a husbandry type adapted to forest landscapes. Accordingly they were skillful in forest products utilization: hunting, berries and mushrooms picking, wood use for construction. They used those habits in new places. In agriculture they used systems adjusted to natural-climatic conditions of forest zone. More late migrants from central and northwestern Russia, Belorussia, northern Ukraine had analogous attitude to forests and lands.

The habits of migrants from southern parts of Russia and Ukraine, from Moldavia and Korea were different. They were typical dwellers of steppes or forestless areas. Frequently they didn't know forest, didn't comprehend it and were even afraid of the forest. Their agricultural systems (except Korean one) were oriented on dry hot summer, which didn't coincide with monsoon conditions of the S-RFE. Thus forests outrooting and arable area expansion (Table 4.1) inevitably accompanied agriculture development.

[2] In spite of very strict prohibition such behavior remains in many Far Eastern places till now. In case of dry summer that occurs once during 10-13 years they turn into conflagrations destroying forest on dozens thousand hectares.

Table 4.1. Sowing areas and rural population dynamics in 1860-1997

Years	Sowing areas, thousand hectares			Rural population, thousand persons		
	*krai*s		Total	*krai*s		total
	Primorskiy	Khabarovskiy		Primorskiy	Khabarovskiy	
1860	-	1	1	6	10	16
1900	100	14	114	100	28	128
1917	304	34	338	299	61	360
1923	283	32	315	369	85	454
1940	332	91	423	419	260	679
1960	571	169	740	453	294	747
1980	742	280	1022	479	324	803
1990	742	268	1010	512	387	899
1996	558*	232*	790*	490	303	793

*1995. Source: Data Base, Economic Research Institute, 1998

However up to mid of the 1870th the first towns were formed, factories and plants were built and industry was established. Wood was in demand not only for housing construction, utensils and tools manufacturing, buildings heating but also for industrial item production, factories and transport fuel. It became popular goods which in commercial logging - forest industry was established. From that time forestlands were considered not only as suitable for agriculture but also as independent productive and profitable objects.

Territory Development with the Forest Industry

Logging operations were carried out mainly in winter after snow cover fixing. That operations involved mainly peasants who worked in their fields in summer but in winter they either applied for a job to an employer or logged timber themselves for further selling it (as a rule by single logs) to processing plants representatives. Large-scale logging enterprises almost did not exist but small ones were multiple.

Cuttings were primarily high-grade-selective and of low intensity, they did not change forest cover so significantly as clearing for agriculture because their volume was relatively small (Table 4.2).

Table 4.2. Timber logging in 1860-1996, million cubic meters

Years	Krais (Provinces)		Total
	Primorskiy	Khabarovskiy	
1860	0.05	0.1	0.15
1880	0.2	0.4	0.6
1900	1.5	1.0	2.5
1917	1.8	1.5	3.3
1923	2.3	1.1	3.4
1940	3.1	8.0	11.1
1960	4.6	7.8	12.4
1980	6.1	13.7	19.8
1986	6.4	15.1	21.5
1997	1.2	3.8	5.0

Source: Data Base of Economic Research Institute, 1998

Of course outrooting of forests for agriculture and settlements went on. But now the best logs from cleared lots were not burned but sold elsewhere. Many cases were reported when standing timber was sold from

the lots set aside for clearing and the prices were very low. So just before the World War I the forests on peasants and Cossacks allotments appeared to be completely destroyed.

In 1917 the October Socialist revolution provoked Civil war and Intervention lasted in the S-RFE up to 1923.

By the end of 1920th the main event in industry and then in agriculture policy appeared to be large-scale specialized enterprises establishing which were considered as more effective. Agriculture and logging began to loose mutual ties and to move away from each other in their activities. Forest industry forms a contingent of regular employees.

Generally speaking agriculture and settlement oncoming on S-RFE forest lands is uneven in time. It is a fluctuation process having not less than 5 peaks:

1) beginning of 13th century - Dzhurdzhen era;
2) prerevolution years (1915-1917);
3) years before World War II (1937-1940) - industrialization era;
4) late in 1950 - early in 1960th - Khrushchev's virgin soil developing;
5) 1975-1985 - development of Baikal-Amur railroad zone.

Fluctuation is made of increasing and braking of forests clearing and cutting. The braking happened at different times: after Dzhurdzhen state ruining, during the Civil war. After the World War II big cities (Vladivostok, Khabarovsk, Komsomolsk) and their industry developed fast mostly due to rural population. As a result many villages appeared deserted and the fields around overgrown by forest. The last braking one can see in time of current economic crisis.

At the same time the logging operations were intensified and in many areas high-grade selective cutting were replaced with clear cutting.

In spite of the relatively long development period the borders between agriculture and forestry lands use are frequently remain at that allocation where the Migration Board defined them on the turn of the 19-20th centuries. Forests along these borders can be named "marginal". They undergo the strongest influence and are very unstable in their status. For just here lands use type changes the most often: outrooting and ploughing are replaced by natural forest overgrowing or artificial forests. The latter are sometimes again outrooted before economic crisis.

Rural (including forest camp towns) population was and remains the largest firewood consumer. In fuel balance of rural regions firewood still plays an important, often predominating role while wood is currently almost not used as fuel in the cities.

During all history of forest development the main destroying factor was not logging but forest fires. They are considered in the Report 2, which are devoted this topic.

Mineral extraction is one of other destroying factors also. However it is more significant in the northern part of the RFE but in S-RFE it doesn't play big role.

Forest Dynamics under Development Process

During development process the forests suffered great losses. Reliable assessment data for past years don't exist but according reconstruction in mid of 19th century 80-85 percent of S-RFE area was covered by forest. During the last 37 years (a period of rather accurate information) this index became stable and fluctuated in the range of 67-70 percent.

Exhausting forest use that exists many decades resulted in the RFE forest resources transformation, which manifested in the fact that they have changed as quantitatively as qualitatively. The most accessible and often the most valuable resources are exhausted. Remaining ones have lost the original virgin features. They are often secondary forests, impoverished, less dense and so on. Because of mismanagement, extensive utilization transformation rate has appeared to be higher than it could be proceeding from the development level. At the

same time use methods practically remained the same as were used for originally undeveloped resources. They were only provided with still more powerful equipment and still more destructive technologies. These methods do not correspond to the new state of the forests, the gap is still widening and result is one of the main problems of regional forest use.

Table 4.3 illustrates that forest dynamics during the last 10 years was controversial. Its main factors were:

1) Heavy forest fires in Khabarovskiy Krai in 1988 that manifested in figures of 1993[3]. In spite of natural reforestation the losses of forest area are demonstrated in all figures of 1993.
2) Decreasing of cut area. Economic crisis results in slump of cutting. So cut area continued to decrease during total period and this trend is in contradiction with previous factor (heavy fires).
3) Mighty natural reforestation that also act parallel to factor 2 and contra factor 1.

In spite of such controversial it is possible to find some trends:

1) increasing of forest covered area[4] i.e. such difference as: NATURAL REFORESTATION - FIRES - CUTTING + CUT AREA DECREASE > O;
2) decreasing of timber stock volume because changing of mature stands to young ones that take place under two factors:

- after fires the mature especially overmature stand died off as the first because they are weakened;
- natural reforestation produces young stands;

3) more fast increasing of deciduous forest area than coniferous ones because in the most cases the coniferous stand suffers from cutting and fires but the young stands arises at the first stage as deciduous ones and at the second stage the coniferous trees are settled under deciduous layer.

Specific features of regional forest use have shaped in the course of historical development.. They are as following;

1. Noncomplex use of some rather limited in structure and quality resource, i.e. such use that utilize very narrow set of forest resources, usually only one (timber, grass, needles), and as a rule not full amount of this matter. For instance, only qualitatively best softwood timber is harvested during main logging operations, utilization of the rest is very low. Hence in selective economic cutting only 35-50 percent and in clear cutting only 65-80 percent of usable stock is felled [Krechetov, 1966].
2. Low rate of working and processing of timber. Usually only 30-35 percent of harvested timber was processed in the S-RFE, now in pace of economic crisis these figures are 10-15 percent.
3. Using of technologies not corresponding to the advanced world level.
4. High losses of raw resource in harvesting, transportation, processing and storage. Only about 40 percent of harvested timber are converted into finished product.
5. Minimal environment limitations. In spite of big production slump real reduction of ecological impact caused by forest harvesting was not so big and caused by forest fires increased.
6. Weak interdependence (and often even direct competition) between forest industry branches and also between forest and non-forest (mining, agriculture) industry branches results in economic and social losses.
7. Low prestige of forestry professions, inadequate salaries and low rate provision of those working in the forest with social infrastructure. Forest resource use fee is very low. Direct payments are not that significant as to stimulate an industry unit to forest resources saving.

[3] The inventory has not been updated after the catastrophic fires of 1998.

[4] Very sharp increase of forest covered area in Khabarovskiy krai during 1993-1998 is result of new and more accurate inventories in the northern part of the *krai*. If these data are excluded other parts demonstrate moderate increases atthe rate of 2.5 percent per 5 years.

8. As common result of given above the significant transformation of forest resources not so big in forest area as in structure and quality.

Table 4.3. Forest Dynamics in the S-RFE, 1988-1998

Indices	Year	*Krais* (Provinces)		Total area
		Primorskiy	Khabarovskiy	
Forest lands, thousand hectares:				
Covered by density forests	1988	11160	48837	59997
	1993	11240	47319	58559
	1998	11335	52504	63839
including man-made forests	1988	38	106	144
	1993	43	108	151
	1998	52	145	197
Forest covered lands by species group:				
Coniferous	1988	6497	36483	42980
	1993	6458	35440	41898
	1998	6328	39257	45585
Deciduous	1988	4624	6491	11115
	1993	4730	6265	10995
	1998	4955	6923	11878
Afforested lands:	1988	426	10838	11264
	1993	303	10218	10520
	1998	185	5362	5547
Total forest lands	1988	11595	59789	71384
	1993	11554	57621	69175
	1998	11521	57866	69387
Non-forest lands, thousand hectares	1988	336	17274	17610
	1993	335	16263	16598
	1998	341	15822	16163
Timber stock volume, million cubic meters	1988	1749	5324	7073
	1993	1769	4994	6763
	1998	1771	5265	7036

Source: Data Base, Economic Research Institute, 1998

3. Consideration on Direct and Underlying Causes of Forest Transformation in Two Territories

The direct and underlying causes of forest transformation create very complicated systems. Most of them are described above. They become apparent in pace of forest use and create social and environment problems.

Environmental problems connected with S-RFE forests concern not only locals but also the world at large. The world community sees the forests of the S-RFE (like Siberian forests) as not only a source of world class timber but also as an unrivaled carbon sink that can slow expected global warming [Negodyaev, 1998].

The protection and regeneration of S-RFE forest resources is a social issue of world proportions.

Origination of Environmental Problems

Overwhelming majority of environmental problems originate in the process of forest resources use. Some of them were mentioned above. The main ones are:

- inefficient use of timber resources at logging site as well as in processing (loss amounted around 25-30 percent of harvested wood stock);
- obsolete, non-ecological technologies and equipment for cutting;
- large area of wild forest fires (annual average 400,000 ha), in such catastrophic dry years as 1954, 1961, 1976, 1988 and 1998 the annual burnt area amount 1-2 million hectares is event of world significance;
- transformation of developed forest resources, losses of their quality and, sometime, productivity;
- pollution of waters;
- soil erosion and degradation;
- disturbance of fish resources.

Strategic Solutions

The strategic way to solve the problems is the modernization and ecologization of all use methods, complex using of forest-resource potential, which provides agreement in various raw materials and environmental forest use. However till now different kinds of forest use are characterized by poor interrelation and often by real competition which cause high economic and social losses. Practically in the history of the S-RFE was not given an example of complex territory and forest development.

The value of environmental and social elements of forest resources will grow fast. At the moment environment disturbances related to forest use and in the first hand to contradictions between forest resources potential status and its development methods present one more serious problem which is getting more and more aggravating.

Solving Directions

Currently one can see legislative regulation intensification. However it is formal in the most part and not implemented in real activity. So a real decrease of environmental degradation does not yet occur.

To work out problems the following measures were proposed:

- to attract specific ecological technologies and investments for these technologies[5] , in particular foreign investments that can turn to be one of the most important integration channels in Northeast Asia [Natural Resource Use, 1997; Natural Resources and Environment, 1995];
- to provide necessary legislative basis and its implementation for long-term nature resources development which will cause a user to take interest in forest resources reproduction and also for management and control providing of resources use while meeting ecological demands;
- to provide ecological standards and regimes of forest resources use [Chelyshev, Makova, 1998];
- to develop efficient use control system;
- to develop a system of interests and actions agreement for state and private structures, central and local governments at all the stages of development and implementation of forest resources use projects;
- to use such current methods as ecological certification, exchange by carbon emission quotas, etc.

[5] The term "technologies" is used to mean a set of methods, modes, machines and devices that make up an integrated procedure of forest resource extraction and processing.

Measures Set

Unfortunately the deepening of economic crisis does not give any opportunities for implementation of new measures. On the other hand the end of the crisis will demand new technologies on the basis of new equipment. It can give chance to change the type of forest use.

According the RF President's Decree Russia must shift to sustainable development. In forest terms this concept are very close to multiple use of forest resources. An effort is made below to formulate suggestions that will allow promoting the process of regional sustainable (multiple) forest use shaping:

- Purposeful reorganization of the whole system of forest use, transition from extensive-exhaustive type of forest use to intensive type allowing to involve various types and qualities of resources into operation. Shifting to complex systematic but not partial intensification, to establish active system of multiple forest use in the S-RFE based on the principles of constancy and inexhaustibility [Commentary, 1998].
- Sophistication, extending and detailing of forest use policy in the S-RFE; combination of long-term rational goals, wise strategy and flexible tactics. Departure from traditional straightforward frontal territory and resources development. Combination continuous development with spotty one. Development commencement does not necessarily mean raw resources extraction and utilization of only un-processed raw materials. From the first step they must be processed and perfected to the semi-consumed or consumed shape.
- Recognition of the fact that in conditions of absolute value growth of renewable resources and their intangible resource component the significance of forest resources will remain high and should be utilized while preserving economic and environmental conditions. The goal ultimately is to increase productivity of all resources types.
- Gradual achievement of universal environmental safety of forest use. General transition to resource conserving and environmentally safe methods which simultaneously provide social and economic sustainability of forest use. Improvement of regional forest use to organizational and technological levels comparable with levels in adjacent developed countries.
- Transition to methods and modes of forest use which completely conform to new transformed status of forest resources.
- State support of the mentioned changes in general and also of the most economic and socially significant projects of forest use at least at the stage of the regional economy reorganization. Direct (subsidies and favorable credits) and indirect (tax and custom privileges, privileges in resources payments) finance supporting. Establishing of the regional system, preferably in form of specialized banks, which will allow to finance forest units in utilization and reproduction of forest resources, to provide credits including loans on resources mortgage, to accumulate payments for resources and also to register subsidies, loans and mortgages. Using of foreign experience for organizing such system.
- Compiling and implementation of system of payment for forest resources, which would really influence the rationality of their use regulation. Implementation into practice real prices for forest resources to provide transition of new economic system and especially aspiration for joining a common system of NEA nature use. It means a real market of forest resources inside the S-RFE should be formed and will be integrated into the international market.
- Extensive coordination of transition problem to real sustainable forest use with social and political problems. Competent and not preconceived interpretation of forest use issues in mass media. Broad participation of the population in important decisions on forest resources use.
- Obligatory social-ecology-economic assessment of the projects. Preferential licenses allocation for the projects providing complex development of natural resource potential of the territory and also obligatory including raw resources processing and resources reproduction. Commitment of projects development on the basis of all the resources complex use principles and also sustainability of renewable resources based on advanced methods and technologies of extraction. Strict interdiction of the enterprises activities that ruins environment beyond the accepted standard limitations.
- Compiling of harmonious and ramified system of laws and codes on nature use both on federal and local level, introducing into them many types of property in forest resources. Clear legislative formulation of separation of responsibility in resources management according to authority levels and compiling on this basis an object list for resources management in the frames of forest resources cadastre.

- Establishment of a new system of use standards which consider real status of forest resources and used technologies and also allows to change standards automatically in case of development methods and technologies changing. Developments of corresponding methods of allowable use estimation.
- Establishment of strict, harmonious and obligatory control system for forest resource uses which will exclude both unnecessary regulations and arbitrariness opportunities when any bureaucrat can make decision not according laws or common sense but according his/her will or private interest.
- Basing of the system on modern technical means and special financing formed by users' fees to a special fund.
- Expanding of scientific researches and machines designing for regional forest use i.e. such machines that are adjusted to local conditions of forests soil relief, etc.

Necessity of Restructuring

The current economic crisis creates an opportunity for fundamental forest management changes, since in order to overcome this crisis the industry must modernize. The crisis is also an opportunity for the industry to renovate its system to comply with the new forest resource base. If changes do not take place, recovery from the current crisis will be neither complete nor long term.

An essential role in the renovation and development of the forest sector is the social-ecological component of forest resource management. One must understand clearly that without forest industry restructuring it is impossible to solve ecological and social problems. Such was poorly considered in earlier times and even less attention has been paid to this factor in recent days. The continued promotion of unsustainable forest use practices is even less acceptable now. This is yet another weighty reason for changing the approach to forest resource development. Unless significant structural reorganization and technical refitting of current operations takes place, the industry will find it very difficult to achieve the changes necessary to effectively end the current crisis. Changes in forest sector structures are long overdue. Technical refitting of production facilities, especially to make better use of low value timber, has long been discussed. Current equipment needs to be replaced by modern, highly automated, ecologically safe equipment. This will provide an opportunity to introduce new timber harvest technologies and new forest policy as a whole.

An integrated approach is an opportunity to develop new organizational and operational forms that lead to structural changes resulting in dynamic and effective management of the forests. Systemic changes in industrial forest development methodology, in logging technologies and equipment must take place. This will assure a genuine shift to sustainable forestry by turning timber enterprises into integrated units operating on a permanent, and not short-term, basis. This approach is one of the major ways of addressing the economic, social and ecological challenges facing the forest sector.

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