

STRUCTURAL CONTEXT OF FOREST LOSS IN THE SOUTHERN PART OF THE RUSSIAN FAR EAST

A SYNTHESIS REPORT OF IGES FOREST CONSERVATION PROJECT ON THE RUSSIAN FAR EAST



Institute for Global Environmental Strategies



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September 18, 2000

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1. INTRODUCTION

The Russian Far East (RFE) has long been regarded by the central government in Moscow as a timber resource base. As a result, forest resources have been exploited for timber, especially the most accessible locations with valuable resources (Newell & Wilson, 1996; Kakizawa, 1998a). After the collapse of the Soviet Union, the exploitation of timber resources accelerated, causing valuable forests—including mature coniferous and hardwood broad-leaved forests—to decrease both in area and volume (Kakizawa, 1998a; 1998b). Extensive harvesting of these valuable resources expanded the affected area to include remote forests; frequently occurring forest fires have worsened conditions even further in recent years (The World Bank, 1997; Kakizawa, 1998a).

These forests and resources are important globally, regionally and domestically. On the global and regional scales the forests of the RFE are very important for preserving biodiversity including endangered species, for stabilizing climate change and for providing a long-term supply of timber resources. Forests in the region have also played important roles in the regional economy, as a base of the region's social structure and environment, and as the basis of livelihood for indigenous people.

2. FOREST RESOURCES AND RECENT CHANGES

During the process of economic development the forests have suffered great losses. Reliable data for past years are not available, but according to estimates, in middle of the nineteenth century 80 to 85 percent of the southern part of the RFE (S-RFE) area was covered by forest. During the last 37 years (for which rather accurate information is available) this ratio was stable and fluctuated in the range of 67 to 70 percent.

Generally speaking, the expansion of agricultural and settlements on S-RFE forestlands was uneven over time. Clearing and logging of forest in the region have increased during at least six peaks of activity (Table 1):

- 1) Dzhurdzhen era (beginning of 13th century);
- 2) pre-revolution years (1915-1917);
- 3) industrialization era (before World War II, i.e., 1937-1940);
- 4) Khrushchev's virgin soil developments (late 1950s to early 1960s);
- 5) development of Baikal-Amur railroad zone (1975-1985); and
- 6) current Economic Crisis (1992-present).

Up to the middle of the nineteenth century when the settlement of Russia started, only aboriginal tribes inhabited the territory and forest development was limited (**Box 1**). Before that time, forest loss had occurred due to occasional burning to clear land.

In the territory substantial forest conversion into farmland began in the middle of nineteenth century when czarist Russia launched efforts for full-scale settlement in the area. From that time until the twentieth century, forests that had gentle knolls with southern exposure were developed for human settlements and agriculture. This certainly caused forest destruction. Wood was also harvested not only for housing construction, utensil and tool manufacturing, and building heating but also for industrial production, factories and transport fuel. However, in the beginning of the twentieth century large-scale logging enterprises were rare but small ones existed and they conducted primarily high-grade selective and low intensity logging. Thus the impact of logging on forest cover was less significant than the impact of clearing for agriculture.

Table 1. Logging areas and rural population dynamics in 1860-1997

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

Years	Logging area (and volume) 1000 ha (million cubic meters)			Rural population, thousand persons		
	Primorskiy	Khabarovskiy	Total	Primorskiy	Khabarovskiy	total
1860	- (0.05)	1(0.1)	1(0.15)	6	10	16
1880	- (0.2)	(0.4)	(0.6)			
1900	100(1.5)	14(1.0)	114(2.5)	100	28	128
1917	304(1.8)	34(1.5)	338(3.3)	299	61	360
1923	283(2.3)	32(1.1)	315(3.4)	369	85	454
1940	332(3.1)	91(8.0)	423(11.1)	419	260	679
1960	571(4.6)	169(7.8)	740(12.4)	453	294	747
1980	742(6.1)	280(13.7)	1022(19.8)	479	324	803
1990	742	268	1010	512	387	899
1996	558*	232*	790*	490	303	793
(1997)	(1.2)	(3.8)	(5.0)			

Box 1. The History and Forest Use of Indigenous People in the RFE

Strong Influence of Russian Activities

Russia invaded what is now the Russian Far East to hunt sable in the beginning of the seventeenth century. The indigenous people put up stubborn resistance to the Russians, and the Qing Dynasty Government kept the Russians out of the Amur River basin, preventing them from expanding their territory. Although the Russians went to the Pacific coast and Alaskan region in the second half of the eighteenth century, they later abandoned the colony in Alaska. Russia eventually took the area north of the Amur River and east of the Ussuri River from China by force. At this time the prototype of future development of the RFE was shaped. Thereafter Russians immigrated at a rapid pace, due to the opening of the Trans Siberian Railroad, the rapid progress of mining developments, and as a consequence the indigenous people became minority in the region. After the Russian Revolution, the racial autonomous districts were also established according to the racial territory principle. By Stalin's policy, peasants were forced to gather on collective farms (*kolkhozy*) from the end of the 1920s and the indigenous people were also involved in this campaign. In this process, the society and economic activities of indigenous people were forced to transform drastically.

On the other hand, industrial development and natural resource exploitation also progressed rapidly, and environmental destruction became a social problem in the country. In the Far East, the negative impacts of large-scale natural resource developments were not as serious as in West and East Siberia. However, natural resource development progressively encroached upon the livelihood base of indigenous people under the unprecedented social and economic disorder after the collapse of the Soviet Union. Most indigenous people find themselves in serious poverty and do not receive the benefits of development. Because they have no effective measures to protect them against unsustainable development, it can be concluded that their future is precarious.

Livelihood Strategies Based on Trading of Non-Timber Forest Products

Before the nineteenth century the area was under an East-Asian-style system, in which the people maintained and developed their society and culture based on hunting and gathering activities, mainly for regional fur trading. Thereafter the system was transformed (through the introduction of modern technology) due to introduction of a socialist system. However, the people maintained their existing livelihood strategies based on sustainable forest resource use. After the transition to the new market economy system, almost all subsidies and supporting measures by the central government were cut or reduced drastically, and consequently the people struggle today to develop new livelihood strategies in line with the new system. Unfortunately, due to the insufficient infrastructure to adapt to the new market economy, a sharp drop of fur demand and failures in dealing with the market, most of their attempts have not succeeded.

Thus the people have given priority to hunting for meat as a new means of self-sufficiency and currency acquisition. Such a change of livelihood strategies tends to bring over-hunting of medium- and large-sized mammals and the depletion of game. As a result, natural forests have less livelihood values than they used to have, the people become alienated from their land and resources have deteriorated.

Large-scale forest development in the region started after the October Socialist Revolution in 1917. Logging operations progressed mainly in Primorskiy at the beginning. After the 1960s, full-scale logging also started in Khabarovskiy, and the speed of forest development accelerated. From 1980 to 1990 the total logging area and volume of both *krai* were around one million hectares and 20 million m³, respectively. In those days logging operations in Russia paid little attention to sustainability and used a “cut and move” strategy—moving to new logging frontiers when timber resources were exhausted in one area. It was said that such logging methods originated in legal and institutional arrangements aiming to achieve production quotas under the planned economy. In the planned economy, achieving the volume of harvest assigned by Moscow was recognized as most critical goal; thus neither profitability nor efficiency were paid attention. Timber products were sold at very low prices and the forest industry was sustained by generous federal subsidies. Most timber produced in the region was loaded to European Russia and exported. The profit from forest development was not redistributed for forest production such as forest management and technology modernization or improvements bringing efficient resource use.

After the collapse of the Soviet Union, on top of the shortcomings of the legal and institutional base, weakened forestry governance caused by political disorder and economic crisis has increased extensive logging even more than before. Log production for export has gone up especially due to the rapid increase of domestic transportation costs and sharply lower domestic demand.

On the other hand, many areas in the RFE have suffered fires every year and middle to large-scale forest fires have also occurred frequently (**Box 2**). The forest fires of 1998 in Khabarovsk were the worst since 1954 and 1976—more than 1.9 million hectares of forests were burnt that year.

Recent official statistics on forest resources reveal the changes caused by extensive forest development and frequent forest fires, in the form of degradation of forest resources with a decrease of mature forests and an increase of young deciduous forests, as well as a decrease in the volume of stock of forests (**Fig 1**).

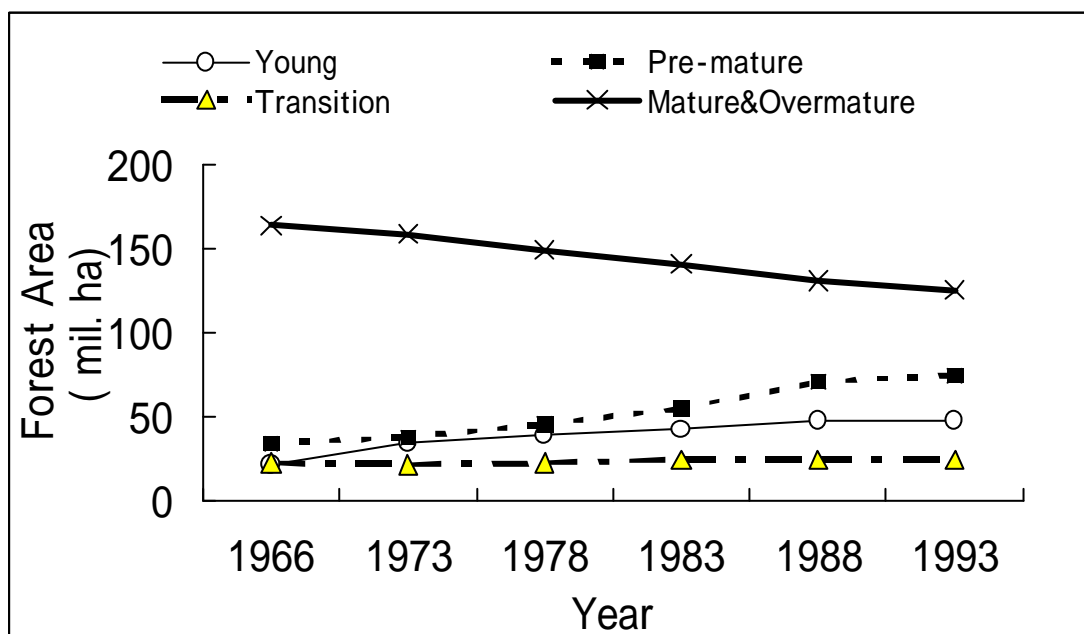
In Russia the deforestation, i.e., the decrease of forestland, has not occurred in the same way as in tropical forests, but the degradation of forests has progressed steady. One can observe forest dynamics broadly in the RFE in that the mature forests, mainly coniferous, have decreased, and then young deciduous secondary forests such as Butura have naturally regenerated on the vacant lots. The rate of such degradation is faster than in other regions in Russia and the speed is likely increasing due to recent the situation.

Table 2. Frequency of forest fires, and burnt area from 1988-1998*

in Primorskiy Krai and Khabarovskiy Krai

Year	Primorskiy Krai			Khabarovskiy Krai		
	Number of fires	Burnt area, 1000ha	Average fire area ha	Number of fires	Burnt area, 1000. ha	Average fire area, ha
1988	217	4.3	19.8	1224	353.0	19.8
1989	351	19.3	55.0	997	115.7	55.0
1990	227	1.3	5.7	953	130.9	5.7
1991	127	3.1	24.4	291	11.5	24.4
1992	216	6.9	31.9	372	17.1	31.9
1993	262	14.4	55.0	651	60.3	55.0
1994	78	3.3	42.3	278	13.0	42.3
1995	178	22.5	126.4	569	53.8	126.4
1996	187	6.8	36.4	1128	191.0	36.4
1997	425	13.3	31.3	389	34.0	31.3
1998*	556	58.6	105.4	1262	1900.0	105.4
Average	256.7		49.5	737.6		322.7

* to October 26. Source: Far Eastern Forestry Research Institute

Figure 1. The Change of Forest Area in the RFE (Unit: million ha)
Source: Sheingauz et al. (1989) etc.

Box 2. Risk and the Causes of Forest Fires in the S-RFE

Fire Risk

The official Russian classification of fire risk divides all forest area into 5 classes by coefficient of risk. Of the total area 41.5 percent of the forest area in Khabarovsk has been classed “very high” or “high” risk (Sheingauz, 1998b). In neighboring Primorskiy Krai, more than two-thirds of the territory is concentrated in the “middle” class and less than 1 percent in the extreme classes (“very high” and “low”) (Sheingauz, 1998b). Thus, the forests in Khabarovskiy Krai can be evaluated as having a rather high potential for forest fires.

Causes of Fires

As for the causes of forest fires, it is said that 15 to 30 percent of all recent fires in the RFE were of natural causes, whereas 70 to 85 percent were by human activities (Sheingauz, 1998b). Of the more than 500 fires of 1998 it is estimated that 80 percent were started by human activity.

(YAMANE Masanobu)

The Causes of forest fires, average for 1988-1997,

Causes	Krai	
	Primorski	Khabarovski
Careless behavior of population with fires including: logging operations and survey expedition	64.0	57.9 5.1 6.5
Agricultural burning of grasslands	25.0	12.2
Lightning	4.8	16.1
Other	6.2	13.8
<i>Total</i>	<i>100</i>	<i>100</i>

Sources: data of the krais' Forestry Service Directorates

3.FRAMEWORK OF THE STUDY

Many causes of forest destruction exist. This study addresses the primary underlying (i.e., ultimate or root) causes which contribute the most important proximate (i.e., direct or immediate) causes of forest destruction.

In the study, an explanatory model of forest loss proposed by Hirsch (2000), which was developed based on existing studies, was employed as a main analytical framework to consider the existing discussion aimed at addressing the causes of forest loss. This model is a schematic representation of the ways and modes of explaining deforestation (**Fig. 2**)

The diagram shows the different ways in which more immediate causes are framed in terms of means, purposes and agents or key actors in the process of deforestation or the degradation of forests. It also shows how underlying causes can be identified with reference to contextual and developmental factors. Debates over deforestation are often confused by arguments between those more concerned with proximate causes and those interested in ultimate causes. One way in which clarification can be sought is to ensure that debate occurs in one of two ways. The first way is to consider causation in a mode that seeks to identify proximate or ultimate causes within the same frame of reference (vertical Mode 1 in **Fig. 2**). The second way is to identify relationships between immediate and underlying causes (horizontal Mode 2 in **Fig. 2**). Policy frame works and development interventions also need to be developed with reference to these considerations.

Lebedev et al. (1998) carried out an analysis on the underlying causes of forest destruction in the Sikhote-Alin region. His analysis appears to be based on abstract contextual causes according to **Mode 1** in the analytical framework used in this paper.

In this study the authors aimed to clarify the underlying causes connected with a given proximate cause. Thus the analysis focuses on possible underlying causes of unsustainable logging and large-scale forest fires, which are recent major proximate causes of forest degradation in the S-RFE, according to **Mode 2** in the analytical framework. This is because a clear- understanding of causation among the causes of forest loss is useful to identify concrete directions and actions that could halt forest destruction.

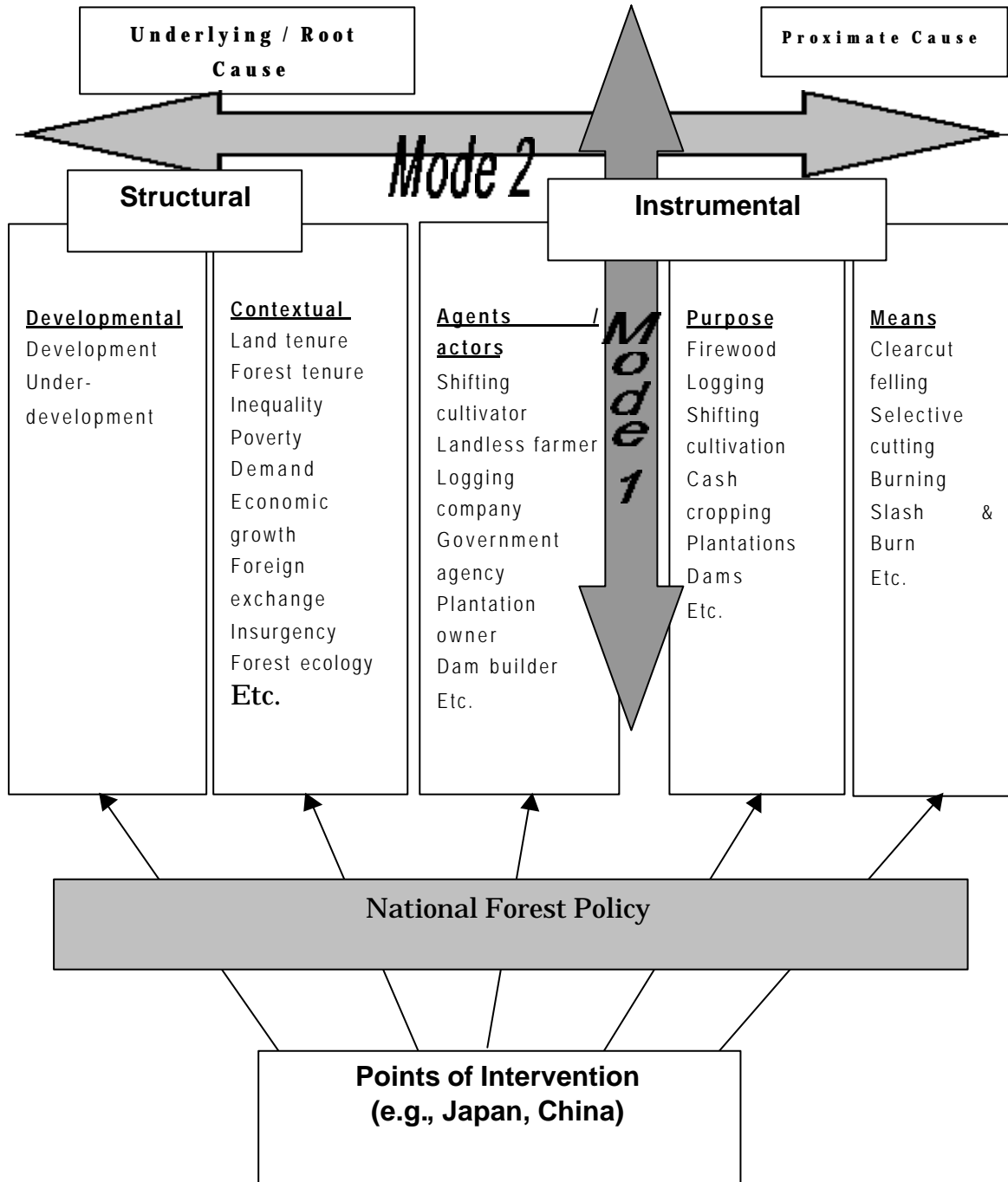


Figure 2. Explanatory modes of Underlying Causes of Forest Loss
 Source: Hirsch, 2000

Box 3. Underlying Causes Addressed at CIS Regional Meeting of IFF-NGO /

UC Process

As a regional meeting of the NGO-UC (Underlying Causes) Initiative of the IFF (Inter-governmental Forum on Forests), a meeting was held for the Commonwealth of Independent States (CIS) at Krasnoyarsk, Sakha, on 29th June 1998. In the meeting, poverty was recognized as the most important cause of modern forest loss and degradation in the country. Poverty has become serious through unstable economic conditions as well as a transition to a market economy after the collapse of the Soviet Union. Critical socio-economic conditions also contributed a 'relative poverty' which is based on the avarice of Russians who are aiming eagerly at power and wealth, and such behavioral patterns are another main cause of forest degradation (Laletin, 1998). Political factors such as changeable policies and short-term leadership pursuing quick results in a shortsighted way are also recognized as common underlying causes of deforestation in Russia (Laletin, 1998).

In a case study of the Sikhote-Alin region of the RFE (Lebedev et al, 1998), legislative and administrative shortcomings for sustainable forest management/use were exposed, and market pressures, which have a strong connection with the Asian economy, and low citizen awareness of the problem were also recognized as critical socio-economic causes. Our preliminary research in Khabarovsk showed that legislative and administrative shortcomings as well as structural defects of the wood industry (Sheingauz, 1998a) were main underlying causes of deforestation in the RFE.

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Underlying Causes Identified in the Sikhote-Alin region (Lebedev et al, 1998)

Categories	Underlying Causes	
Institutional Causes	Legislative and administrative shortcomings	Defects of legislation and governmental strategy based on an old-fashioned methodology of forest evaluation, a lack of forest research institutions, etc.
	Violations of forestry rules	Permanent violation of logging rules in former times, Industrial logging under the label of salvage, etc.
	Violations of customs and financial rules	Fabricated list of timber sorting and prices in comparison to real consignments, intentional padding of volume, etc.
Economic Causes		Strong influence from Asian market Absence of a new non-timber forest product market
Social Causes		Low citizen consciousness of the problem Weak NGO contribution

4 STRUCTURAL CONTEXT OF RECENT FOREST LOSS IN THE S-RFE

4.1 Causation of Unsustainable Commercial Logging

Logging operations in the region are quite extensive and wasteful, aiming to harvest high quality logs. It is said that timber wasted amounts around 25 to 30 percent of the harvested wood stock. In selective cutting only 35 to 50 percent of usable stock is felled, and in clear cutting only 65 to 80 percent. Only thick and high-quality timber is carried out from logging sites; utilization of the rest is very low. This is why very few wood-processing facilities for thin and low-quality timber are found in the territory. In the past, usually only 30 to 35 percent of harvested timber was processed in the S-RFE; as a result of the economic crisis these figures have dropped to 10 to 15 percent.

Such logging operations were common in the Soviet period. However, unreasonable pricing of timber and the shortage of wood processing facilities for valuable wood amplified the extensive and wasteful logging. In addition, insufficient controls on the violation of rules was also an underlying factor. Under the current economic situation, the devaluation of ruble has created favorable conditions for export because logging is now the easiest way to acquire foreign currency. Unfortunately, it is rare that the foreign exchange acquired has been re-invested for forestry and the forest industry sector.

4.1.1. Expanding Timber Trade from the RFE to Asia-Pacific Countries

Recent increases of timber demand in Asia-Pacific countries (APC) is also a key underlying cause strongly accelerating unsustainable commercial logging. According our estimation about 50 to 60 percent of timber products in the S-RFE are exported to the APC, mainly Japan. Japan has imported Russian timber constantly since the 1960s. In the middle of the 1970s around 9 million m³ of timber, mostly raw logs, were shipped to Japan. Even in after the collapse of Soviet Union, imports of Russian logs to Japan steadily increased after 1991 (4.3 million m³), reaching a high in 1999 (6.07 million m³).

Before the economic crisis 40 to 45 percent of the total volume wood products produced were consumed within *krai* borders, 25 to 30 percent were sent to other regions of the former USSR and 30 percent were exported abroad. In contrast, today about 50 to 60 percent are for export and rest is consumed within the *krai* territories. 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 northeast Asian countries: Japan, China and Republic of Korea (**Box 4**). Japan consumes about 60 to 70 percent of the S-RFE exports. The timber exports to China have been increasing recently (**Box 5**) at a rapid pace.

Both internal and external causes have influenced the recent increase of timber trade from the RFE to APC.

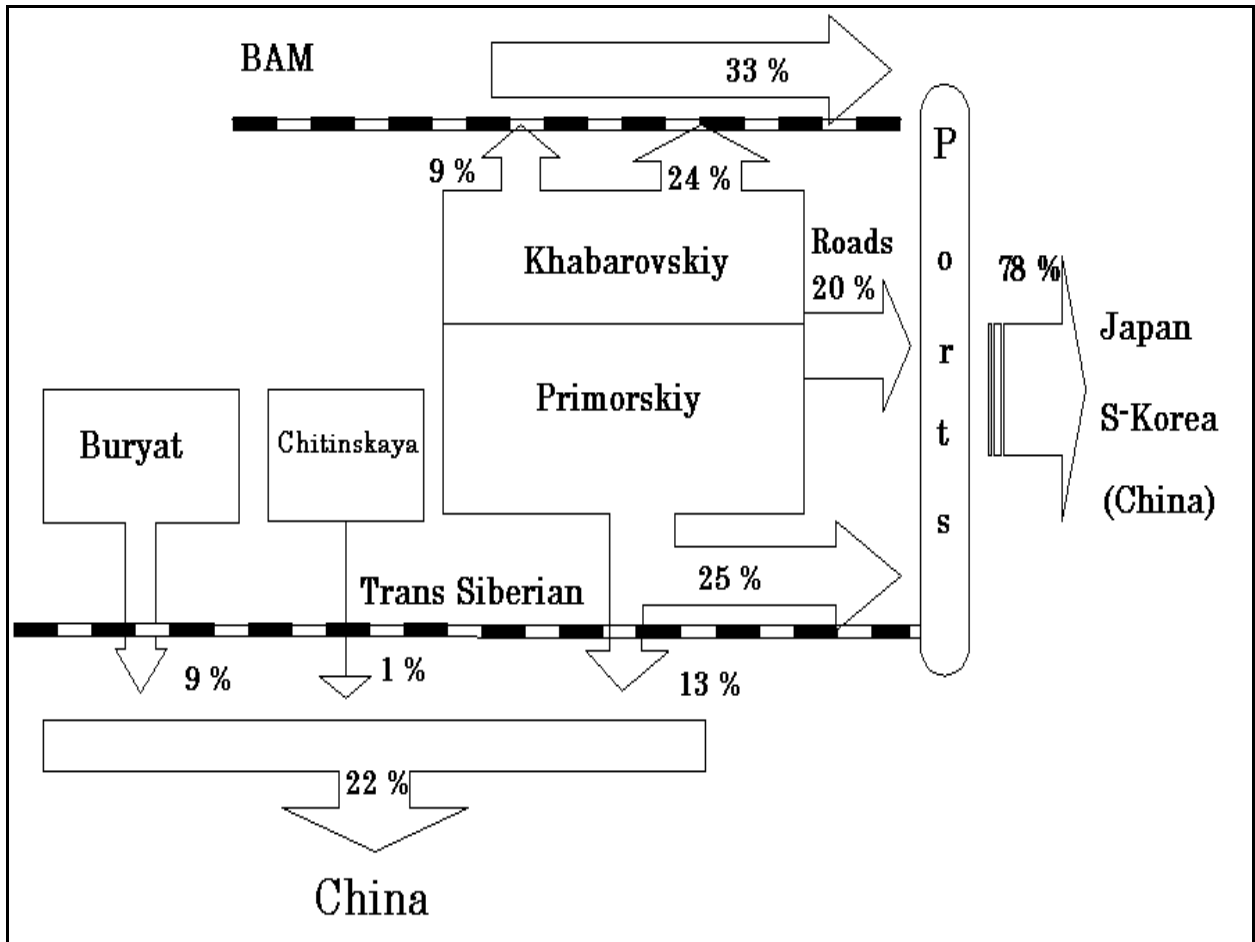


Figure.3. Timber Flow of 1998 from inland areas of the RFE to APR

Box 4. Recent Timber Flow from the RFE to Asia-Pacific Region

Based on our analysis on timber trade statistics of the RFE to the Asia-Pacific Region (APR) in 1998, the authors identified the following characteristics:

- 1) The supply of RFE timber products to the APR was equal to 8.39 million cubic meters. Most timber products (85 percent) were exported by sea and 15 percent by railroads.
- 2) Recently almost all exported timber products from the RFE were loaded to only three APR countries—Japan, South Korea and China. Timber export to Japan still stands out as in the past but the recent increase of log exports to China is remarkable.
- 3) From the RFE provinces, 43 percent was shipped from ports of Primorskiy Krai and 35 percent from ports of Khabarovskiy Krai. From Buryat Republic most timber is transported by rail.
- 4) Logs produced in the provinces adjacent to Russia-China border, including Buryat, Chitinskaya and a part of Primorskiy, are transported to nearby gateways via railway and then loaded to China. This share of total export volume was around 20 percent in 1998 and has shown remarkable increases recently.
- 5) Logs produced inland or in the areas along railroads in Primorskiy and Khabarovskiy Krai are transported to the coastal ports in these two provinces via two main railroads and then shipped out mainly to Japan and South Korea. This has been a principle route in both the Soviet and post-Soviet era.
- 6) On the coastal area of the Pacific Ocean in Primorskiy and Khabarovskiy Krai, logs are transported directly to the nearest coastal ports by truck and then loaded mainly to Japan and South Korea. The share of this route is around 20 percent and has been increasing recently.

(YAMANE Masanobu & SHEINGAUZ Alexander)

Box 5. Recent China-Russia Timber Trade

- 1) Significant increase of China's timber import from Russia: Russia is one of China's largest outside timber suppliers. The amount of logs imported from Russia enjoyed nearly a doubling each year from 357,788 m³ in 1995 to 4,304,946 m³ in 1999, and its share of China's imported logs also increased from 13.9% in 1995 to 42.5% in 1999.
- 2) Existence of favorable trade regulation for saw log imports: Besides import commodity inspections and the requirement of import certificates for specific tree species, only weak regulations are applied to imported saw logs. In addition, the tax rate for saw logs has been lower than for sawnwood, and fell by 13% since January 1999 as a result of the application of a preferential import tariff rate of zero following APEC trade liberalization timetable. [
- 3) Three largest gateways for timber imports from Russia: Manzhouli in Inner Mongolia province and Suifenhe in Heilongjiang province are two largest direct border gateways for China's timber imports from Russia. Erlianhot, also in Inner Mongolia province, is the third largest gateway for China's timber imports from Russia. In terms of the log imports in 1999, it is interesting that the Manzhouli gateway accounted for about 40%. Suifenhe accounts for about 30%, and Erlianhot accounts for about 20% of the total log import from Russia.
- 4) Border gateways linked to Primorskiy in Russia are a main route of hardwood saw log imports to China.
- 5) Ten small border gateways in Heilongjiang Province: In Heilongjiang Province, besides Suifenhe and Heihe gateways, which are either already large or expected to be large border gateways for Russian timber import, ten other small gateways have also been identified along the border. These include Xunke, Jiayin, Luobei, Fujin, Tongjiang, Fuyuan, Raohe, Hulin, Mishan and Dongning. However, the timber trade in these small gateways, and probably all trade activities, are not large due to the lack of rail connections.
- 6) Key other three border gateways to be monitored in the future: Heihe gateway in Heilongjiang province will be one of the largest Russian timber import gateways in the future. Hunchun is the only border gateway with Russia in Jilin province. However, China's timber imports from Russia through this indirect gateway are still small.
- 7) Several coastal gateways for small timber trade: Along China's coastal areas, several first-class customs/gateways are reported to have timber imports from Russia by ship: Dalian, Tianjin, Qingdao, Shanghai, Shantou, Shenzhen, Huangpu and Guangzhou. However, the amount of imports via these gateways is not large.

(YAMANE Masanobu & LU Wen-ming)

4.1.2. Internal / External Intervention

Economic Crisis

In August 1998, due to the so-called Russia financial crisis, both national and local financial infrastructure faced a very serious situation and the functioning of banking system was paralyzed. With the drastic devaluation of the currency and the sharp decrease of imports, inflation recurred starting in that month. As a consequence, real monetary income has fallen sharply and the production of manufacturing and light industry such as motor car and home electronics has decreased remarkably.

However the unintentional devaluation of ruble brought unexpected economic impacts in 1999. The clearest impacts were the increased exports and reduction of imported items. The sharp increase of timber exports also resulted from the devaluation.

China's Growing Timber Consumption

Plywood production using tropical hardwood logs has been decreasing steadily due to various constraints such as demands for sustainable forestry, logging restrictions on natural forests and a consequent shift toward log production from man-made forests. As a result, Russian timber has strongly attracted plywood industries in APR, especially Japanese industry.

Moreover, growing Chinese timber consumption also poses the greatest long-term threat to the forests in the RFE. In 1997, Russian log exports to China totaled about 0.9 million m³, while in 1998 this figure almost doubled to 1.7 million m³. It is clear that the timber demand is increasing steadily, driven by strong domestic economic growth and rising standards of living in China. In addition, the newly created Natural Forest Protection Program (**NFPP**) (**Box 6**) will lead to a sharp decrease of China's domestic timber production in areas targeted by the NFPP; as a result, the amount of timber imported can be expected to increase dramatically. Indeed, in line with such changes, China's log imports from Siberia and the RFE all along the Chinese border have been increasing remarkably. The preliminary statistics for 1999 showed that log imports that year already exceeded 10 million m³.

Box 6. Natural Forest Protection Program—China's New Forest Policy

The Natural Forest Protection Program (NFPP) is a great and trans-century environmental protection program. Natural forests are still the main body of forests in China and are playing a significant role in maintaining and improving the environment. However, unscientific and irrational management over a long period of time in the past have led to serious damage to the structure and ecological functions of the forests, i.e., the devastating floods in the Yantgze, Nenjiang and Songhua Rivers.

This new forest policy aims to:

- increase the quantity and improve the quality of natural forest resources, and enable the full play of ecological functions;
- create new employment opportunities and better mean per capita income for people in the forest areas through changes in forest industries;
- establish large-scale commercial forests as the forestry base of key forest regions;
- achieve radical transitions both from planned economy to market-oriented economy, and from extensive management to intensive management,
- realize sustainable forest management and establish a scientific forestry management system.

According to the preliminary design, the key regions of the NFPP cover 18 provinces (or autonomous regions and municipalities), namely, Sichuan, Yunnan, Guizhou, Hunan, Hubei, Jiangxi, Shaanxi, Shanxi, Gansu, Qinghai, Henan, Jilin, Heilongjiang, Xinjiang, Inner Mongolia, Ningxia, Hainan and Chongqing.

The NFPP will be implemented in two phases. During the first phase (1998-2000): 125.418 million ha of natural forests were classified as follows: logging ban (59.881 million ha), logging control area (36.996 million), and commercial forests (28.541 million ha). As a result, by 2000, the harvesting quota of natural forests will be cut down by 12.36 million m³ compared with the level of 1997. While 730,000 surplus laborers and 270,000 laid-off employees in forest regions will be absorbed and re-allocated by afforestation activities and alternative projects, 440,000 retired employees will enter old-age social insurance systems at the provincial level.

During the second phase (2001-2010), the program will mainly focus on the establishment and protection of ecological and public welfare forests, the development of transitional projects, the cultivation of forest resources, the increase of wood supply capacity and economic development in forest regions. By 2010, natural forest resources will be basically restored. Timber production will be shifted from logging of natural forests to the management and utilization of plantations.

According to the statistics, 1.44 billion-yuan were invested from the establishment of public welfare forests. Timber production was reduced by 2.933 million m³, 318,000 ha of public welfare forests were planted, 882,000 ha of forests were tended, and 2.433 million ha of mountainous areas were closed for reforestation. Natural regeneration by enrichment planting of 139,000 ha had been accomplished and 189,000 laid-off employees from forest harvesting areas were properly settled and re-allocated.

(LU Wen-ming)

4.1.3. Key Agents / Actors

The Local Government

In the Soviet period the government recognized forests in the RFE as a timber resource base and strongly promoted forest development policies and administration, aiming to achieve the targets of national economic plan. The forest industry sector followed such a development paradigm and pushed forward with unsustainable forest use. Since the collapse of the Soviet Union, on top of the bad legacy of destructive resource use, forest administration has been weakened due to the financial difficulties in federal government; local capacity for forest conservation especially suffered serious damage. Weakened forest governance at both the federal and local levels has brought many problems, which directly connected with forest loss, such as the expansion of extensive logging and widespread illegal activities.

The federal government established the "Forest Code of the Russian Federation" in 1997, following the adoption of the "Fundamentals of the Forest Legislation of the Russian Federation" in 1993, aiming to respond to the trend toward decentralization and the rapid transition to a market economy. In the S-RFE, *krai* governments are independently developing new legislative bases under the support of foreign aid institutions. However the political and socio-economic disorder has continued everywhere in the country and the legal and institutional infrastructure is still under development; evidently, effective implementation of sustainable forest policy will take some time.

Logging Companies¹

Although international logging ventures have received much attention, most of the logging in the RFE is actually done by domestic operations. Enforcing regulation for domestic logging operations and timber trading firms is more difficult than for international ventures, because domestic ventures attract less scrutiny from the forest authorities and press, according to Russian observers.

Small firms working under salvage logging contracts with the Forest Service *leskhozy* (district forestry offices) log a large amount of timber. These firms then sell timber for cash—often with fake documents—to Chinese wholesalers. According to estimates by officials in the Primorskiy Krai administration, up to 40 to 50 percent of hardwood logged in Primorskiy region is logged or exported illegally. For example, in 1998, 445,000 cubic meters of high quality ash—more than 20% of the region's annual allowable timber harvest—was exported to China and Japan from so-called "salvage operations." These operations are also allowed within protected territories. The Forest Service and small companies use this loophole to increase logging volumes, even though such logging does little to benefit local budgets.

¹ This section was derived from "Plundering Russia's Far Eastern Taiga" (Newell and Lebedev, 2000).

Local Forest Management Bodies

Due to the serious financial situation facing local forest management authorities, some *leskhozy* were abusing salvage logging operations in order to obtain the revenue they needed to survive. *Leskhozies* faced chronic revenue shortages even in the Soviet period; thus most local forest management bodies held their own wood processing facilities, processed logs harvested from thinning or sanitary logging, and sold processed wood aiming to make a profit for themselves. However, actually these logging operations were not different much from final felling. Since the Forest Code and Federal Basic Laws do not allow *leskhozy* to operate final felling, these logging activities are the violation of rules.

Consumer Countries

Timber consuming countries in the Asia-Pacific region, especially Japan and China, which have continued timber imports from the RFE in the past and increased the amount of timber traded recently, are key actors driving the loss of forests in the region. [It is certain that their influence will increase.

4.1.4 Underlying Causes

The increase of commercial logging in the area was mainly due to such internal and external "**market forces**" as the demand for foreign currency and the increase of timber demand. Various underlying causes of widespread unsustainable logging operations—originating in such ultimate causes as "**economic and political instability**" and "**insufficient legal and administrative base**"—are closely and mutually connected.

Market Forces

Market forces have constituted an essential driving force of commercial logging, both in the past and present. Since the collapse of the Soviet Union, acquiring foreign exchange has been a main concern of the forest sector and logging companies, because favorable conditions for timber trade have emerged under strong demand for Russian timber in the APR. Thus the increase of log demand in consumer countries and the economic crisis are key Underlying Causes relevant to "Market Forces."

Economic and Political Instability

In this root cause the authors identified such underlying causes as the rapid transition to a market economy, structural adjustments forced by the International Monetary Fund and decentralization. These causes brought serious poverty and a shortage of finances for forest management due to the economic crisis. The rise of shadow economy also originated in these root causes.

Insufficient Legal and Administrative Base

Another of the crucial underlying causes of extensive and wasteful commercial logging can be considered a negative legacy of the Soviet period—inefficient forest resource use policy. Recently, central and local governments have made much effort aiming to realize wise forest resource use through reforms of the legal and administrative base. However, the legal and administrative base is still not sufficient, for various reasons. A part of this insufficiency, especially local forest authorities' inability to control illegal activities, originates in the shortage of finances and personnel. In this sense building an administrative base on dependable financial resources can be essential to overcome irrational forest resource use.

4.2. Causes of Frequent Large-scale Forest Fires

After World War II, Primorskiy Krai and Khabarovskiy Krai experienced six and nine large-scale forest fires, respectively (**Table 2**). Catastrophic fires seem to occur once every 10 to 12 years. However the forest fires of 1998 (**Box 7**), which occurred mainly in Khabarovskiy Krai and Sakhalin Oblast and damaged 2.2 million hectares of burnt area, were the worst since the forest fires of 1954 and 1976.

The number of fires and area burnt manifest very wide fluctuations from year to year. The frequency and spread of fires are also very different in both *krais* because of differences in the type of forest vegetation and the intensity of forest management. It is said that there is no close correlation between forest fires and logging operations. However, the areas of forest fires in both *krai* are along the Sea of Japan and main transportation corridors, such as the Trans-Siberian Railroad and BAM railroads or main roads to loading points. This observation suggests the connection of forest fires and human activities, including logging operations. In fact, the frequency of forest fires has increased in line with the progress of forest development in the region, and the careless handling of fire by forest workers has caused many forest fires. Large amounts of slash left in a logging site can be very good fuel for fires. In addition new road construction for logging operations has opened new access routes for local people, leading to small fires in the forests.

Recent official studies indicated that more than seventy percent of forest fires were caused by human activities. It has also been pointed out that intensive selective logging has made forest conditions drier and such changes amplify the risk of fires caused by spontaneous combustion. In this sense, commercial-logging activities have a close linkage with forest fires.

Box 7. Catastrophic Forest Fires of 1998 in Khabarovskiy Krai

Many areas in Russia suffer from forest fires every year but the forest fires of 1998, which occurred mainly in Khabarovskiy Krai and Sakhalin Oblast, were the worst since the forest fires of 1954 and 1976.

The damage included 2.2018 million hectares of burnt area and resulted in damage of 1.5633 million hectares of dense forests. Around 15 million cubic meters were lost in Russia, more than three years of timber production in Khabarovskiy Krai (one of the most important timber-producing areas in Russia). This disaster has brought enormous damage to the local economy and forest industry of the RFE as well as losses of the forest's ecological functions—losses estimated at 4.6 billion rubles (207.2 million US dollars) (Kolomytesv & Sheshokov, 1999).

Moreover, the fires caused extensive destruction of various forest-based resources on land traditionally used by indigenous people in the RFE, affecting timber and non-timber products, hunting and game stock representing their food base (UNDAC, 1998). It is likely that over one million people have been affected over a significant period of time by smoke and carbon monoxide (CO) (UNDAC, 1998). The possibility of an influence on the global climate, contribution to global warming and implications for abnormal weather in neighboring China have also been pointed out (UNDAC, 1998). The fires have largely destroyed biodiversity in the RFE, which is referred to as the richest area in the northern hemisphere for biodiversity. Two sites registered under the Ramsar Convention as wetlands of international importance and two *zapovedniks* (protected nature reserves) are located within the affected area (UNDAC, 1998).

(YAMANE Masanobu)

4.2.1. Weakened Fire Control System

The system for forest fire control in Russia has a strong structure and was designed systematically. The expenses are basically financed from the state budget: fire control, construction of forest roads, water reservoirs and fire barriers, laying of mineral strips on the ground, purchasing of equipment, salaries for staff, and rent of aircraft. The legislative base for forest fire control is also well prepared, including the Forest Code of the federation and federal or local acts (Sheingauz, 1998b).

After the collapse of the Soviet Union, however, the fire control system has weakened remarkably. This change was caused by a substantial decrease in the budget from the federal government for the fire control system, due to the unfavorable economic condition in Russia.. The budget for air-based and ground-based systems for fire control during 1991 and 1996 were relatively stable, at 129 to 168 million rubles, and 5 to 15 million rubles, respectively. However, the consumer price index reached 248,733 points in 1996 from 100 in 1992 (World Bank, 1997), and consequently the financial base is seriously inadequate for maintaining the fire control system. A combination of inadequate resource allocation of regional authorities by the central government, inability of regional authorities to clear year-end debts resulting from this situation, and the release of annual budgets too late for effective fire control measures to be put in place prior to the fire season, were fundamental causes of the fire (UNDAC, 1998).

This recent financial situation led to a serious shortage of capacity for fire control systems and a significant deterioration of their original functions: effective fire monitoring and quick fire-fighting.

The biggest effect was a cutback of air-based monitoring. This curtailment was caused by steep rises of costs for aircraft and fuel prices. The capacities for ground monitoring also declined. The costs for equipment for fire-fighting as well as fuel for large-sized machinery, such as bulldozers and trucks loaded for staff became prohibitively high, and shortages of living essentials and delayed wage payments for staff also became critical.

There is a high possibility that the frequency of large-scale forest fires, such as the fires of 1998, will increase noticeably, because the situation is not likely to be improved for some time.

4.2.2. Increase of Small Fires in Forest Areas

The increase of small fires in forest areas was another cause of the fire of 1998. It is said that 15 to 30 percent of all the recent fires in the RFE were from natural causes, whereas 70 to 85 percent were caused by human activities. Of the more than 500 fires of 1998, it is estimated that humans started 80 percents.

The availability of daily essentials in remote areas has dwindled owing to the recent serious economic conditions. It is for this reason that people in remote areas visited forests more frequently than before, seeking products for their daily use such as firewood, mushrooms, edible wild plants, berry and hunting animals. Recent motorization has also brought more citizens, who know nothing about forest fires, into forest areas than before, and their careless handling of cigarettes and fires have become the main artificial cause of the fire (Sheingauz, 1998b).

In addition to those factors, the lack of concern and careless behavior by citizens caused the fires (Sheingauz, 1998b). It is a common belief of citizens that in the RFE there are abundant forests, and that the fires do not cause significant damage. Such convictions have weakened after the year of catastrophic fires, but two to three years later the previous attitudes about fire returned (Sheingauz, 1998b).

4.2.3. Key Agents / Actors

Logging Companies

In the RFE, large-scale clear felling is main type of operation. In addition, only thick and valuable wood such as pine and hardwood are harvested, and thin and low-value trees are left behind. Consequently, large amounts of slash are left on the logging sites, with high risks for combustion and the expansion of fire. Among forest fires caused by human activities, which account for more than 70 to 85 percent of the total, it has been pointed out that the careless handling of small fires is a significant cause of recent forest fires.

Local Forest Management Authority

On local level, a Regional Forestry Service and district *leskhoz*s are responsible for forest management. Today they face chronic shortages of finances and personnel, and thus have been not able to implement the proper forest management. In the recent financial crisis, forest fire control has been inactive, even though that is a basic task for these authorities.

Local People / Citizens

The strongest connection of citizens and local people with forest loss in the region is a careless handling of small fires. It has been pointed out that around 70 percent of forest fires were caused by artificial causes such as campfires and discarded burning cigarettes. Recently the entry of citizens/local people into forests has also increased for several reasons. In short, citizens/local people are key actors in terms of the first causes leading forest fires.

4.2.4. Underlying Causes

Though natural factors such as local forest conditions and abnormal weather conditions have played an essential role in large-scale forest fires, several institutional factors were more crucial to the occurrence and expansion of the fires. In this study, **the deterioration of fire control systems and inadequate/insufficient resource allocation** was identified as a secondary cause. The authors concluded that the changes were caused by a substantial decrease in the budget from the federal government for the fire control system, due to the unfavorable economic conditions in Russia.

Increased numbers of small fires started by citizens' **careless behavior in forests** and **extensive/ineffective logging activities at logging sites** also are significant secondary causes of frequent forest fires. The former originates in **the lack of citizens' concern about fires**. The latter is caused by inadequate forest institutions/regulation and the bad legacy of resource use policy in the Soviet period. In addition **the lack of management on burnt areas** was also recognized as an underlying cause of forest degradation in the region.

In conclusion, **“political/economic instability”** in Russia and **“insufficient legal and administrative base”** have been the key root causes of the recent large-scale forest fires. These two root causes were mutually connected to increase “forest fire area” and “high risk logging sites for fires,” amplifying the problems of the “weak fire control system,” and causing frequent forests fires on a large scale.

Forest management operations, which mainly depend on natural regeneration, might also accelerate forest degradation. Thus current forest management policy can be addressed as a key underlying cause.

5. Structural Context of Recent Forest Degradation in the S-RFE

Considering the results of this study the elements of the causative chain of recent forest degradation in the S-RFE were combined in **Figure 4**.

The degradation of forests in the area has accelerated due to two main proximate causes: unsustainable commercial logging and large-scale forest fires. Large-scale forest fires have a strong connection with unsustainable commercial logging. These two main proximate causes are under the multiple influence of various underlying causes such as “Market Forces in Asia-Pacific Countries,” “Economic/Political Instability” and “Insufficient Legal and Administrative Base.”

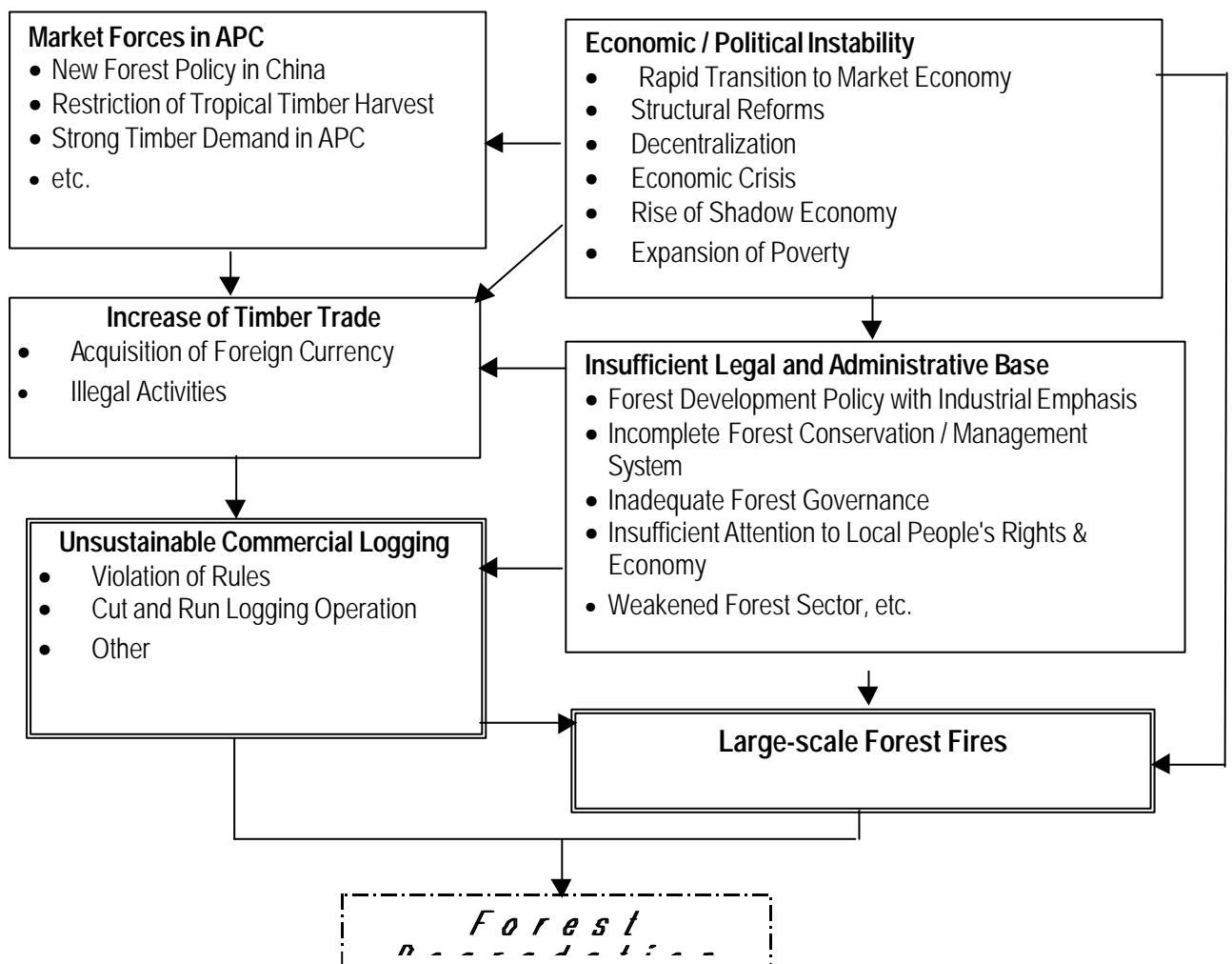


Figure 4. Causes and the Mutual Relationship of Forest Loss in the S-RFE

- Root / Underlying Causes
 Major Proximate Causes

6. SUGGESTED DIRECTIONS AND ACTIONS

To overcome forest degradation in the S-RFE caused mainly by two major proximate causes—unsustainable commercial logging and large-scale forest fires—this research suggests that effective measures to prevent or stop the negative impacts of the underlying causes mentioned earlier should be clarified

The members of research group propose the following two basic directions:

- Promote social and economic infrastructure development to realize a market economy, under natural Resource policies that give full consideration to the environment as well as local people's rights and local economies.
- Reform and strengthen forest governance and the forest industry sector, ensuring sustainable forest resource use and forest conservation by prompting modernization and forest conservation.

The members of research group also propose strategic solutions grouped into the six headings shown below.

6.1. Government Responsibilities

Central and local governments should continue to show the **political will** to regulate and monitor forestry using strong measures—while balancing state, business and local community interests—with a master plan for appropriate, sustainable and equitable development.

The following actions should be taken:

- Allow for transparency and consultation on all decisions regarding the forestry sector, and provide for participatory processes that actively engage a wide range of stakeholders.
- Ensure that they take into account all social, environmental and economic costs when considering the benefits of any land or forest development.
- Promote stronger legislative regulation that includes a harmonious and integrated system of laws and codes on nature, on both the federal and local levels.
- Careful coordination of transition to sustainable forest use, while taking into consideration social and political problems.

6.2. Forest Development

The improved management of forest development alone, such as timber concessions and forest conversion projects, will not solve deforestation. Wise use of forest resources and local alternatives to concessions should be considered.

To progress in this direction the following prerequisites should be met:

- All concessionaires should be required to complete an Environmental Impact Assessment (EIA), as well as a Social Impact Assessment that would focus on the social impacts of proposed logging.
- The national government, in close co-operation with provincial authorities and local communities, should conduct long-term monitoring of logging operations, as well as log transport and exports. Monitoring groups in villages should be encouraged and provided training.
- The forest industry sector should promote modernization and consideration of the environment under the frame of integrated management.
- Improvement should be made in timber pricing, forest use fees and the allocation of fees collected, aiming to realize sustainable forestry.
- Guidelines, law enforcement, and supporting measures on market mechanisms for sustainable resource use should be developed and properly implemented.

6.3. Fire Control

In the short-term, it is essential to prevent forest fires caused by various human activities. With this in mind, the authors emphasize two key solutions: strengthening the weakened fire control system, and raising public awareness about fires.

The following actions are needed:

- Administration of national and local forest fire control systems, coupled with the national fire control policy and programs, should be strengthened.
- Well-balanced forest control measures should be allocated in the system, with attention to both advanced technology and practical equipment.
- Public awareness should be promoted both for local people and urban residents, regarding fire prevention and environmental education about forests.
- International cooperation for fire control and expansion of international aid should be promoted, under the full support of developed countries in the Asia-Pacific region.

6.4. Community Forestry and Participatory Forest Management

Due to environmental constraints, the shortage of financial source and the weakened public forest sector, in the new market economy, the existing forest sector alone cannot provide the whole livelihood of local people, as was the case in the Soviet period. Consequently, forest development with an industrial emphasis and narrow-minded resource use are likely to accelerate, and the connection between local people and local forests may be weakened further. In contrast, local communities should be encouraged to continue to value forest resources through their increased involvement in management of forests.

Thus, the authors believe that at the local level, people should be involved as key actors of forest management. In this context the introduction of community forestry, which has been widely employed in tropical countries and the promotion of local participation are key solutions for forest conservation in the RFE.

In order to make progress in this direction, the following actions should be taken:

- Legal mechanisms should be developed or strengthened for recognizing traditional land-use practices and systems of customary tenure, in order to protect the rights of indigenous peoples. The management status of 'TTP' should be improved and the area expanded.
- Sufficient flexibility should be maintained at the national and provincial levels to allow local institutions and knowledge to frame locally unique solutions, in order to promote local economy and industry aiming for financial autonomy (i.e., social forestry).
- Strategies should be compiled for nature and cultural resource conservation at both the federal and *krai* levels.
- Education and advocacy should be promoted on social forestry, nature and culture resource conservation.

6.5. Sustainable Trade

Timber trade can provide an economic basis for the development of the area. The Russian central and local governments, along with consumer countries and NGOs must take action now to make the timber trade environmentally sustainable.

Based on these research findings, the authors emphasize the necessity for quick action to:

- crack down on corruption and bribery;
- ensure full enforcement of existing Russian laws and regulations;
- examine and introduce market-based measures, such as timber certification, to ensure sustainable timber trade;
- ensure accuracy and transparency at all levels of trade statistics; and
- carefully reform and implement forest and resource development policy, keeping in mind the impacts on regional timber trade.

6.6. Responsibilities of the International Community

Forest conservation is an urgent concern of both local and international society. In addition, the role of the international community in forest loss in the RFE region is vital, as this study has shown. Thus the support of international communities is essential to halt forest loss and realize forest conservation in the region.

For these purposes the following actions should be taken:

- The international community should place increased emphasis on the importance of community involvement and participation in approaches to forest conservation, natural resource management and land planning.
- Pledges of loans or grants made by the international community should be carefully conditioned on the basis of respect for human rights and sustainable management of natural resources, in agreements that are informed and transparent to the public. Compliance with such written conditions should be closely monitored and the government must be held accountable for its policies.
- The International community must give carefully consideration of aid from international institutions and bilateral cooperation for large-scale forest development projects aimed at forest carbon sequestration.
- The international community should assist governments to develop community forestry or joint-forest management systems.
- Regional coordination on the impacts of deforestation should be encouraged.
- The international community should provide funds for research projects, to find solutions to overcome forest loss.

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