# Working Paper

## Foreign Investment in the Forest Sector in the Russian Far East and Potential Market Integration with Northeast Asia

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WP-94-92
November 1994

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## FOREWORD

IIASA, the Russian Academy of Sciences and Russian governmental organizations initiated the Siberian Forest Study in 1992, with the overall objective of the Study to be:

- identification of possible future sustainable development options for the Siberian forest sector (assess the biospheric role of Siberian Forests, and identify suitable strategies for sustainable development of forest resources, the industry, the infrastructure and the society);
- identification of policies for the different options to be implemented by Russian and international agencies.

The first Phase of the Study was to build relevant and consistent databases for the up-coming analyses of the Siberian forest sector (Phase II). Nine cornerstone areas have been identified for the assessment analyses, namely further development of the databases, greenhouse gas balances, forest resources and forest utilization, biodiversity and landscapes, non-wood functions, environmental status, forest industry and markets, transportation infrastructure, and socio-economics.

Important components of the analyses of the Industry and Markets area are market analyses for Russian wood of different regions. The work presented in this paper deals with the Pacific Rim market. The work has been carried out by Kwang-Il Tak during his stay at IIASA, supported by the Ministry of Industry, Canada.

## ABSTRACT

Located in one of the world's most resource-rich regions, the Russian Far East suggests major potential interactions with some of the fastest growing economies in Northeast Asia, namely, Japan, Korea and China. Russian economic reform and opportunity for foreign direct investment have increased the chance of realizing such potential.

The primary purpose of this paper is to investigate the role of South Korean investment in developing the forest resources of the Russian Far East and exporting the raw materials produced to Japan and South Korea. The secondary purpose is to investigate the opportunities for and constraints on the realization of the potential economic complementarity present among the three countries. The Russian Far East could help Japan and South Korea to increase the security of resource supply for the two countries' economies, whereas the Russian Far East could take advantage of these countries' capital and technology to speed up regional economic development and the region's integration into the Asia-Pacific economy.

A case study approach is used for the analysis in this study. The South Korean-Russian forestry joint venture Svetlaya was selected for this purpose. The case study reviewed the joint venture's three year operation through interviews both on site at Svetlaya and in the head office of the Korean investor in Seoul. The interviews were further supported by a field visit to the joint venture's project site in Svetlaya, Primorskiy Kray.

This paper suggests that foreign direct investment is the most powerful agent to realize the resource potential as well as to increase the export of the produced raw materials, though some negative attitudes towards foreign investment in the Russian Far East, as exhibited in the case study, need to be overcome. This study also concludes that a definite interest in forestry investment exists in the Russian Far East, though political and economic instability are the largest barriers to attracting foreign investments in the short term. A broad vision, other than maximizing short-term financial gain, is required for future forestry investments in the region.

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# 1. INTRODUCTION

## 1.1. Interaction Between World's Forest Resource Regions and Market Regions

Forest resources are unevenly distributed across the globe. The current conditions have been long established by natural endowment interacting with agricultural activity, population growth, urbanization, and industrial activities. Both Thirgood (1981) and Perlin (1989) illustrate historically how humans interacted with forests in past times. Human impacts and dependence on forests in ancient times resulted in early forest depletion in the Levant and old Greece (Thirgood, 1981). The depletion of forests spread over Europe and to the American continents as human history continued (Perlin, 1989). Security of timber for shipbuilding was sought by ancient Greek nations to control the sea, which led to economic and military supremacy (Perlin, 1989). Perlin remarks that fortunate Greek nations gained timber from nearby forests, but deforested nations had to secure their timber from remote regions through diplomatic efforts or military alliances with well wooded countries. He also mentioned that security of timber was one of the main motivations of many military activities and conquests at the time.

The use of wood in naval shipbuilding has virtually disappeared, but it is still important for other uses in modern industry, so the interaction between humans and forests continues. The only difference now is the scale of the interaction, which has changed historically from local or regional to the current transnational. Many countries obtain their wood not from local forests but through trade with other countries. The volume of traded forest products has continued to and is expected to increase in the future.

The distribution of forest resources has a very important influence on patterns of international economic activity and development. Despite an ever-growing volume of trade, the world's forest products trade in the northern hemisphere is dominated by a few major importing and exporting regions. Major importing regions are the core regions of the world economy, namely, the European Community (EC), the United States, and Japan. The major exporting regions are periphery to the importing regions and rich in forest resources being the Nordic countries and Canada. Now the Russian Far East (RFE), its regional role within Russia becoming more economic than strategic since the break-up of the old Soviet Union, can be added to the above mentioned two resource regions. Due to its potential role as a peripheral resource region to the emerging new economic powers in Northeast Asia, namely, Japan,

Korea and China, it must be considered a potential source of forest products to adjacent resource deficit regions.

Each of the three resource regions in the northern hemisphere is located close to one of the three importing regions of the world economy. However, Nordic-EC and Canada-U.S. relationships have long been established and have reached a mature state of resource-market relationships, but the RFE has not yet fully formed such a relationship with its Northeast Asian neighbors. How these two regions do and will interact with each other, and the implications of such interaction for the traditional wood products exporters in North America, is the main topic to discuss in this paper.

### 1.2. Problems

The Russian Far East and Siberia together form a vast rich forest resource region. This region has remained less exploited due to its remoteness from the European Russia and due to the underdeveloped infrastructural conditions in the region. The region's potential as a major timber supply source is considered large.

There have been several studies to estimate this potential. (Barr and Braden (1988), Cardellichio, Binkley and Zausaev (1989), and Backman and Waggener (1990, 1991 and 1994).) The problem these authors commonly addressed was how to measure the potential production and trade of forest sector. The nature of the problem to investigate in this study is similar to those in the previous studies but the approach is different. Not only does this study focus geographically on the Russian Far East, but treats foreign direct investment (FDI) as one of the most powerful agents to realize the potential and further to integrate the region into the Pacific Rim economy. Furthermore, this study examines the role of FDI through the experience of Hyundai Corporation with its joint venture in the forest sector. Given the particular location of the RFE, the international relations with neighboring countries play a significant role in the understanding of potential foreign investments and market integration in the region. The research question in this study is what role can foreign direct investment play for realizing the potential the Russian Far East has and how the RFE responds to such FDI.

### 1.3. Purpose

The purpose of this study is to provide background information for those countries which are interested in establishing a new resource supply source in the RFE, and for those major exporting countries which can expect competition from the RFE over markets share in the Pacific Rim.

### 1.4. Approaches

Potential role of foreign investment in forestry in the RFE is investigated from the perspectives of forest resource potential in the RFE, regional development in the Northeast Asia, and the potential multinational economic cooperation among the countries around the Sea of Japan. A case study approach is used to investigate the RFE's response to FDI. The case study is the 3 year experience by South Korean-Russian joint venture Svetlaya.

## 2. INTERACTIONS BETWEEN RESOURCE AND MARKET REGIONS IN NORTHEAST ASIA

The global economy seems to have two contradictory forces globalization and regionalization. While the world economy tends towards transnationalism, countries in a region often form economic blocs to help manage in economic relations. The idea that Northeast Asia could be a big potential regional market in the 21st Century has been hypothesized in Japan by numerous Japanese authors such as Kanemori (1990), Ogawa and Murakami (1991), Toma (1991), and Ogawa (1993). Regionally, prefectures on the Japan Sea side of the country have initiated and promoted the hypothesis now known as 'Japan Sea Rim Economic Bloc' (Toma, 1991).

Northeast Asia is a region covering Japan, South and North Korea, three provinces of Northeastern China, and the Russian Far East. While this region accounts for nearly 300 million people, or 10% of the total Asian population in terms of GNP, Northeast Asia accounts for as much as 70% of total (Kanemori, 1990). Furthermore, Northeast Asia can be divided into two distinct parts: resource regions in the north and market regions in the south. Resource regions include the RFE and Northeast China and market regions cover Japan and Korea.

In the Northeast Asian region, countries of varied levels of economic development coexist, from highly developed Japan and NIE South Korea to less developed but fast growing Northeast China and finally to less developed North Korea and the RFE. Due to the diverse endowment of resources and economic growth characteristics, this region is often referred to as potentially one of the most dynamic economic regions in the world (Toma, 1991). A combination of rich resources in the RFE, inexpensive labour from China and North Korea, and technology and capital from Japan and Korea suggests the potential for creating a huge market within the region. Table 2.1 shows the distribution of the endowment of productive resources in the countries within the Northeast region.

Table 2.1. Endowment Conditions in Northeast Asia

| | Labour | Natural Resources | Capital | Technology |
|---|---|---|---|---|
| RFE | Short | Abundant | Short | Short |
| NE China | Abundant | Sufficient Short | Short | |
| N. Korea | Abundant | Sufficient | Short | Short |
| S. Korea | Sufficient | Short | Sufficient | Sufficient |
| Japan | Short | Short | Abundant | Abundant |

Source: (Kanemori, 1990)

Regional markets in Europe and North America take advantage of economies of scale. of the market. Northeast Asia, by contrast, features complementarity and diverse levels of economic conditions as the most cohesive forces for integration into one big market with a regional GNP of US$3 trillion (Ogawa, 1993).

The region is not completely free from negative aspects affecting the potential outlook however. While diversity of economic and resource conditions could function positively for the formation of a regional market in this region, the different cultural and political backgrounds of the countries tend to hinder the formation of such a market (Kanemori, 1990). When developing a project that requires close multinational cooperation among the countries in the region, one country's interests often conflict with another, as exemplified by the Tumen River Project.[1] Another hindering factor is the differing views concerning the Japan Sea Rim Economic Bloc. The idea enjoys popularity in Japan, but it has been less well received in other countries. Skeptical outsiders often point out that only part of Japan, mainly the less-

[1] Korea Economic Daily on 3 September 1991.

developed Japan Sea side prefectures, is really keen on the idea. This part could not play the immense role which Japan is supposed to play if the idea is to be implemented (Minakir, 1993).

Despite the above negative aspects, circumstances generally favour market integration in the long run (Ogawa, 1993). Market integration will focus on the trade, investment and long term projects associated with natural resources. The interaction between the resource and market regions in Northeast Asia is characterized by the flow of raw materials from north to south. Logs are important commodities in such interaction. Technologies and capital investments flow into the north from the south, as seen in Japanese compensation agreements, JV Svetlaya and Japanese sawmilling JV's. The sparsely populated RFE allows for foreign labour to work in the region as guest workers, such as the Chinese loggers in the JV Svetlaya or North Korean loggers in the Russian-North Korean JV in Khabarovskiy Kray.

If the interactions between the resource and market regions continue in Northeast Asia, both regions will benefit and prosper in the long run. The region, with its complementarity and varied economic conditions, will capitalize on transnational corporate activities to encourage and promote such interactions, and FDI can be a dominant form of interaction.

## 3. TRANSNATIONAL CORPORATION AND THE RFE

By resolution of the USSR Council of Ministers on 13 January 1987, foreign direct investment or foreign ownership of Soviet equity became possible in Russia. Subsequently, the Hyundai-Svetlaya joint venture project was formed as a foreign direct investment (FDI).

Foreign direct investment, by definition, is "an investment made outside the home country of the investing company, but inside the investing company. Control over the use of the resources transferred remains with the investor" (Dunning, 1993). A joint venture is a form of FDI in this sense. An enterprise that engages in FDI and owns or controls value-adding activities in more than one country is a TNC, more popularly known as a transnational corporation (Dicken, 1992). In other words, a TNC is a multi-activity firm which internalizes a cross-border intermediate product market (Dunning, 1993). By forming the joint venture, the Hyundai Resource Development Co., Ltd. became a TNC. However, the parent company was already a Korean TNC for other business activities.

Dicken (1992) remarked that TNC activity is becoming an increasingly popular means of adding value. In fact an increasing proportion of world trade is being made through TNC activities rather than through traditional international trade (Dunning, 1993) Such transnational corporate activity is known as intra-firm trade, which takes place between parts of the same firm but across national boundaries.

There are a variety of motivations for TNC activities. Among others, Dunning (1993) pointed out that TNC activity takes place whenever each of the following three conditions exists:

1. Ownership-specific-advantages: when a firm possesses certain specific advantages not possessed by competing firms of other nationalities.
2. Internalization: when such advantages are most suitably exploited by a firm itself rather than by selling or leasing them to other firms. In other words, the firm internalizes the use of its ownership-specific-advantages to maximize its profit.
3. Locational advantages: when it is more profitable for a firm to exploit its assets in overseas, rather than in domestic, locations.

A typical form of TNC activity is a multinational corporation investing overseas to expand its market. The corporation is traditionally from a developed country possessing the advantages of technology, quality and managerial skills. Japanese foreign investments in the 1960s and 1970s were made to relocate its "sunset" industries to locations where competitive advantages were still viable. This type of investment has a different effect from that of the market seeker. It promotes trade between home and host countries, or between host and third countries (Kojima, 1990). Some resource-poor countries invest abroad to gain access to natural resources unavailable at home. This is known as resource-seeker investment (Euh and Min, 1986). Foreign investment can also be made in search of technology transfers.

The primary motivation for Hyundai's investment in the RFE is understood as resource-seeking investment, but it can also seen as trade-promoting investment since Hyundai plans to export the produced logs to Korea and Japan.

FDI is a way of strengthening international links with the rest of the world economy, and a way for a country and a region to survive and succeed in the increasing globalization of the world economy and ever-changing international economic environment. From the above viewpoints, FDI channeled through transnational corporations can be one of the most powerful external agents to reshape the industries and the regional economy of the RFE.

## 4. FOREST SECTOR IN THE RFE

The potential of forest resources and forest industry in the RFE is discussed in this chapter.

### 4.1. Forest Resources Potential

The RFE comprises 622 million hectares, of which land contained in the forest inventory accounts for 81.6% or 507 million hectares. Compared to Canada, the RFE has a smaller total area but a little larger forest inventory. The total area of the RFE and its forest inventory by subregion are presented in Table 4.1.

Table 4.1. Forested Area in the RFE

| | Total Land Area | | Forest Inventory | | Forest Inventory Ratio |
|---|---|---|---|---|---|
| Subregion | (1,000 $km^2$) | (%) | (1,000 $km^2$) | (%) | (%) |
| Primorskiy Kray | 166 | 2.7 | 136 | 2.7 | 81.9 |
| Khabarovskiy Kray | 825 | 13.3 | 779 | 15.4 | 94.4 |
| Amurskaya Oblast | '364 | 5.9 | 317 | 6.3 | 87.1 |
| Kamchatskaya Oblast' | 472 | 7.6 | 452 | 8.9 | 95.8 |
| Magadanskaya Oblast' | 1,199 | 19.3 | 733 | 14.5 | 61.1 |
| Sakhalinskaya Oblast' | 87 | 1.4 | 76 | 1.5 | 87.4 |
| Yakutia | 3,103 | 49.9 | 2,579 | 50.8 | 83.1 |
| Total | 6,216 | 100.0 | 5,072 | 100.0 | 81.6 |

Source: *Finansi i Statistika* (1990), Goskomles (1990)

#### 4.1.1. Land Classification in the Russian Far East

The Forest Fund, or forest inventory, is a unique Russian term in the country's land classification system. Forest Fund is a much wider concept than forests or forested land. Besides forested area, it includes non-forested areas such as farm lands and

grass lands, and even water surface. A large part of the land in the RFE, amounting to 80%, is included within the Forest Fund (Table 4.1). Within the Forest Fund, the category of forested land comprises the largest share.

The ratio of forested land within the Forest Fund ranges from 60% to 75% in most subregions except the Sakha Republic (Yakutia), and Kamchatskaya and Magadanskaya Oblasts, where the ratios run below 50%. Because of the low forested rate in Magadan, the average ratio of forested area in the RFE is only 45% (Table 4.2). Most of the forests in the region are found in mountains except Yakutia. The share of mountain forests in the RFE is 64.6% in terms of area and 67.5% in terms of growing stock volume as in Table 4.2.

Table 4.2 also shows that because of the variety of climate conditions in this vast region the volume and species distribution vary among the subregions. Furthermore, the RFE can be divided into southern and northern regions. The southern region, consisting of Khabarovskiy Kray, Amurskaya Oblast', Primorskiy Kray and Sakhalinskaya Oblast', supports forests having higher average volume per unit area, and higher annual increment than those in the northern regions. The northern region consists of Yakutia, Magadanskaya Oblast' and Kamchatskaya Oblast'.

Table 4.2. Basic Indices of the Forests in the RFE

| Share of Subregions | Forested Land (%) | Average Stocking Density Ratio All Forests ($m^3$/ha) | Average Stocking Density Overmature Forests ($m^3$/ha) | Mean Annual Increment ($m^3$/ha/yr) | Mountain Forest (%) |
|---|---|---|---|---|---|
| (North) | | | | | |
| Yakutia | 48 | 64 | 83 | 0.6 | 34 |
| Kamchatskaya Oblast' | 42 | 63 | 81 | 0.8 | 98 |
| Magadanskaya Oblast' | 19 | 23 | 34 | 0.4 | 100 |
| Average | 36 | 53 | 66 | 0.6 | 77 |
| (South) | | | | | |
| Primorskiy Kray | 75 | 157 | 184 | 1.5 | 100 |
| Khabarovskiy Kray | 60 | 109 | 145 | 1.3 | 98 |
| Amurskaya Oblast' | 62 | 91 | 131 | 1.4 | 100 |
| Sakhalinskaya Oblast' | 64 | 125 | 185 | 1.4 | 100 |
| Average | 65 | 121 | 161 | 1.4 | 100 |
| RFE Average | 45 | 75 | 99 | 0.9 | 65 |

Source: Minakir and Sheingauz (1991), and Goskomles (1990, 1991)

The Forest Fund in the RFE is classified into forested and non-forested areas (Table 4.3). The former accounts for 70.8% and the latter 29.2% of the Forest Fund. The forested area is further divided into closed and open forests, in other words, stocked and unstocked forests. Nearly 78% of the forested area in the RFE, or 55.1% of the Forest Fund, are stocked forests. Unstocked forests make up only 22% of the forested area, or 15.6% of the Forest Fund.

The forests in the RFE have in the past been grouped by organization responsible for managing the forests: State Forest Management which includes forest authority, long term uses, other ministries, collective farm, and forest industry. While the administrative structure governing management of the forest resources of Russia has changed with the demise of the USSR, the new organizations appearing are assumed not to impact on the distribution of the forest resource among different types of orangizations responsible for management. Thus, the following dicussion, while focusing on the distribution according to organizational structures existing as of 1988, provides some guidance about the current situation.

Forest authority controls 82% of forested areas in the RFE, thus the discussions in the following focus on the stocked forest areas under control of either this organization or State Forest Management depending upon data availability.

The reforestation in this region largely relies on natural regeneration. The area artificially regenerated is extremely low, composing less than 0.3% of the total Forest Fund. The ratio goes no higher than 3% even on Sakhalin Island, which has the largest artificial forests in the RFE and where artificial regeneration has been practised since the early 20 century.

Table 4.3. Classification of Forest Fund under Control of Russian Federal Forestry Service[2]

| Subregion | Forest Area | | | | Non-Forest Area | Grand Total |
|---|---|---|---|---|---|---|
| | -- Stocked Forests -- | | Unstocked Forests | Total | | |
| | Total | Of Which Artificial Forests | | | | |
| | (1,000 ha) | | | | | |
| Yakutia | 146,734 | 3 | 46,081 | 192,814 | 64,224 | 257,038 |
| Primorskiy Kray | 11,160 | 38 | 426 | 11,595 | 336 | 11,931 |
| Khabarovskiy Kray | 48,837 | 106 | 10,833 | 59,789 | 17,274 | 77,063 |
| Amurskaya Oblast' | 21,777 | 50 | 3,180 | 24,992 | 5,750 | 30,742 |
| Kamchatskaya Oblast' | 19,053 | 26 | 1,868 | 20,962 | 22,945 | 43,907 |
| Magadanskaya Oblast' | 22,121 | 3 | 14,856 | 37,000 | 34,772 | 71,772 |
| Sakhalinskaya Oblast' | 5,327 | 138 | 930 | 6,315 | 779 | 7,094 |
| Total | 275,007 | 364 | 78,174 | 353,467 | 146,080 | 499,547 |
| (%) | (55.1) | (0.1) | (15.6) | (70.8) | (29.2) | (100) |

Source: Sheingauz, A. S. *et al.* (1989)

Evident from Table 4.4, the forests artificially opened and denuded but not yet restocked areas account for 11.8% of the total Forest Fund in the RFE, while the area burned by forest fire accounts for 3.9%. The relatively high proportion of farmland results from the large reindeer-herding areas in Kamchatskaya Oblast' and Yakutia which are classified as farm land together with the land for agricultural production. Wetland including tundra accounts for a substantial part of the non-forested Forest Fund, 27.5%, and a significant part of the total forested areas, 8%.

The trend over time seems to indicate an improvement of overall forest conditions in the region, i.e. an increase of stocked forests and a decrease of unstocked forests. Nearly 32 million hectares of stocked forest were added in the period from 1968 to 1988. The area of unstocked forests was reduced by about 20 million hectares over the same period.

[2] This is new name of *Goskomles* (State Committee oo Forestry) after former Soviet Union broke up.

Table 4.4. Changes in Classification within Forest Fund from 1966 to 1988

| Year | Grand Total* | Forested Area: Stocked Forests: Total | Stocked Forests: Artificial Forests | Unstocked Forests: Unstocked Artificial Forests | Unstocked Forests: Burned by Forest Fires etc. | Unstocked Forests: Denuded but not Regenerated | Unstocked Forests: Sub-Total | Forested Area: Total | Non-Forested Area: Farm, Grass, Water | Non-Forested Area: Wetland, eroded land etc. | Non-Forested Area: Sub-Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1 million ha) | | | | | | | | | | |
| 1966 | 503.4 | 243.1 | 0.02 | 0.1 | 38.3 | 59.7 | 98.1 | 341.2 | 27.3 | 134.9 | 162.2 |
| 1973 | 500.1 | 253.8 | 0.1 | 0.1 | 29.7 | 56.9 | 86.7 | 340.5 | 23.1 | 136.5 | 159.6 |
| 1978 | 501.7 | 257.3 | 0.1 | 0.2 | 17.1 | 66.7 | 84.0 | 341.3 | 23.8 | 136.6 | 160.4 |
| 1983 | 500.8 | 266.0 | 0.2 | 0.3 | 22.0 | 57.4 | 79.7 | 345.7 | 24.2 | 130.9 | 155.1 |
| 1988 | 499.5 | 275.0 | 0.4 | 0.3 | 19.6 | 58.6 | 78.5 | 353.5 | 21.4 | 124.6 | 146.0 |
| Change | -3.9 | 31.9 | 0.4 | 0.2 | -18.7 | -1.1 | -19.6 | +12.3 | -5.9 | -10.3 | -16.2 |
| (%) | -1 | 13 | 1,900 | 200 | -49 | -2 | -20 | 4 | -22 | -8 | -10 |

Source: Sheingauz, A. S. *et al.* (1989)

* This area refers to only the areas under control of forest authorities.

About half of this improvement, however, is attributed to the forests in Yakutia, where remoteness and inaccessibility have prevented intensive forest development. Also it is pointed out that a tendency to exaggerate forest potential has caused a bias in forestry inventory and related statistics. Most noticeable is the case of Yakutia where overestimation of stocked forests and underestimation of unstocked forests have been commonly used to exaggerate the forest potential in the region (Fujiwara, Kakizawa and Ishii, 1992). In addition, the fact that only about 15% of AAC is harvested every year in Yakutia makes the large part of the potential in the region more unrealistic.

### 4.1.2. Forest Classification in the Russian Far East

Russian forests are classified into 3 groups, Group I, Group II, and Group III, according to their economic and environmental uses. Group I and Group II forests are mainly for natural resource conservation and environmental protection, whereas Group III are mainly for industrial uses. More detail of this classification scheme is found in Backman and Waggener (1991) as follows:

> "Group I forests. These forests have the greatest restrictions on use and are allocated mainly for protection of the environment. The uses include protection of streams and spawning areas, prevention of soil erosion, protection strips along main vehicular arteries, forests in little forested regions designed to provide general protection of the

surrounding environment, forests around cities and industrial areas designed to improve air quality, forests for the general use of the urban population, forests set aside for national parks, production of nuts and berries, as well as pre tundra forests. A limited amount of harvesting is permitted in this category of forests, solely to facilitate the protection aspect of their use.

Group II forests. These forests have both protection and industrial importance, are located in densely populated areas with a well developed transportation network. A greater degree of management is necessary in these forests to guarantee the continued supply of both industrial products and environmental protection functions than is the case in Group III forests below. Collective farm forests are located in Groups I and II. It is believed that government farm forests are located in Group I and Group II forests as well.

Group III forests. These forests are generally located in the well forested regions and are chiefly designated to provide a flow of wood to support the forest industry of Russia without causing damage to the makeup of those forests. One category within Group III forests is classified as reserve forests. Reserve forests have not yet been assigned to an industrial enterprise and are not expected to be economically developed for the next 15 to 20 years. The second category of Group III forests is called special zoned forests. It is not known for what reasons these forests have been set aside however. Probably, though not necessarily, the reasons stem from environmental factors. The balance of forests within Group III are considered to be operating forests presently developed or area expected to be developed within the course of the next two decades. Thus, reserve forests represent a store of wood volume which has yet to be allocated to any particular enterprise, and *ceteris paribus,* could be available for exploitation in the future. But the volume of timber from such reserve forest lands could be more a mirage than reality."

The distribution of these three groups of forests is broken down by subregion in Table 4.5.

Table 4.5. Forest Fund under Control of Forest Authority classified by Group

| Subregion | All Groups | Groups | | | Within Group III | | |
|---|---|---|---|---|---|---|---|
| | | I | II | III | Operational | Reserve | Special Zoned |
| | (1,000 ha) | | | | | | |
| Yakutia | 225,871 | 23,475 | 0 | 202,396 | 86,507 | 115,889 | 0 |
| Primorskiy Kray | 11,923 | 3,014 | 661 | 8,248 | 8,248 | 0 | 0 |
| Amurskaya Oblast' | 30,672 | 2,394 | 1,340 | 26,938 | 25,733 | 1,205 | 0 |
| Kamchatskaya Oblast' | 14,988 | 2,935 | 3 | 12,050 | 3,982 | 8,068 | 0 |
| Khabarovskiy Kray | 55,311 | 7,188 | 558 | 47,565 | 32,788 | 14,777 | 0 |
| Magadanskaya Oblast' | 71,507 | 3,329 | 0 | 68,178 | 51,869 | 0 | 16,309 |
| Sakhalinskaya Oblast' | 7,090 | 1,304 | 965 | 4,821 | 4,821 | 0 | 0 |
| Total | 417,362 | 43,639 | 3,527 | 370,196 | 213,948 | 139,939 | 16,309 |

Source: Goskomles (1990, 1991)

Group III is the dominant forest group in the RFE as it is elsewhere in Russia. The Group III forests are designated mainly for industrial uses, and 57.8% of the Group III forests is located in the region accessible by transportation network within next 20 years. 34% of of the Group III is in accessible, or reserved forests.

Compared to the other regions in Russia, the RFE presents a higher proportion of Group III forests and a relatively low proportion of Group II forests (Backman and Waggener, 1991). The region's vastness is reflected in a large share of Group III forests. The low proportion of Group II forests reflects the absence of urban areas, compared to the rest of Russia. The proportion of Group I forests is about the same as the national average. A large share of the underdeveloped forests in the permafrost zone, however, is classified as economic forests in Group III. The trend of changes in these groupings is presented in Table 4.6.

Table 4.6. Changes in Forested Area by Group in the RFE (1 million ha)

| | GROUP I | | | | | | GROUP II | GROUP III | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | Preserved Forests | Protective Forests | Green Belt | Nuts Collecting | Others | Total | ↓ | Exploitable Forests | Reserved Forests | Others | Total | GRAND TOTAL |
| 1966 | 31.9 | 31.8 | 1.5 | 0.2 | 1.7 | 67.1 | 3.8 | 168.1 | 254.8 | 9.6 | 432.5 | 503.4 |
| 1988 | 37.9 | 1.5 | 1.5 | 1.0 | 23.6 | 65.5 | 3.5 | 91.8 | 183.4 | 155.3 | 430.5 | 499.5 |

Source: Sheingauz, A. S. *et al.* (1989)

The above table shows no major changes in areas designated for each group between 1966 and 1988, but significant changes have taken place in the composition within groups. In Group I, the ratio of protected forests was adjusted downwards after the 1988 national forest inventory. In Group III, both the forests classified as commercial and reserved have been significantly reduced, and as a result, more forests have been excluded from being exploited by productive activities. The inaccessible and low valued forests previously classified as productive forests in Group III are now excluded from productive forests. These changes were designed to regulate the uncontrolled expansion of productive forests at the expense of reserved forests (Fujiwara et al, 1992)

In Russia, privatization of agricultural land is taking place but most of the forested land is still owned by the state. In 1988, 98.6% of the forests were owned and controlled by the Russian Republic State Committee on Forest Resources (Goskomles). In the Far East, its subregional offices, called silvicultural territorial production agencies took the responsibility on behalf of the state organization (Minakir and Sheingauz, 1991).

### 4.1.3. Species, Volume and Distribution

There are 5 coniferous species and 10 hardwood species commonly found across the RFE. Their scientific names and other names are presented in the following.

Table 4.7. Names of Popular Tree Species in the RFE

| Scientific Name | Russian Name | English Name |
|---|---|---|
| (Coniferous) | | |
| *Abies sibirica* | Pikhta | Siberian silver fir |
| *Larix gmelini (or Larix dahurica)* | Listvennitsa | Dahurian larch |
| *Picea jezonensis* | Elka | Ezo spruce, White wood |
| *Pinus koraiensis* | Kedr, Sasnakoreiskaya | Korean pine |
| *Pinus sylvestris* | Sosna | European red pine, Scots Pine |
| (Hardwood) | | |
| *Betula ermanii* | Bereza | Russian rock birch |
| *Betula mandshurica (or B. platyphylla)* | Bereza | Machurian birch |
| *Fraxinus spp.* | Iasenj | Ashes |
| *Fraxinus mandshurica* | ---- | Japanese ash |
| *Juglans mandshurica* | Orekh | Machurian walnut |
| *Phellodendron amurense* | Barkhat | Amur cork tree |
| *Populus maximowiczii* | Topolj | Japanese poplar |
| *Populus tremula* | Osina | Aspen |
| *Quercus mongolica* | Dub | Japanese oak |
| *Tilia spp* | Lipa | Lime |
| *Tilia amurensis* | ---- | Basswood |
| *Ulmus davidiana var. japonica,* | Ilem | Japanese elm |
| *Ulmus laciniata* | ---- | Elm |

Source: All Nippon Checkers Corporation (1989), Anuchin (1985), Hong and Son(1993), Hora (1981), and Johnson (1984).

Because of the vastness of the RFE and the variety of climatic conditions, species and volume of the forests in the RFE vary among the subregions. Table 4.8 shows the area, volume and volume per unit area of the major species of stocked forests under control of State Committe on Forestry in the RFE. An overall look at the area from the table shows that coniferous forests account for 72.6% of the total area and 84.6% of the total growing stock volume, whereas hardwood species represent 9.7% of the area and 10.4% of the volume.

The deciduous species here are divided into hardwood and softwood according to the wood properties. The deciduous species, however, are classified by several other names. For example, oak, ash and mountain birch are also classified as shade tolerant, hardwooded broadleaf, broadleaved hardwoods and hardleaved. Birch and aspen and alder are classified as shade intolerant, softwooded broadleaf, broadleaved softwoods and softleaved (Fenton and Maplesden, 1986).

The climatic condition in a subregion is well reflected in the average volume per unit area. Table 4.8 explains that southern subregions have higher volumes per hectare than northern ones. The southernmost region, Primorskiy Kray, has the highest volume per hectare in the RFE. The average volume per hectare in Primorskiy Kray is higher than Canada's 163 cubic metres per hectare, and reaches the level of British Columbia's 197 cubic metres per hectare (Forestry Canada, 1990).

Table 4.8. Species Composition of Stocked Forests under Control of State Committee on Forestry

| Subregion | Coniferous | Deciduous | | Shrubs | Total |
|---|---|---|---|---|---|
| | | Hardwood | Softwood | | |
| | (Area) 1000 ha | | | | |
| Yakutia | 127,730 | - | - | 17,019 | 146,732 |
| Primorskiy Kray | 6,497 | 3,223 | 1,301 | 39 | 11,160 |
| Khabarovskiy Kray | 36,483 | 1,932 | 4,559 | 5,863 | 48,837 |
| Amurskaya Oblast' | 14,589 | 516 | 4,720 | 1,952 | 21,777 |
| Kamchatskaya Oblast' | 1,161 | 5,712 | 1,309 | 10,871 | 19,053 |
| Magadanskaya Oblast' | 9,453 | - | 313 | 12,355 | 22,121 |
| Sakhalinskaya Oblast' | 3,814 | 893 | 301 | 319 | 5,327 |
| Total | 199,727 | 12,376 | 14,486 | 48,418 | 275,007 |
| (%) | (72.6) | (4.5) | (5.2) | (17.6) | (100) |
| | (Growing Stock Volume) 1 million $m^3$ | | | | |
| Yakutia | 9,051.4 | - | 83.5 | 190.0 | 9,324.9 |
| Primorskiy Kray | 1,240.0 | 380.4 | 127.0 | 1.6 | 1,749.0 |
| Khabarovskiy Kray | 4,581.8 | 226.4 | 328.0 | 187.8 | 5,324.0 |
| Amurskaya Oblast' | 1,616.6 | 22.1 | 298.7 | 48.6 | 1,986.0 |
| Kamchatskaya Oblast' | 146.1 | 483.9 | 101.0 | 463.8 | 1,194.8 |
| Magadanskaya Oblast' | 340.9 | - | 33.5 | 140.4 | 514.8 |
| Sakhalinskaya Oblast' | 582.3 | 50.1 | 17.7 | 17.7 | 667.8 |
| Total | 17,559.1 | 1,162.9 | 989.4 | 1,049.9 | 2,0761.3 |
| (%) | (84.6) | (5.6) | (4.8) | (5.1) | (100) |
| | (Average Volume/ha) $m^3$/ha | | | | |
| Yakutia | 71 | - | 42 | 11 | 64 |
| Primorskiy Kray | 191 | 114 | 98 | 41 | 157 |
| Khabarovskiy Kray | 126 | 117 | 72 | 32 | 109 |
| Amurskaya Oblast' | 111 | 43 | 63 | 25 | 91 |
| Kamchatskaya Oblast' | 126 | 85 | 77 | 43 | 63 |
| Magadanskaya Oblast' | 36 | - | 107 | 11 | 23 |
| Sakhalinskaya Oblast' | 153 | 56 | 59 | 55 | 125 |
| Average | 88 | 94 | 68 | 22 | 75 |

Source: Sheingauz, A. S. *et al.* (1989)

Note: Data presented here is based upon principal species of forest stands.

Table 4.9 shows coniferous species composition in the RFE. From the table, it can be understood that by far the most dominant species in this region is dahurian larch (*Larix gmelini*). It accounts for 84.5% of the area and 73.3% of the growing stock volume of the coniferous forests.

In order of importance larch is followed by spruce (*Picea jezonensis*), European red pine (*Pinus sylvestris*), Korean pine (*Pinus koraiensis*), and fir (*Abies sibirica*). Most of the larch in the RFE, nearly 69%, is concentrated in Yakutia, where it comprises 91.5% of the coniferous forests. The prevalence of larch is not restricted to Yakutia, but is common in most of the RFE. Larch accounts for 91.7% and 100% of the coniferous species in Kamchatskaya and Magadanskaya Oblasts. Larch is scarcest in Primorskiy Kray, where it accounts for only 17.5% of the coniferous species.

Table 4.9. Coniferous Species

| Subregion | Korean Pine | Spruce | Fir | Larch | European Red Pine | Total |
|---|---|---|---|---|---|---|
| | (Area) 1000 ha | | | | | |
| Yakutia | 397 | 380 | 21 | 116,880 | 10,052 | 127,730 |
| Primorskiy Kray | 2,244 | 2,817 | 295 | 1,137 | 4 | 6,497 |
| Khabarovskiy Kray | 803 | 8,559 | 605 | 25,366 | 1,150 | 36,483 |
| Amurskaya Oblast' | 6 | 416 | 52 | 13,389 | 726 | 14,589 |
| Kamchatskaya Oblast' | - | 213 | - | 940 | 8 | 1,161 |
| Magadanskaya Oblast' | - | - | - | 9,453 | 0 | 9,453 |
| Sakhalinskaya Oblast' | 0 | 1,271 | 838 | 1,636 | 69 | 3,814 |
| Total | 3,450 | 13,656 | 1,811 | 168,801 | 12,009 | 199,727 |
| (%) | (1.7) | (6.8) | (0.9) | (84.5) | (6.0) | (100) |
| | (Growing Stock Volume) 1 million $m^3$ | | | | | |
| Yakutia | 74.2 | 48.0 | 3.8 | 7,881.6 | 1,043.8 | 9,051.4 |
| Primorskiy Kray | 503.4 | 515.0 | 44.6 | 176.8 | 0.2 | 1,240.0 |
| Khabarovskiy Kray | 173.6 | 1,492.5 | 83.5 | 2,701.3 | 130.9 | 4,581.8 |
| Amurskaya Oblast' | 1.1 | 71.2 | 8.8 | 1,473.1 | 62.4 | 1,616.6 |
| Kamchatskaya Oblast' | - | 45.8 | - | 100.2 | 0.1 | 146.1 |
| Magadanskaya Oblast' | - | - | - | 340.9 | 0.0 | 340.9 |
| Sakhalinskaya Oblast' | 0.0 | 239.0 | 149.8 | 192.7 | 0.8 | 582.3 |
| Total | 752.3 | 2,411.5 | 290.5 | 12,866.6 | 1,238.2 | 17,559.1 |
| (%) | (4.3 | (13.7) | (1.7) | (73.3) | (7.1) | (100) |
| | (Average Volume/ha) $m^3$/ha | | | | | |
| Yakutia | 187 | 126 | 181 | 67 | 104 | 71 |
| Primorskiy Kray | 224 | 183 | 151 | 155 | 50 | 191 |
| Khabarovskiy Kray | 216 | 174 | 138 | 106 | 114 | 126 |
| Amur Oblast' | 183 | 171 | 169 | 110 | 86 | 111 |
| Kamchatskaya Oblast' | - | 215 | - | 107 | 12 | 126 |
| Magadanskaya Oblast' | - | - | - | 36 | - | 36 |
| Sakhalinskaya Oblast' | - | 188 | 179 | 118 | 12 | 153 |
| Average | 218 | 177 | 160 | 76 | 103 | 88 |

Source: Sheingauz, A. S. *et al.* (1989)

The highly valued species, Korean pine and spruce, exist most densely in the southern subregions, especially in Primorskiy Kray. Korean pine forest has as high as 218 cubic metres per hectare of growing stock volume per unit area. Spruce, fir and European red pine follow Korean pine in terms of volume per hectare with 177, 160 and 103 cubic metres per hectare respectively. Larch has the least volume per hectare, 76 cubic metres.

Table 4.9 shows the deciduous species composition. The deciduous species growing in Russia are further grouped into hardwood and softwood according to the wood stree point expressed in MPa[3]. The tree species with the point greater than 40 MPa are called hardwood deciduous and the ones less than 40 MPa are softwood deciduous (Backman and Waggener, 1991). Most of the deciduous forests are concentrated in the southern subregions and Kamchatskaya Oblast'. Each of Primorskiy and Khabarovskiy Krays, and Amurskaya and Kamchatskaya Oblasts has between 17% and 26% of the total deciduous forests in the RFE.

Deciduous forests are the most prominent in Primorskiy Kray, where they comprise 40.5% of total forests, followed by Kamchatskaya Oblast' (36.8%), Amurskaya Oblast' (24.0%), and Sakhalinskaya Oblast' (22.4%). Yakutia is recorded as having no deciduous forests. Deciduous forests are significant only in Primorskiy Kray.

[3] MPa is an abbreviation for megapascals. MPa is a unit of measure common in the International System of Units (SI) to denote stress. One pound per square inch (psi) equals approximately 0.007 MPa.

Table 4.10. Deciduous Species

| Subregion | Hardwood | | | | | Softwood | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ash | Oak | Bass-wood | Others | Sub-Total | White Birch | Poplar | Others | Sub-Total |
| | (Area) 1000 ha | | | | | | | | |
| Yakutia | - | - | - | - | - | 1,817 | 53 | 113 | 1,983 |
| Primorskiy Kray | 309 | 1,947 | 390 | 677 | 3,223 | 990 | 63 | 248 | 1,301 |
| Khabarovskiy Kray | 107 | 656 | 343 | 826 | 1,932 | 3,458 | 195 | 906 | 4,559 |
| Amurskaya Oblast' | - | 436 | 19 | 61 | 516 | 4,505 | 30 | 185 | 4,720 |
| Kamchatskaya Oblast' | - | - | - | 5,712 | 5,712 | 657 | 173 | 479 | 1,309 |
| Magadanskaya Oblast' | - | - | - | - | - | 12 | 210 | 91 | 313 |
| Sakhalinskaya Oblast' | - | 25 | - | 868 | 893 | 139 | 16 | 146 | 301 |
| Total | 416 | 3,064 | 752 | 8,144 | 12,376 | 11,578 | 740 | 2,168 | 14,486 |
| (%) | (3.4) | (24.8) | (6.1) | (65.8) | (100) | (79.9) | (5.1) | (15.0) | (100) |
| | (Growing Stock Volume) 1 million $m^3$ | | | | | | | | |
| Yakutia | - | - | - | - | - | 64.7 | 6.4 | 12.5 | 83.5 |
| Primorskiy Kray | 39.8 | 183.3 | 59.6 | 97.7 | 380.4 | 91.0 | 10.5 | 25.5 | 127.0 |
| Khabarovskiy Kray | 14.0 | 59.0 | 51.6 | 101.8 | 226.4 | 214.0 | 35.6 | 78.4 | 328.0 |
| Amurskaya Oblast' | 0.0 | 16.0 | 2.3 | 3.8 | 22.1 | 275.8 | 5.7 | 17.2 | 298.7 |
| Kamchatskaya Oblast' | - | - | - | 483.9 | 483.9 | 51.3 | 21.0 | 28.7 | 101.0 |
| Magadanskaya Oblast' | - | - | - | - | - | 0.4 | 26.1 | 7.0 | 33.5 |
| Sakhalinskaya Oblast' | - | 2.0 | - | 48.1 | 50.1 | 8.1 | 2.1 | 7.5 | 17.7 |
| Total | 53.8 | 260.3 | 113.5 | 753.3 | 1,162.9 | 705.3 | 107.4 | 176.7 | 989.4 |
| (%) | (4.6) | (22.4) | (9.8) | (64.8) | (100) | (71.3) | (10.9) | (17.9) | (100) |
| | (Average Volume/ha) $m^3$/ha | | | | | | | | |
| Yakutia | - | - | - | - | - | 36 | 121 | 110 | 42 |
| Primorskiy Kray | 129 | 94 | 153 | 144 | 114 | 92 | 167 | 103 | 98 |
| Khabarovskiy Kray | 131 | 90 | 150 | 123 | 117 | 62 | 183 | 87 | 72 |
| Amurskaya Oblast' | - | 37 | 121 | 62 | 43 | 61 | 190 | 93 | 63 |
| Kamchatskaya Oblast' | - | - | - | 85 | 85 | 78 | 121 | 60 | 77 |
| Magadanskaya Oblast' | - | - | - | - | - | 33 | 124 | 77 | 107 |
| Sakhalinskaya Oblast' | - | 80 | - | 55 | 56 | 58 | 131 | 51 | 59 |
| Average | 129 | 85 | 151 | 90 | 94 | 61 | 145 | 82 | 68 |

Source: Sheingauz, A. S. *et al.* (1989)

The RFE represents a vast forest area but the forest conditions differ among subregions as seen above. For example, more than one-half of the forest in the RFE is in the northern subregion, but the quality of the forests is inferior to the southern subregion because of the harsher climate, smaller tree size and lower stocking, and the dominance of less-valued larch. The average volume per hectare in Yakutia is less than 1/2 of that of Primorskiy Kray, which has the highest volume per hectare of the RFE. In Magadan the same figure goes down to as low as 1/4 of that of Primorskiy Kray. However, in the south, the average volume per hectare is comparable to the Canadian national average (Table 4.10). Average volumes per hectare of certain species in Primorskiy Kray are close to the level of British Columbia's.

Table 4.11 Growing Stock Volume per hectare between Canada and the RFE

| | Coniferous | | | | Hardwood | | | |
|---|---|---|---|---|---|---|---|---|
| | Average | Pine | Spruce | Fir | Larch | Deciduous Average | Softwood Deciduous Aspen | W. Birch |
| | ($m^3$/ha) | | | | | | | |
| Yakutia | 71 | 187 | 126 | 181 | 67 | - | 121 | 36 |
| Primorskiy Kray | 191 | 224 | 183 | 151 | 155 | 114 | 167 | 153 |
| Khabarovskiy Kray | 126 | 216 | 174 | 138 | 106 | 117 | 183 | 150 |
| Amurskaya Oblast' | 111 | 183 | 171 | 169 | 110 | 43 | 190 | 61 |
| Kamchatskaya Oblast' | 126 | - | 215 | - | 107 | 85 | 121 | 78 |
| Magadanskaya Oblast' | 36 | - | - | - | 36 | - | 124 | 33 |
| Sakhalinskaya Oblast' | 153 | - | 188 | 179 | 118 | 56 | 131 | - |
| Average(RFE) | 103 | 218 | 177 | 160 | 76 | 94 | 145 | 61 |
| Canada | 203.6 | 198.9 | 170.3 | 195.0 | 155.1 | 136.0 | 188.1 | 90.7 |
| B. C. | 258.2 | 209.5 | 249.3 | 233.4 | 227.4 | N.A. | 225.6 | 159.2 |

Note: 1. Hardwood deciduous species, also known as shade-tolerant hardwood species and "hard" hardwood, include oak, ash, beech, and stone birch.
2. Softwood deciduous species, also known as shade-intolerant hardwood species and "soft" hardwood, include aspen, white birch, alder, lime, and basswood.
3. Maple alone is used for Canada in the comparison of hardwood deciduous average.

Source: Compiled from Sheingauz, A.S. *et al.* (1989), Forestry Canada (1990) and Fenton and Maplesden (1986)

Table 4.12 shows that the total forest area in the RFE has been increasing over time. However, a large part of the increase is attributed to the larch in Yakutia. The areas of the high valued Korean pine show a decline over time.

Table 4.12. Changes in Species Composition Over Time

| Year | Korean Pine | Spruce /Fir | Larch | Europ. Red Pine | Total | Oak | Ash | White Birch | Others | Total | Shrubs | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1 million ha) | | | | | | | | | | | |
| 1966 | 4.0 | 15.5 | 155.1 | 9.4 | 184.0 | 2.7 | 0.5 | 9.0 | 11.2 | 23.4 | 35.8 | 243.2 |
| 1973 | 3.7 | 15.6 | 162.9 | 10.5 | 192.7 | 3.0 | 0.5 | 9.8 | 11.7 | 25.0 | 36.1 | 253.8 |
| 1978 | 3.4 | 16.0 | 164.2 | 10.9 | 194.5 | 2.9 | 0.4 | 10.5 | 11.7 | 25.5 | 37.2 | 257.2 |
| 1983 | 3.2 | 16.0 | 167.9 | 11.5 | 198.6 | 3.0 | 0.4 | 10.6 | 12.2 | 26.2 | 41.2 | 266.0 |
| 1988 | 3.4 | 15.5 | 168.8 | 12.0 | 199.7 | 3.1 | 0.4 | 11.6 | 11.8 | 26.9 | 48.4 | 275.0 |

Source: Sheingauz, A. S. *et al.* (1989)

### 4.1.4. Annual Increment

The annual increment of the forests in the RFE is 202 million cubic metres (Table 4.13). This seems overestimated compared to 84.5 million cubic metres exclusive of Yakutia estimated by Cardellichio, *et al.* (1989). About 82% of the increment is attributed to coniferous species. Yakutia accounts for 40% of the increment. Yakutia and 3 southern subregions, Primorskiy Kray, Khabarovskiy Kray and Amurskaya Oblast', account for over 90% of total annual increment in the RFE.

The annual increment in Canada is 338 million cubic metres. The standing forest contributes 335 million cubic metres and natural regeneration is responsible for an additional 3 million cubic metres (Honer and Bickerstaff, 1985). Among them, the province of British Columbia (B.C.) represents 103.6 million cubic metres, just about half of the RFE's. However, the annual increment in B.C. is from a land base less than one fourth of the RFE's. The inventoried forest land in B.C. is 60.31 million hectares (Forestry Canada, 1990) against 275 million hectares of stocked forests in the RFE (Sheingauz *et al.*, 1989) The average annual growth rate (mean annual increment, or MAI) per hectare in Primorskiy Kray, Khabarovskiy Kray, Amurskaya Oblast' and Sakhalin Island is between 1.3 and 1.5 cubic metres per hectare, higher than that of the average of the RFE, 0.9 cubic metres per hectare. The MAI is 1.15 cubic metres per hectare exclusive of Yakutia (Cardellichio *et al.*, 1989). The MAI in the RFE is much lower than the one in Canada and B.C. The MAI in Canada is 1.7 cubic metres per hectare. The MAI in B.C. and Nova Scotia is estimated to be 2.3 cubic metres per hectare. In the case of managed stands on medium-to-good sites, it could be 10 cubic metres per hectare on the coast and 4 cubic metres per hectare in the interior

of B.C. (Cardellichio, *et al.*, 1989). This comparison suggests a significantly slower growth rate of the forests and lack of forest management in the RFE (Table 4.13).

Table 4.13. Annual Increment in the RFE

| Subregions | Annual Increment | | | | Mean Annual Increment/ha | | | |
|---|---|---|---|---|---|---|---|---|
| | Coniferous Species | Hardwood Deciduous | Softwood Deciduous | Total | Coniferous Species | Hardwood Deciduous | Softwood Deciduous | Average |
| | (1 mil. $m^3$/yr) | | | | ($m^3$/yr) | | | |
| Yakutia | 80.0 | - | 2.3 | 82.3 | 0.6 | - | 1.2 | 0.6 |
| Primorskiy Kray | 10.1 | 3.7 | 3.4 | 17.2 | 1.6 | 1.1 | 2.6 | 1.5 |
| Amurskaya Oblast' | 18.7 | 0.5 | 8.3 | 27.5 | 1.3 | 1.0 | 1.8 | 1.4 |
| Kamchatskaya Oblast' | 0.9 | 3.8 | 1.8 | 6.5 | 0.8 | 0.7 | 1.4 | 0.8 |
| Khabarovskiy Kray | 46.4 | 1.9 | 9.4 | 57.7 | 1.3 | 1.0 | 2.1 | 1.3 |
| Magadanskaya Oblast' | 3.0 | - | 0.6 | 3.6 | 0.3 | - | 1.9 | 0.4 |
| Sakhalinskaya Oblast' | 5.9 | 0.8 | 0.5 | 7.2 | 1.5 | 0.9 | 1.7 | 1.4 |
| (Averages) | | | | | | | | |
| RFE | 165.0 | 10.7 | 26.3 | 202.0 | 0.8 | 0.9 | 1.8 | 0.9 |
| Canada | | | | 338.0 | | | | 1.7 |
| B.C. | | | | 103.6 | | | | 2.3 |

Note: Total annual increment in B.C. is based upon 45.05 mil. ha. of the inventoried, stocked, productive and non reserved forest in B.C.

Source: Minakir and Sheingauz (1991) and Honer and Bickerstaff(1985)

There are six age classes of forested land as in the table. According to Backman and Waggener (1991), overmaturity is reached at age between 100 and 140 in coniferous species and between 50 and 70 in softwood deciduous species, while maturity is at age between 80 and 100 in the former, and 40 and 50 in the latter. Premature age class occurs at an age between 80 and 100 years for conifers and hardwood deciduous tree species and between 50 and 60 years for softwood deciduous species. Middle aged class occurs at age between 40 and 60 for coniferous and hardwood deciduous tree species, and 20 and 30 for softwood deciduous species. The age class of young stand I ranges from 10 to 25 years and young stand II from 25 to 40 years depending on the species. The division between age classes is not clear in softwood deciduous species as seen in Table 4.14.

Table 4.14. Six Age Classes of Russian Forests

| Age Class | Coniferous Species | Deciduous Species | |
|---|---|---|---|
| | | Softwood | Hardwood |
| Young I | 10 - 25 yrs. | 10 - 25 yrs. | 10 - 25 yrs. |
| Young II | 25 - 40 yrs. | - | 25 - 40 yrs. |
| Middle Aged | 40 - 60 yrs. | 20 - 30 yrs. | 40 - 60 yrs. |
| Approaching Mature | 60 - 80 yrs. | 50 - 60 yrs. | 60 - 80 yrs. |
| Mature | 80 - 100 yrs. | - | 80 - 100 yrs. |
| Overmature | 100 + yrs. | 50 - 70 yrs. | 100+ yrs. |

Source: Backman and Waggner (1991).

Table 4.15 shows the age classes distribution of the stocked forests in the region, which constitutes 55.1% of total forested area as presented in Table 4.3. Overmature forests in the RFE comprise 19% of the total, while mature and overmature forests combined comprise 49%.

Table 4.15. Maturity of Stocked Forests under Control of State Forest Management

| Subregions | Total | Young Stands | | Middle Aged Forests | Approaching Maturity | Mature | Over-mature |
|---|---|---|---|---|---|---|---|
| | | I | II | | | | |
| | (1,000 ha) | | | | | | |
| Yakutia | 146,732 | 15,689 | 13,844 | 35,726 | 9,718 | 39,894 | 31,861 |
| Amurskaya Oblast' | 11,160 | 335 | 605 | 2,861 | 1,920 | 4,113 | 1,326 |
| Kamchatskaya Oblast' | 48,83 | 3,559 | 4,254 | 12,817 | 4,612 | 15,259 | 8,336 |
| Khabarovskiy Kray | 21,777 | 2,292 | 2,826 | 6,937 | 2,186 | 4,818 | 2,716 |
| Magadanskaya Oblast' | 19,053 | 56 | 197 | 5,375 | 2,694 | 8,568 | 2,163 |
| Primorskiy Kray | 22,121 | 983 | 2,225 | 5,699 | 3,424 | 5,679 | 4,111 |
| Sakhalinskaya Oblast' | 5,327 | 513 | 636 | 1,516 | 454 | 1,015 | 1,196 |
| Total | 275,007 | 23,427 | 24,587 | 70,933 | 25,008 | 79,343 | 51,709 |
| (%) | (100.0) | (8.5) | (8.9) | (25.8) | (9.1) | (28.9) | (18.8) |

Source: Sheingauz, A. S. *et al.* (1989)

Table 4.16 shows the trend of changes in age-class structure and volume between 1966 and 1988. First, it shows the change in age-class structure in that the areas of young and, middle-aged forests are increasing whereas the ones of mature and overmature forests are decreasing. Every five years, about 5 million to 10 million hectares of mature and overmature forests disappear in the RFE by artificial or natural causes (Sheingauz, *et al.*, 1989). Second, the growing stock volume shows a fluctuation over time. One obvious trend in the forest volume in the RFE is downward, as with the forested areas.

Table 4.16. Trend of Changes in Forested Area and Volume in the RFE

| | Area | | | | Volume | |
|---|---|---|---|---|---|---|
| Year | Young | Middle Aged | Approaching Mature | Mature & Overmature | Total | Mature & Overmature |
| | 1 million ha | | | | 1 million $m^3$ | |
| 1966 | 21.8 | 34.4 | 23.0 | 164.0 | 22,419.5 | 15,714.9 |
| 1973 | 34.4 | 38.3 | 21.9 | 159.1 | 22,098.6 | 16,409.2 |
| 1978 | 39.2 | 45.8 | 22.9 | 149.3 | 21,964.1 | 20,163.4 |
| 1983 | 42.8 | 55.2 | 24.8 | 141.2 | 21,702.3 | 14,761.8 |
| 1988 | 48.0 | 70.9 | 25.0 | 131.1 | 19,686.3 | 12,982.1 |
| 1966-1988 | +26.2 | +36.5 | +2.0 | -32.9 | -2,733.2 | -2732.8 |
| (%) | +120 | +106 | +9 | -20 | -12 | -17 |

Source: Sheingauz *et al.* (1989)

### 4.1.5. Rehabilitation of Damaged Areas

Several factors limit the growth of the resource base and the utilization of resources. Among others, fire damage and lack of reforestation are major ones.

One of the primary issues related to the growth of timber volume in the RFE is the control of forest fires. Statistically the average area damaged by forest fire in a year between 1978 and 1987 was 308,500 hectares, which is 0.006% of total forest area in the RFE (Table 4. 17). The actual figure, however, could have been 7 or 8 times higher than provided in the official statistics (Sheingauz, 1990). This could be about 0.4% of the total forest area in a year, which is quite a significant area and delays the improvement of forest conditions in the region. The fire protection efforts usually suffer from lack of manpower and equipment and budget (ERI, 1991).

Table 4.17. Reported Area Damaged by Forest Fires per Year between 1978 and 1987

| Subregions | Area damaged by forest fire (1,000 ha) | Share in total forest area (%) |
|---|---|---|
| Yakutia | 131.0 | 0.05 |
| Primorskiy Kray | 13.7 | 0.11 |
| Khabarovskiy Kray | 51.9 | 0.07 |
| Amurskaya Oblast' | 85.8 | 0.28 |
| Kamchatskaya Oblast | 5.8 | 0.01 |
| Magadanskaya Oblast' | 16.9 | 0.02 |
| Sakhalinskaya Oblast' | 3.4 | 0.05 |
| Total (RFE) | 308.5 | 0.06 |

Source: (Sheingauz, 1990)

Table 4.18 shows the area and volume damaged by forest fires from the official statistics of 1992.

Table 4.18. Forest Fire Statistics in 1992

| Subregions | No. of Forest Fire (Occurance) | Damaged Area (ha) | Damaged Volume (1,000 $m^3$) |
|---|---|---|---|
| Yakutia | 1,040 | 215,135 | 5,104.2 |
| Primorskiy Kray | 243 | 8,854 | 135.3 |
| Khabarovskiy Kray | 377 | 20,224 | 147.5 |
| Amurskaya Oblast' | 404 | 55,681 | 279.0 |
| Kamchatskaya Oblast | 107 | 10,074 | 175.4 |
| Magadanskaya Oblast' | 171 | 26,658 | 360.6 |
| Sakhalinskaya Oblast' | 26 | 104 | 5.4 |
| Total (RFE) | 2,368 | 336,730 | 6,207.4 |

Source: *Goskomstat Rossii (1993).*

Reforestation is practised to improve the areas damaged by logging and forest fires in the RFE. The results are modest. According to Russian regulation, at least 30% of cut areas are supposed to be regenerated by the actual replenishment lags far behind. Between 1986 and 1988, an average of 400,000 hectares were logged every year while only 14% of them, or 56,000 hectares, were replanted (Sheingauz, 1991). During that period, an average 714,000 hectares was damaged by forest fires per year. If the areas damaged by fires are included in areas to be reforested, the rehabilitation rate goes down to 5% of the total damaged areas (Sheingauz, 1991).

Table 4.19. Reforestation in the RFE (1988)

| Subregion | Total Reforested Area (1,000 ha) | Successfully Regenerated (1,000 ha) | Survival Rate (%) | Share of Artificial Forest Stocked | |
|---|---|---|---|---|---|
| | | | | Forests (%) | Total(%) |
| Yakutia | 6 | 4 | 67 | 0.002 | 0.002 |
| Primorskiy Kray | 243 | 47 | 19 | 0.3 | 0.4 |
| Khabarovskiy Kray | 400 | 225 | 56 | 0.2 | 0.4 |
| Amurskaya Oblast' | 173 | 85 | 49 | 0.2 | 0.3 |
| Kamchatskaya Oblast | 101 | 67 | 66 | 0.1 | 0.3 |
| Magadanskaya Oblast' | 35 | 26 | 74 | 0.01 | 0.07 |
| Sakhalinskaya Oblast' | 262 | 196 | 75 | 2.6 | 3.1 |
| Total (RFE) | 1,220 | 650 | 53 | 0.1 | 0.2 |

Source: (Sheingauz, 1990)

Table 4.19 shows that as of January 1988, 1.2 million hectares had been replanted and only 53% were successfully regenerated. The forested areas artificially established account for only about 2% of the total forested area.

### 4.1.6. Accessibility

The forest resources in the RFE allow limited access: physically by modestly developed transportation network, and administratively by groupings for specific uses as discussed earlier and by organizations responsible for managing forest lands. The organizations include forest authority, other ministries, government farms, and collective farms, and timber industry. Table 4.20 shows the areas controlled by these organizations. The forest lands allocated for forest industry are negligible and not presented in the Table.

Table 4.20. The Forest Fund: Areas Controlled by Different Organizations in the RFE

| Organization | Forest Area | Forest Land | Stocked Forests | Growing Stock Vol. |
|---|---|---|---|---|
| | ---------- | --(thousand ha)---------- | | (million $m^3$) |
| State Forest Management | 499,546.0 | 353,467.5 | 275,006.0 | 20,761.6 |
| Forest Authority | 417,360.0 | 314,467.8 | 247,858.7 | 19,166.7 |
| Share of total (%) | (82.0) | (86.9) | (87.8) | (72.9) |
| Long Term Use | 82,186 | 38,999.7 | 27,147.3 | 1,594.9 |
| Other Ministries | 7,489.2 | 6,246.3 | 5,447.5 | 493.2 |
| Collective Farms | 146.6 | 146.6 | 97.9 | 1,813.2 |
| Total | 507,181.8 | 359,860.4 | 280,551.4 | 23,068 |

Source: *Goskomles (1990,1991)*

As shown in the table, forest authority has the largest share of each classification. 88% of total forested area and 73% of total growing stock volume are under control of the organization. These are probably the areas where most of the initial forestry investments would be directed in the future. Table 4.21 shows the areas and volume under control of the forest authority and exploitable based upon the transportation network to be developed within the next 20 years.

Out of total stocked forests under the control of forest authority, 47% of coniferous, or 88.6 million hectares and 31% of deciduous forest areas, or 18.3 million hectares, fall on the category of exploitable in the next 20 years. In terms of volume, 59%, or 9.7 billion $m^3$ of coniferous forests, and 57%, or 1.4 billion $m^3$ of deciduous forests, are classified as exploitable within the next 20 years. By subregion, Shakalinskaya Oblast', Primorskiy Kray, Amurskaya Oblast', and Khabarovskiy Kray show higher ratio of exploitable forests than other regions.

Table 4.21. Area and Volume of Stocked Forests, Exploitable under Control of Forest Authority

| Subregion | Coniferous Species | Deciduous Species | Total Exploitable Forests | Total Stocked Forests | Ratio of Exploitable Forests |
|---|---|---|---|---|---|
| | ---------- (1,000 ha) ---------- | | | | (%) |
| Yakutia | 45,820 | 1,336 | 47,156 | 139,485 | 34 |
| Primorskiy Kray | 5,202 | 3,793 | 8,995 | 11,157 | 81 |
| Khabarovskiy Kray | 18,477 | 5,211 | 23,689 | 39,277 | 60 |
| Amurskaya Oblast' | 12,705 | 4,855 | 17,560 | 21,777 | 81 |
| Kamchatskaya Oblast | 621 | 2,128 | 2,748 | 8,787 | 31 |
| Magadanskaya Oblast' | 2,312 | 132 | 2,443 | 22,052 | 11 |
| Sakhalinskaya Oblast' | 3,436 | 893 | 4,329 | 5,326 | 81 |
| Total Exploitable Forests | 88,572 | 18,347 | 106,919 | 247,859 | 43 |
| Total Stocked Forests | 188,237 | 59,623 | 247,859 | | |
| Ratio of Exploitable Forests(%) | 47 | 31 | 43 | | |
| | ---------- (million $m^3$) ---------- | | | | (%) |
| Yakutia | 4,023 | 58 | 4,082 | 9,009 | 45 |
| Primorskiy Kray | 962 | 397 | 1,359 | 1,749 | 78 |
| Khabarovskiy Kray | 2,670 | 437 | 3,107 | 4,621 | 67 |
| Amurskaya Oblast' | 1,407 | 288 | 1,695 | 1,986 | 85 |
| Kamchatskaya Oblast | 111 | 196 | 307 | 621 | 49 |
| Magadanskaya Oblast' | 76 | 12 | 88 | 513 | 17 |
| Sakhalinskaya Oblast' | 516 | 52 | 568 | 668 | 85 |
| Total (RFE) | 9,766 | 1,440 | 11,206 | 19,167 | 58 |
| Total Stocked Forests | 16,634 | 2,532 | 19,167 | | |
| Ratio of Exploitable Forests(%) | 59 | 57 | 58 | | |

Source: *Goskomles (1990, 1991)*

To summarize the resource condition and its potential in the RFE, the forests in the RFE cover a vast area and offer an abundance of potential timber resources. However, the stock volume of the forests is significantly lower than that of other comparable countries due to slow growth rate, low stocking density, and different management practices. In addition, the forests in the RFE are largely deteriorating, especially in the southern regions where geographic advantage for foreign investment is high and the high-valued species are concentrated. In the north, where the forests have been relatively protected from development by remoteness and inaccessibility, the quality, species composition and volume per hectare are inferior to the other regions because of the harsher climatic conditions. The forests in the north are mostly in the

permafrost zone, and any small changes to the forests could cause irrevocable damage to the regional environment. These vulnerable environmental conditions become major constraints to intensive forest development in the RFE, especially in the north. Despite these problems, the potential of the forest resources in the region is well appreciated by foreign investors, especially those from neighbouring resource-poor countries. Many Korean and Japanese companies in the RFE recognized the potential and stated that what matters for the potential is not the resource per se but how to materialize the potential through appropriate investment. This view is quite contrasting to the one held by Russians who normally underestimate the resource potential in the RFE. Given the growing stock and infrastructure conditions, the four southern subregions of the RFE, i.e., Primorskiy Kray, Khabarovskiy Kray, Amurskaya Oblast' and Sakhalinskaya Oblast', have most of the economic resource base and suggest the highest potential for forest development in future. The exploitation of the forest resources in the RFE in the future is going to be affected by various cut control regulations.

## 4.2. Forest Products Industry

### 4.2.1. AAC and Annual Harvest

Table 4.22 shows the AAC volume since 1980. The AAC in the RFE has sustained at around 100 million $m^3$, though it has dropped slightly every year since 1987. Each of Yakutia and Khabarovskiy Kray accounts for one third of total AAC in the RFE. Next major portion of the AAC originates from Primorskiy Kray and Amurskaya Oblast'. Two subregions combined account for over 25% of total AAC.

Table 4.22. AAC in the RFE

| Subregion | 1980 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|
| | (1 million $m^3$) | | | | | | | | |
| Yakutia | 33.0 | 33.0 | 33.0 | 33.0 | 33.0 | 33.0 | 32.0 | 33.0 | 33.1 |
| Primorskiy Kray | 14.5 | 14.5 | 14.5 | 14.5 | 15.0 | 15.0 | 15.2 | 11.5 | 12.2 |
| Khabarovskiy Kray | 35.1 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 36.7 | 32.5 | 32.3 |
| Amurskaya Oblast' | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 11.0 | 16.1 | 16.1 |
| Kamchatskaya Oblast' | 2.5 | 2.5 | 2.5 | 2.2 | 2.2 | 2.2 | 2.2 | 1.9 | 1.9 |
| Magadanskaya Oblast' | 3.9 | 1.2 | 1.2 | 1.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Sakhalinskaya Oblast' | 6.6 | 8.1 | 8.1 | 8.1 | 6.0 | 6.0 | 6.0 | 4.6 | 4.7 |
| Total | 106.5 | 107.2 | 107.2 | 107.2 | 104.5 | 104.5 | 103.5 | 100.0 | 100.7 |

Source: 1. *Goskomstat SSSR*, 1990

2. *Goskomstat Rossii*, 1991, 1993

There are three sources of harvest in Russia: principal harvest, intermediate harvest, and other harvest. According to Backman and Waggener (1991), principal harvest is conducted largely in mature stands, primarily in Group III forests with some occurring in Group II forests. Intermediate harvest occurs in all groups of forests and includes stand improvement, thinning, and sanitation fellings. Other utilization is thought to occur in Groups I, II, and III forests mainly in response to industrial development.

Table 4.23 shows the AAC in 1992 and the actual harvest from the above three sources in each subregion. Only 24% of total AAC is actually harvested in the RFE. Sakhalinskaya Oblast' shows the highest proportion of actual harvest by 55.3% of AAC and Yakutia shows the lowest proportion by 11.5% of AAC. In general southern subregions present higher actual harvest compared to the northern subregions. Yakutia, while contributing the greatest proportion to the resource potential in the RFE, offers a very limited contribution to the actual harvest.

Table 4.23. AAC and Actual Harvest Volume in 1992

| Subregion | Area Harvested (thous. ha) | AAC (mil $m^3$) | Actual Harvest (mil $m^3$) | Actual Harvest ($m^3$/ha) | Actual Harvest (%) |
|---|---|---|---|---|---|
| Yakutia | 62.1 | 33.1 | 3.8 | 61.2 | 11.5 |
| Primorskiy Kray | 50.4 | 12.2 | 3.8 | 75.4 | 31.2 |
| Khabarovskiy Kray | 89.7 | 32.3 | 9.8 | 109.3 | 30.3 |
| Amurskaya Oblast' | 46.8 | 16.1 | 3.9 | 83.3 | 24.2 |
| Kamchatskaya Oblast' | 5.0 | 1.9 | 0.4 | 80.0 | 21.1 |
| Magadanskaya Oblast' | 1.6 | 0.4 | 0.1 | 62.5 | 25.0 |
| Sakhalinskaya Oblast' | 14.9 | 4.7 | 2.6 | 174.5 | 55.3 |
| Total | 270.5 | 100.7 | 24.4 | 90.2 | 24.2 |

Source: *Goskomstat Rossii* (1993)

The annual principal harvest in the RFE showed a steady increase until 1980 and stagnated thereafter (Table 4.24). The annual harvest is about one third of the allowable cut--107.2 million cubic metres in 1988--allocated for the RFE by the central government under the former USSR (Sheingauz, 1991). In 1988, only 10% of the AAC was actually logged in Yakutia and 38% in Khabarovskiy Kray where the utilization rate was the second highest after Sakhalineskaya Oblast' in the RFE (Sheingauz, 1991). Since the annual harvest volume is based upon the logs produced, the actual volume logged is usually higher. There exists a significant amount of losses during the

logging in the RFE, ranging from 5% to 35% depending upon the region (Cardellichio, et al., 1989).

### 4.2.2. Production

Table 4.24 shows principal harvest volume from 1965 to 1990. It explains that three-quarters of the annual principal harvest originates from the three southern subregions, Khabarovskiy Kray, Amurskaya Oblast' and Primorskiy Kray. This reflects the high productivity and quality of the forests, and a relatively well developed infrastructure, especially the railway network in these subregions.

Table 4.24. Annual Principal Harvest Volume, 1965 - 1990

| Subregion | 1965 | 1975 | 1980 | 1985 | 1990 |
|---|---|---|---|---|---|
| | (1 million $m^3$), (%) | | | | |
| Yakutia | 3.3(13) | 3.8(11) | 4.1(11.7) | 4.3(12) | 4.8(14.6) |
| Primorskiy Kray | 5.4(22) | 6.5(19) | 6.4(18.2) | 6.3(18) | 4.9(14.9) |
| Khabarovskiy Kray | 7.7(31) | 15.4(44) | 15.4(43.9) | 13.8(40) | 13.2(40.1) |
| Amurskaya Oblast' | 3.4(14) | 3.9(11) | 4.8(13.7) | 5.7(16) | 6.1(18.5) |
| Kamchatskaya Oblast' | 0.7 (3) | 1.0 (3) | 0.8 (2.3) | 0.9 (3) | 0.7 (2) |
| Magadanskaya Oblast' | 0.6 (3) | 0.4 (1) | 0.4 (1.1) | 0.3 (1) | 0.2 (0.6) |
| Sakhalinskaya Oblast' | 3.5(14) | 3.9(11) | 3.2 (9.1) | 3.5(10) | 3.0 (9.1) |
| Total | 24.6(100) | 34.9(100) | 35.1(100) | 34.8(100) | 32.9(100) |

Source: Compiled from Sheingauz (1990 and 1991) and Minakir *et al.* (1991)

It can also be noted that the relative importance of Khabarovskiy and Primorskiy Krays has slightly diminished as the harvest volume in these territories has been reduced since 1980. The continuous logging and the consequent deterioration of productivity of economic forests in these regions are to blame for the reduction. In addition, the logging areas have gradually moved into northern and remote areas, as highly productive regions are exhausted in the south. As a result, low grade and less-valued logs have become more prevalent.

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remote areas, as highly productive regions are exhausted in the south. As a result, low grade and less-valued logs have become more prevalent.

The industrial activities in the other sectors show a similar subregional distribution in proportion to the subregional harvest. Overall Khabarovskiy Kray shows the most active production in all sectors. Primorskiy Kray leads in plywood and chipboard production, while fibreboard production is heavily concentrated in Khabarovskiy Kray (Table 4.25).

Table 4.25. Production of Main Forest Products in 1991

| Subregion | Logs | Sawn Timber | Plywood | Chipbd | Fibrebd | Paper | Paperbd |
|---|---|---|---|---|---|---|---|
| | ----- mm $m^3$ ------ | | -------- 1,000 $m^3$ ------ | | - mm $m^2$ - | ------ 1,000 ton ---- | |
| Yakutia | 2.8 | 0.6 | - | - | - | - | - |
| Khabarovskiy Kray | 10.4 | 1.7 | 7.5 | 92.0 | 19.0 | 4.9 | 143.2 |
| Primorskiy Kray | 3.9 | 0.8 | 6.9 | 94.2 | 1.1 | - | - |
| Amurskaya Oblast' | 4.9 | 0.7 | 0.7 | - | - | 2.9 | - |
| Kamchatskaya Oblast' | 0.7 | 0.2 | - | 0.6 | - | - | - |
| Magadanskaya Oblast' | 0.2 | 0.1 | - | - | - | - | - |
| Sakhalinskaya Oblast' | 2.7 | 0.4 | - | - | - | 200.0 | 77.3 |
| Total (RFE) | 25.6 | 4.5 | 15.1 | 186.8 | 20.1 | 207.8 | 220.5 |

Source: Zausaev (1993)

Note: * Logs are from delivered harvest.

Paper and paper products are produced mainly in Sakhalinskaya Oblast' and Khabarovskiy Kray. Sakhalin accounts for over 90% of the total paper production in the RFE. The paper production on Sakhalin Island largely relies on the old paper production facilities built by Japan after 1905.

Let us examine the changes in production over time. Log production steadily increased to a peak in 1987. It has since dropped sharply to 25,600,000 cubic metres in 1991 (Table 4.24). The production of sawn timber reached its peak in 1970 and declined thereafter. In 1991, the production plummeted to less than 4,500,000 cubic metres, which is less than the level of 1965. The low quality of timber and the chaotic economic and political situations in Russia can be blamed for the decline (Kakizawa, 1992b).

Paper production has also stagnated and indeed decreased continuously since 1975 as shown in Table 4.26. The outdated production facilities in Sakhalin Island are the main cause of the stagnation. Plywood production also shows a decline after reaching its peak in 1970. In 1991, the production dropped to as low as 30% of peak production. On the other hand, fibreboard, chipboard and paperboard production have increased steadily since 1965. They are, however, still too small to meet the regional demand (Sheingauz, 1990).

Table 4.26. Production Trend of Wood Products between 1965 and 1991

| Products | Units | 1965 | 1970 | 1975 | 1980 | 1985 | 1987 | 1991 |
|---|---|---|---|---|---|---|---|---|
| Logs | 1mm $m^3$ | 24.6 | 29.5 | 34.9 | 35.1 | 34.8 | 35.2 | 25.6 |
| Sawn Timber | 1mm $m^3$ | 5.5 | 6.7 | 6.6 | 6.3 | 6.2 | 6.5 | 4.5 |
| Plywood | 1 mm $m^3$ | 36 | 50 | 46 | 36 | 36 | 40 | 15.1 |
| Chipboard | 1mm $m^3$ | 2 | 34 | N.A. | 100 | 117 | 159 | 186.8 |
| Fibreboard | 1mm $m^2$ | 5 | 7 | N.A. | 19 | 23 | 24 | 20.1 |
| Paper | 1000 t | 167 | 196 | 229 | 232 | 228 | 227 | 207.8 |
| Paperboard | 1000 t | 107 | 121 | 134 | 169 | 192 | 262 | 220.5 |

Source: Compiled from Sheingauz (1990) and Zausaev (1993)

In general, the forest industries in the RFE have stagnated since the 1970s, and processing has continued to produce a lower level of products, logging and saw-milling. Reasons for such stagnation are discussed in the following:

The first is an inefficient use of forest resources, or low productivity in the logging and wood processing industries. The forest industry in the RFE has long been based upon a small number of high-quality exportable coniferous species. This accelerates the shift of logging into even more remote and northern regions in search of the preferred species. Even the modernization of logging equipment has not helped to increase productivity. In addition to the advance of logging into northern and remote regions, the large amount of waste produced during production contributes to low productivity.

Secondly, low log prices contribute to the stagnation of the industry. Under the central planning system, the log price was set rather uniformly, regardless market preferences. Log prices failed to reflect market prices and were kept unrealistically low. The stumpage price was also set without reference to the costs involved in managing the forests. For example, the stumpage price for pine saw logs from

Khabarovskiy Kray takes only 3% of the log price (Fujiwara *et al.*, 1992). The forest management cost in Khabarovskiy Kray in the late 1980s was between about 24 and 25 million rubles a year, but the annual stumpage revenue was only 11.5 million rubles (Fujiwara et al, 1992). In addition, the distribution of capital investment has been strictly controlled by the central government and the forest management situation has gradually deteriorated over time.

Thirdly, there has been a lack of investment in processing facilities. The investment for all industries in the RFE has gradually shrunk from 752.2 million rubles in 1971 to 485.7 million rubles in 1981 (Fujiwara, *et al.*, 1992). No fund has been available for capital investment since 1988. Normally decisions on the important capital investment are made in European Russia, where the centre of power is located. The RFE has normally been treated as a lower priority region for investment. As the economic crisis continues and available funds for investment have been used up in Russia, investments for new production facilities have stopped and the aging of existing production facilities has continued.

The logging sector requires less capital investment and less labour per unit of production than other sectors in forestry. So far in the RFE, investments have been concentrated in the logging sector. As a result, the structure of the forest industry has become extremely unbalanced. Since the capability for expanding production capacity is notably lower in the RFE than in the other Russian regions for the region's lower investment priority, the imbalance is expected to continue.

Fourthly, the forest industry in the RFE was developed in order to expand the log export capability of the former Soviet Union. Log exports from the RFE increased in the 1960s and 1970s. However, the aging processing facilities and deteriorating quality of logs forced the industry to continue to search for a small number of high quality coniferous log species. As a result, upgrading and retooling the industry has been largely disregarded, although logging technology was imported from Japan to supply mainly logs for KS agreement.

Lastly, a labour shortage has also contributed to the stagnation of the industry. In the RFE, labour shortage is common across all sectors of industry. It is more acute, however, in the forest industry where the working environment is much harsher than other sectors. The forest industry also tends to have a higher labour mobility, so there is a poor build-up of technical expertise. Imported labour from neighbouring North Korea, China, Cuba and Vietnam is widely used in the RFE. Some 10% of the total

labour employed in the forestry sector was foreign in the late 1980s (Cardellichio et al., 1989).

Judging from the above, it may be possible to maintain the current level of production for the next few years. In order to increase the production, however, the logging operation inevitably needs to move into remote or new areas, which, in turn, will require a large amount of new investment.

### 4.2.3. Exports of Forest Products

About 25% of the total forest products produced in the RFE over the last 20 years has been exported. Traditionally, forest products are the most important export commodity in the RFE. Forest products accounted for 61% of total exports in the RFE in 1975. Although their share went down to 43.2% in 1990, it is still the largest among total exports in the region (ERI, 1991).

The RFE is the most important region in Russia for log exports. More than half of the country's log exports originate from the RFE (Barr and Braden, 1988). As the production of the forest industry stagnated in the 1980s, so did the exports of forest products.

The largest share of the RFE's export by value is logs, 75.4%, followed by sawn timber, 14%, pulp, 5.6%, and chips 2.6% in 1988 (Sheingauz, 1990). 81% of the logs are saw logs, 79% of which are softwood logs. The remaining 19% of the exported logs are pulp logs. Fibreboard, plywood and paper share less than 1% of total exports. From the composition of the exports, the export structure is oriented to unprocessed or primary processed products (Table 4.27).

Table 4.27. Exports of Forest Products from the RFE[4]

| Year | Logs | | | Sawn Timber | Chips |
|---|---|---|---|---|---|
| | Total | Saw Log | Pulp Log | | |
| | (1,000 $m^3$) | | | | |
| 1965 | 3,545.9 | N.A. | N.A. | 121.3 | - |
| 1970 | 6,116.4 | 4,094.1 | 734.6 | 184.5 | - |
| 1975 | 7,113.0 | 5,016.2 | 768.0 | 235.5 | 461.9 |
| 1980 | 5,595.6 | 3,755.6 | 837.0 | 291.5 | 526.0 |
| 1985 | 7,259.2 | 5,427.3 | 1,163.8 | 378.4 | 405.0 |
| 1988 | 8,203.8 | 6,811.0 | 1,369.5 | 539.8 | 669.5 |
| 1989 | 6,388.0 | 5,132.0 | 1,244.0 | 514.0 | 697.0 |

Source: Sheingauz (1990)

Table 4.28 shows that the largest share of log exports originates from Khabarovskiy Kray, followed by Amurskaya Oblast', Primorskiy Kray, and Sakhalinskaya Oblast' in 1991. Their respective shares were 52.3%, 25.3%, 13.8% and 4.7% (Arai, 1992). The exports of other products are largely dominated by one or two subregions. For example, 73.4% of the export of sawn timber originates from Khabarovskiy Kray and 58% of chips from Primorskiy Kray. Pulp exports are dominated by Khabarovskiy Kray and Sakhalinskaya Oblast', and paperboard exports are also monopolized by Khabarovskiy Kray.

[4] A recent report from JETRO (1993a) shows an inconsistency with the figures presented here and a dramatic decrease in the export figures. According to the report, the RFE exported 2,619.7 cubic metres of logs in 1989, 3,067.7 cubic metres in 1990, 1,961.8 cubic metres in 1991, and 1,882.6 cubic metres in 1992. The JETRO figures are again inconsistent with another Japanese source by Arai (1992). It seems to the author that a different way of tallying the figures or a different definition of export or individual item was adopted in each of the above sources. The following discussion is based upon the data available and disregards the inconsistency between the sources.

Table 4.28. Forest Products Exports from the RFE in 1991

| Subregion | Logs | Sawn Timber | Chips | Pulp | Paperboard |
|---|---|---|---|---|---|
| | ---------- 1,000 $m^3$ (%) ---------- | | ---------- 1,000 ton (%) ---------- | | |
| Yakutia | 62.1 (2.4) | - | - | - | - |
| Primorskiy Kray | 354.5(13.8) | - | 255.2(58.0) | - | - |
| Khabarovskiy Kray | 1,338.5(52.3) | 107.3(73.4) | 83.6(19.0) | 6.1(67.8) | 1.9(100) |
| Amurskaya Oblast' | 646.6(25.3) | 0.4 (0.3) | 87.7(20.0) | - | - |
| Kamchatskaya Oblast' | 38.0 (1.5) | 3.5 (2.4) | 13.8 (3.1) | - | - |
| Magadanskaya Oblast' | - | - | - | - | - |
| Sakhalinskaya Oblast' | 120.2 (4.7) | 35.0(23.9) | - | 2.9(32.2) | - |
| Total(RFE) | 2,560.0(100) | 146.2(100) | 440.3(100) | 9.0(100) | 1.9(100) |

Source: Arai (1992)

Table 4.29 explains that traditionally Japan is the major importer of Russian forest products, accounting for over 80% of total log exports from the RFE in the 1970s and about 60% in the 1980s (Sheingauz, 1990). The log volume exported to Japan was 3,560,000 cubic metres in 1991 and 3,660,000 cubic metres in 1992 (JAWIC, 1993). Japan has also monopolized all the chips produced in the RFE through the 2 industrial chips and pulpwood agreements.

Table 4.29. Exports of Forest Products to Japan

| Year | Logs | Sawn Timber | Chips |
|---|---|---|---|
| | ---------- 1,000 $m^3$ (%) ---------- | | |
| 1965 | 2,198.7 | 35.8 | n.a. |
| 1970 | 4,879.5 | 47.9 | n.a. |
| 1975 | 5,813.5 | 96.6 | 461.9 |
| 1980 | 4,597.2 | 117.2 | 526.6 |
| 1985 | 4,354.2 | 81.8 | 405.6 |
| 1988 | 4,899.5 | 116.8 | 669.5 |
| 1989 | 5,242.0 | 262.0 | n.a. |
| 1990 | 4,841.0 | 264.0 | n.a. |
| 1991 | 4,303.0 | 250.0 | 486.8 |
| 1992 | 4,268.0 | 222.0 | 303.1 |

Source: Sheingauz (1990), Linsan gyoosei kenkyukai (1992), Dal'lesprom (1993)

Forest products have been a flag-ship item in Japanese imports from the USSR. They accounted for 41.1% of total Japanese imports from that country in 1970. Their share decreased to 21.8% in 1988 and 20.7% in 1989 but continued to be the largest share among Japanese imports from the USSR (Ogawa and Murakami, 1991). Forest product imports from Russia were dominated by logs. Processed products including lumber comprised only 5% of total forest product imports. Of total imports for the 10 years between 1983 and 1992, softwood sawlogs accounted for 74.2%, followed by hardwood sawlogs 13.6%, pulpwood logs 7.2%, lumber 4.9% and others 0.1% (Table 4.30).

Table 4.30. Composition of the Imports by Product Category (1983 - 1992)

| Softwood (%) | | | | | |
|---|---|---|---|---|---|
| Sawlogs | Pulpwood | Lumber | Others | Hardwood Logs (%) | Total |
| 74.2 | 7.2 | 4.9 | 0.1 | 13.6 | 100 |

Source: JAWIC (1993)

The major species imported to Japan are spruce, fir, larch, European pine and Korean pine. Spruce and fir account for 48% and 45% respectively of the imports of softwood sawlogs and pulpwood logs. Larch is the second most important species in the sawlog imports, and represents 45.1% of pulpwood log imports. In the case of lumber imports, spruce and fir are dominant with 41.8% and European pine and larch take 25.4% and 18.1% respectively (Table 4.31).

Table 4.31. Species Composition of the Softwood Logs and Lumber Imported from the USSR(1983 - 1992)

| Species | Sawlogs | Pulpwood | Lumber |
|---|---|---|---|
| | (%) | | |
| spruce/fir | 48.0 | 45.0 | 41.8 |
| larch | 33.0 | 45.1 | 18.1 |
| E. red pine | 14.1 | 3.0 | 25.4 |
| Korean pine | 4.9 | 6.9 | 0.7 |
| Others | - | - | 14.0 |
| Total | 100 | 100 | 100 |

Source: JAWIC (1993)

### 4.2.4. Export Control Mechanisms

Several mechanisms have been introduced to control the exports of forest products since direct trade by individual enterprises was first allowed in 1987. They are related to export taxation, export quota and the license granting system, and disposal of foreign currency earnings. Many of them have served as barriers to the growth of exports. The recent developments related to these mechanisms are discussed below.

First, a Presidential Decree in 1992 imposed tariff barriers on exported forest products. A few products such as chips and hardwood pulp logs were exempt from export tax. The export taxation system set forth a tax amount in ECU (European Currency Unit) for the export of a ton of individual forest products (Table 4.32).

Table 4.32. Tax Amount for Forest Products

| Forest Products | Tax Amount (ECU/ton) |
|---|---|
| Logs (Softwood) | 12 |
| Logs (hardwood) | 10 |
| Sawn Timber (Primary Product) | 20 |
| Sawn Timber (End Product) | 50 |
| Chipboard | 5 |
| Fibreboard | 25 |
| Plywood | 50 |
| Wood Pulp | 50 |
| Newsprint | 74 |
| Kraft Paper and Paperboard | 53 |

Source: Arai (1992)

This export tax system, which is supposed to control exports, does little to inhibit them due to a very low ruble to dollar exchange rate.

Secondly, a compulsory sale of foreign currency earnings was imposed on all exporters by the same Presidential Decree because of a severe shortage of foreign reserves in Russia. The Russian Central Bank's Order No. 7 on 29 June 1992 and Supplementary Order No. 17 on 15 September 1992 ruled that 50% of foreign currency earnings should be sold to the Russian Central Bank (Yoon, 1992). Of the 50%, 30% could be sold directly to the Central Bank and 20% to the domestic foreign currency market. Accordingly, only 50% of the earning remained at the disposal of the

exporters. A growing need to secure more foreign reserves may force the Russian government to raise the rate from 50% to 100% (Arai, 1992). This makes it very difficult to increase exports from the RFE. This compulsory selling means a significant loss to exporters by selling and purchasing foreign currency at different exchange rates in the domestic market. If the handling fees charged by banks and the high inflation rate are considered, the loss to exporters becomes larger and the exporting enterprises will be inhibited from exporting.

Thirdly, another non-tariff barrier is the export quota and export license system. Export licenses were issued to regional production associations based upon the quotas granted to them by the central government. The quota is distributed among the enterprises under the production association. JV enterprises can freely export their own production without an export license or quota. This licensing and quota granting system, however, also becomes a barrier to streamlining the exporting process, since the export enterprises have no way to ensure, when entering into an export contract, whether a license will be granted and for the quantity stated in the contract. Forest products, classified as a strategic material, require an additional permit for export. Only a small number of specialized organizations can export the items designated as strategic materials. Currently, three organizations including *Dal'les*, and *Dal'intorg* are designated for the export of forest products in the RFE (Arai, 1992). This strategic material code applies to even JV exporters.

Lastly, the exchange rate usually affects the trade behaviour. The falling ruble to dollar exchange rate is observed as a measure taken deliberately by the Russian government in order to increase exports while inhibiting imports. The export promotion effect which could have been obtained under a normal situation, however, is largely offset by the instability prevailing in the transitional Russia. The falling exchange rate is compensated for by rapidly rising costs of production, especially in the area of transportation costs (Backman, 1993).

In summary, with the world's largest log markets in the neighbourhood and with its small regional market, it is a natural consequence that large part of the production of the forest industry in the RFE should be exported. The role of exports becomes even greater in the transitional economy in the RFE. In reality, however, the forest industry which should support the exports has stagnated its production and the situation has become worse ever since the break-up of the former Soviet Union. Lack of new investments might be the chief reason for such deteriorating situation of the industry. Conversely, new investments also would play a significant role to rejuvenate the

industry and increase exports. Considering the current financial situation in Russia, the new investments are expected to arrive from the outside of the country rather than from the inside. Now the questions are how the local environment reacts to the investments from outside of the region and how they contribute to the growth of the industry and exports. These questions are discussed in the remainder of this paper.

## 5. CASE STUDY : KOREAN-RUSSIAN FORESTRY JOINT VENTURE SVETLAYA

This chapter describes the nature of the Joint-venture (JV), forest resource conditions in the JV project site, and the JV's three year performance followed by a discussion on the JV's interactions with local environment.

### 5.1. THE JOINT VENTURE[5]

Svetlaya is a 50/50 Korea-Russia joint venture forestry project established on 1 July 1990. The JV Svetlaya is located in a small town of the same name in Ternei Rayon[6], which is a district in the northeastern corner of Primorskiy Kray. It is about 800 km from Vladivostok, the capital of the territory (Map 5.1).

The Korean partner in the JV, Hyundai Resource Development Co. Ltd., was newly incorporated at the time the joint venture was established. Hyundai Resource Development Co. Ltd. was formed from two companies in the Hyundai Group: Hyundai Corporation and Hyundai Wood Industries Co., Ltd. The former is a trading arm of the group and the latter specializes in manufacturing wood products including popular brands of office and home furniture for the Korean and overseas markets.

The Russian partner, after disintegration of the former Soviet Union, changed to *Primorsklesprom*, the Forest Industry Association in Primorskiy Kray and *Terneilesprom*, a district level forest production organization in Ternei Rayon.

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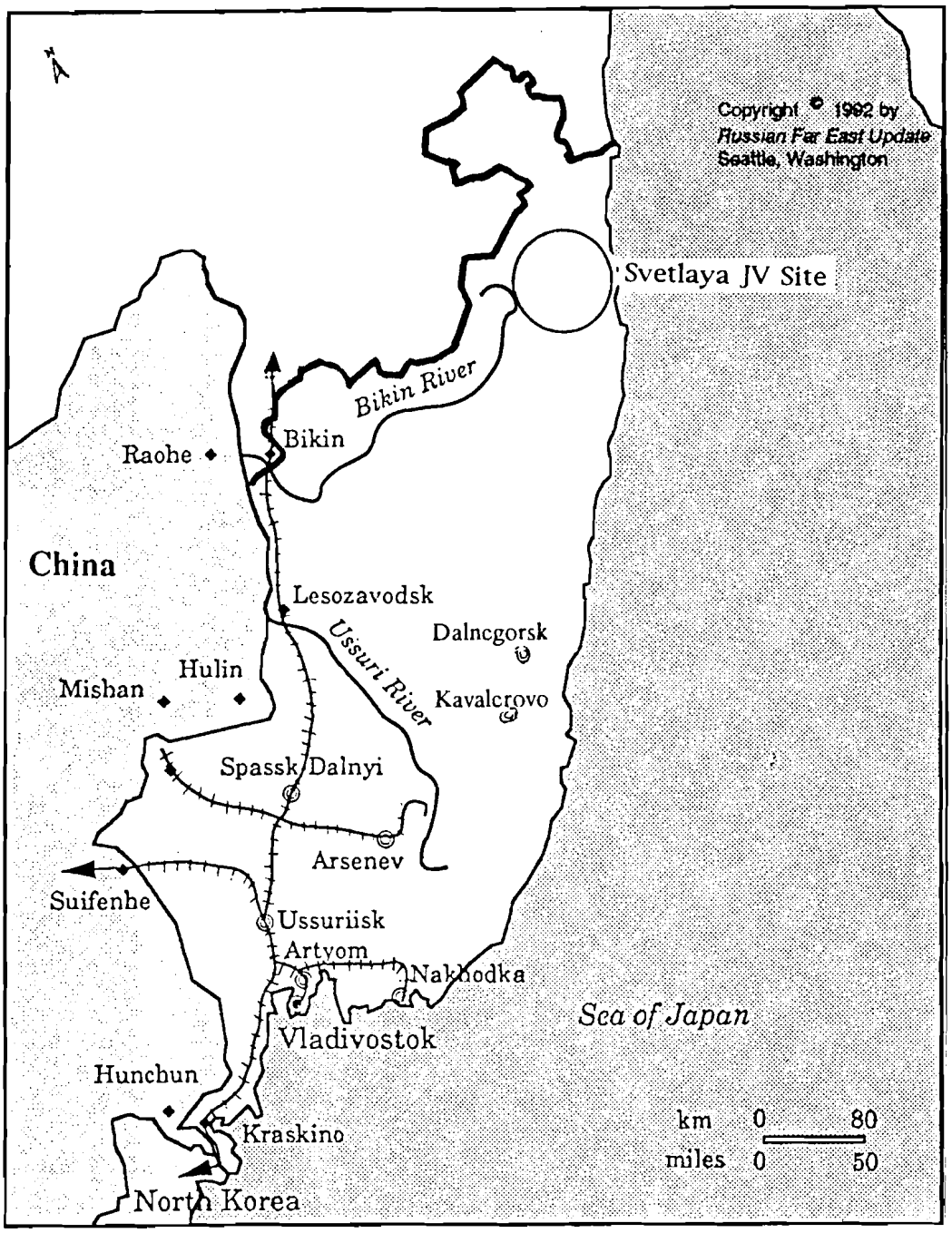
[5] The information on the project is based upon personal communication with Hyundai Resource Development Co., Ltd in Seoul, repeated several times from the early stage of the JV, and the author's personal site visit to Svetlaya where the JV is being operated.

[6] Rayon is a lower administrative unit than kray, or district. For example, there are 31 rayons including 5 city-districts in Primorskiy kray (Miller, 1993a).




Map 5.1. Location of JV Svetlaya

Source: RFEU (1992a), reproduced with permission

The project site had been an area allocated to a small *lespromkhoz* under *Terneilesprom* before the JV Svetlaya was established.

The JV project amounts to US$54 million. Hyundai's investment was undertaken by purchasing logging equipment and machinery and building camps and offices. As of April 1992, US$40 million had been spent by the JV mainly on purchasing logging machinery, mostly Finnish 'Finlanp' feller-bunchers, a few Canadian harvesters, and logging trucks, and US$4 million on purchasing spare parts and supplies. The Russian partners' share of the investment took the form of logging rights and land for offices, camps and port facilities necessary for the JV.

The period of the logging concession granted is 30 years from 1990 to 2020. The line of business activities the joint venture initially intended consists of logging and log sales, forest protection and reforestation, building logging roads and wood processing. The Russian partner is mainly responsible for the production planning whereas the Korean partner takes only a supportive role for the JV such as administration for the project.

## 5.2. FOREST RESOURCE

The project area covers 439,300 hectares in Terneiskiy and Pozharskiy Rayons of which 363,900 hectares are forested. 235,900 hectares of the forested area are to be developed during the project period. The topography of the project site is largely flat and does not require heavy expenditures for building new logging roads.

The total estimated volume of growing stock in the project area is 60.2 million cubic metres. The growing stock volume in the accessible area, however, is only 42.2 million cubic metres. The area planned for harvesting for the first 5 years from 1991 to 1996 is 9,393.5 hectares in Terneiskiy Rayon and 11,672 hectares in Pozharskiy Rayon and the growing stock volumes in the two areas are 1.9 million cubic metres and 2.3 million cubic metres respectively ( Table 5.1).

Table 5.1. The Areas and Growing Stock Volume to be Cut in the First 5 Years (1991-1996)

| | Terneiskiy (Svetlaya) | Pozharskiy | Total |
|---|---|---|---|
| Area (ha.) | 9,394 | 11,672 | 21,066 |
| Growing Stock Volume (1,000 $m^3$) | 1,910 | 2,326 | 4,236 |
| Volume per ha. ($m^3$/ha) | 203 | 199 | 201 |

Source: Compiled from Hyundai (1993)

The species composition of the whole area is 50% spruce, 30% larch and 20% fir and birch. The area to be logged in the first 5 years of the project, however, has 80% spruce, 10% larch and 10% fir (Hyundai, 1993), and is therefore more profitable than the balance of the JV area.

The soil conditions examined during the site visit were not productive because of large rocks, high gravel content, and generally a thin layer of top soil. One part of the forests appeared unhealthy. Diseased and dead trees were quite visible on the site. The site being logged at the time of the site visit had volume density as high as 250 cubic metres per hectare (Ivanovich, A., 1993). The site was covered with 90% spruce and 10% larch with an average age of 130 to 150 years.

The average diameter of the spruce logs was about 24 cm, estimated by random measurement of logs waiting at the roadside for trucking. However, small diameter logs under 15 cm were also quite visible. Based on volume per hectare according to published statistics, the growing stock volume on the project site is almost equal to the Canadian average (Table 2.12). By contrast to what the table implies, the actual quality of logs on site is discouragingly inferior. Average temperature of the project site is 25 degrees Celsius in the hot summer months and minus 30 degree Celsius in winter. The poor soil condition and harsh climate seem largely responsible for the inferior quality of the logs.

According to regulations, the JV should cut dead and diseased trees for forest hygiene purposes, which imposes extra cost on the JV. The annual volume cut should be exactly what is permitted, otherwise a penalty is imposed on the difference.

## 5.3. REFORESTATION AND RESEARCH

All logged areas are required to be replenished at the cost of the JV by regulations in the JV contract. The JV applies three different efforts to satisfy the reforestation regulation. 30% of the logged area is artificially reforested by seedlings grown at on-site nurseries. Two greenhouse nursery buildings (1,700 square metres) have been built for this purpose . Another 30% of the logged area relies on natural regeneration and the remaining 40% is covered by saving saplings during logging, which became possible by introducing new logging technology and training loggers.

The logged areas were reforested both by planting seedlings and by direct seeding. An area of 50 hectares was reforested in 1991 mainly by larch seedlings and a direct seeding of spruce between the seedlings. In 1992 370 hectares were reforested by planting seedlings and 123 hectares were seeded. Among them 292,000 spruce seedlings planted in the fall had been grown in the newly built greenhouse nursery on the project site. Table 5.2 shows that the area to be reforested in 1993 was 340 hectares, 100 hectares of which had been reforested by June 1993.

Table 5.2. Reforestation by the JV

| Year | Species | Reforested Area (ha.) | Quantity (no. of seedlings/kg) |
|---|---|---|---|
| 1991 | Larch (seedling) | 50 | 100,000 |
| | Spruce (seed) | 200 | |
| 1992 | Korean Pine (seedling) | 103 | 200,000 |
| | Spruce (seedling) | 267 | 400,000 |
| | Spruce (seed) | 123 | |
| 1993.6 | Spruce (seedling) | 100 | 285,000 |
| 1993 plan | | (340) | |

Source: Complied from Hyundai (1993)

The planting density in the reforestation is 2,500 seedlings per hectare and the average area planned to be reforested in a year is about 300 hectares. The greenhouse has enough capacity to produce the seedlings for the reforestation by the JV. The survival rate of the planted seedlings has become a problem. 38% of the planted seedlings died in 1992 but a local forest scientist is working to solve the problem.

## 5.4. PRODUCTION AND EXPORTS

Currently the project operates far under its capacity. The JV's manpower, equipment and port capacity has been prepared for the planned 1 million cubic metres a year production target, which has not been reached. Because of an environmental dispute over logging in the new area, which is not soon expected to be resolved, the realization of the 1 million cubic metres production target seems to be unrealistic at this moment. The JV's monthly average production was 20,000 cubic metres when the author visited the site. The annual production target is set at about 200,000 cubic metres. Almost all the produced logs are exported to Japan and Korea by two shipments per month. About 10,000 cubic metres are being shipped out in each shipment.

There seems to be no question about the justification for exporting the logs produced. Considering the particular location of the JV and the condition of the infrastructure, exports are a natural consequence. The fact that the world's largest log market is only a few hundred kilometres away across the Sea of Japan even further justifies the exports. Russian logs are imported to Japan through the ports on the Japan Sea coast.

The Japanese market is familiar with Russian logs. They have used the logs for many years since the early 20th century. Some of the Russian logs are similar to those of northern Japan, for example, Hokkaido. Facing a short supply of hardwood logs for plywood manufacturing, Japan has developed the technology to manufacture a softwood plywood using Russian larch logs. The production of softwood plywood has been increasing very rapidly in Japan.

Russian logs are relatively new to the Korean market. Since the Svetlaya project, however, development has been initiated by Hyundai, which has its own wood manufacturing company. The company manufactures home and office furniture using the Russian logs imported to Korea. The Russian logs are mainly used for flooring and temporary construction materials. They are also peeled and used as core veneer for the manufacture of hardwood plywood. The general problems of quality and undeveloped uses related to Russian logs have been gradually overcome with the new technology and extra demand caused by a short supply from other sources. The demand for Russian logs will not be lowered in these two countries .

## 5.5. REGIONAL DEVELOPMENT

Svetlaya is a village of 1,500 people on the Japan Sea coast. Ternei Rayon is the least populated district in the territory with 0.6 persons per square kilometre, it is far below the territory's average population density of 13.9 persons per square kilometre (Baklanov, Romanov, Moshkov, and Stepanko, 1992). The main industry in the village is fishing and fish processing, which employs three-fourths of the villagers, and the rest are engaged in forestry (Baklanov *et al.*, 1992).

The JV's 280 Russian workers are mostly from the local village and the JV contributes to local employment. Since the production target has been reduced to 200,000 cubic metres a year, the JV has laid off loggers. But the target of lay-offs are the Chinese loggers: most of the Russian loggers have been kept on site for the sake of the village's employment.

Originally an integrated production system was planned for the JV as part of the long-term plan. For this, a chip mill has been built on the site to produce 400 cubic metres of wood chips a day but an extra investment is said to be required to operate it. Building a saw mill and a pulp mill was also planned in relation to the logging venture. If these production facilities are completed according to the original plan, the JV's contribution to local employment will be even greater. The JV also planned some community projects including building a school. These are all up in the air at the moment, however, because of the uncertain future of the JV, arising from a crucial environmental dispute over the new logging area.

The JV project is potentially a contributor to infrastructure in the undeveloped northern part of Primorskiy Kray. If the logging goes deeper into the interior of the project site as originally planned, it will help the village Svetlaya to be connected with other villages in neighbouring districts, namely, Pozharskiy and Krasnoarmeiskiy Rayons (See the Map 5.2). By branching further from the logging it could make a large untapped forest region accessible, and promote regional development in the long run. This may be infeasible now, however, because of the environmental dispute over the indigenous people's rights over the land. As more FDI's are initiated on more locations in the RFE, similar impacts as happened in Svetlaya are expected, and all the local impacts across the RFE will collectively lead to a regional development.


Map. 5.2. Neighbouring districts of the project site

Source: RFEU (1993a), reproduced with permission

Besides the visible and direct impacts, the JV also has brought indirect impacts. The JV has made the isolated village connected to outside world through the visitors from around the world to the JV. The high-technology satellite communication being used by the JV office has lessened the feeling of isolation. The coming and going of Korean managerial staff, hundreds of Chinese loggers, log carrier ships, foreign journalists and even a group of international environmental activists have made the remote village conscious of the inter-related world. Such contacts with outside world, directly and indirectly, will eventually help to change the people's attitude toward FDI, although it will take a some time.

## 5.6. INTERACTIONS WITH THE INVESTMENT ENVIRONMENT

A joint venture operation is a productive activity in a foreign country which involves an interaction between the productive resources and the investment environment in the host country The JV Svetlaya has had to respond to changing Russian rules and regulations, while it has also received various reactions to its operation in the host country from local, regional and international communities since it started. Most of these interactions reflect various problems the joint venture has run into since it started. Since the JV is the first foreign direct investment in logging operation in the RFE, its implications for future investments are immense. The problems the JV Svetlaya has faced are those which have already appeared in much of the literature on the subject, such as the article by Cardellichio *et al.* (1989). Many of these problems are so complex and interrelated that they are not easy to segregate from one another. They can, however, be classified into environmental problems, institutional instability, labour, and infrastructure.

### 5.6.1. Environmental Problems

The environmental problems the JV Svetlaya has faced are related to two thing; nature conservation of rare tree and animal species and indigenous people's rights. One of the two areas the joint venture planned to log in the first five year period of the project is an area of 11,672 hectares in Pozharskiy district, which covers more than half of the area to be logged in the first five years.

The area in Pozharskiy district includes the upper reaches of the River Bikin and has been assigned to the indigenous Udeghe people as their hunting ground. International environmental groups claimed that the area includes untouched Korean pine forests which provide a habitat for the Siberian tiger, a rare indigenous species. They also asserted that the logging had been prohibited in the disputed

area by an environmental impact assessment study. Korean pine (*Pinus koraiensis* ) is a protected species and its logging is prohibited by law across the RFE. 50 Greenpeace activists visited the site in the summer of 1992 and protested against the logging in the area. The logging operation was also widely protested by international environmental groups from Japan and other countries. A major logging operation planned in the Pozharskiy area for early 1992 was stopped by a blockade of armed native people.

The prohibition of logging in the area became the most crucial cause for the JV's failure to meet the one million cubic metres yearly production target. The target has not been met for the last 3 years. In the first year of its operation, in 1991, the JV produced 250,000 cubic metres because of incomplete investment in logging and transportation equipment. In the second year, despite the mobilization of machinery and equipment, the JV's production remained at 250,000 cubic metres mainly due to the protest against logging in the Pozharskiy area. No major increase in production by the JV was expected in 1993.

The land in question was originally allocated to the Svetlaya joint venture project by Primorskiy Kray Administration[7] headed by the governor. The Primorskiy Territorial Council claimed on 24 July 1992 that the allocation of the land to Svetlaya Joint Venture infringes on the rights of indigenous peoples and opposed the governor's decision. The case was taken to the regional court by the Council. Primorskiy Kray Court decided that the Administration's decision was legal. The decision was again appealed to the Russian Supreme Court. On 30 November 1992 the Supreme Court invalidated the lower court's decision and returned the case to be retried (RFEU, 1993c). This problem had a crucial effect on the project and drove it to the verge of a close-down.

According to Russian law, a referendum among the indigenous people is required before an outsider's business activity can be granted in the case of the land allocated for native people (RFEU, 1992b). These legal requirements were not seriously considered and incorporated into the JV document by the Russian partner, Primorsklesprom. The JV project was influenced by politics from its formation. The joint venture formed and even began its operation well before Korea and the USSR

[7] Each territory in the RFE is governed by two (often opposing) leaders, the head of the Administration and the Territorial Council of People's Deputies. The former is often called the governor and is appointed by the President of the Russian Republic. The latter is called the legislature. It has elected members and is controlled by the "malyi sovet" (little council). Source: Miller (1992b)

established diplomatic ties. The joint venture was a kind of symbol for the two countries, which were entering into relationships at the time. The Korean government's "Northern Policy" contributed to the swift formation of the JV. The Russians were also impressed that the JV was formed in a hasty manner without a careful study of potential problems involved with the project. Obviously, it is believed that the head of the Administration was persuaded to help push the deal through. It is also conceivable that such careless JV arrangements occurred in an attempt to give more business opportunities to Korea in order to stimulate Japanese interest in the RFE.

### 5.6.2. Institutional Instability

Since the JV project started its operation, there have been numerous new regulations and changes in the legal system, which significantly affected the joint venture's operation. Among others, the institutional instabilities which affected the Svetlaya JV project were related to a series of measures taken by the Russian government: freezing of foreign currency accounts, the forcible sale of foreign currency earnings, and the imposition of export duties.

Faced with a serious shortage of foreign currency in October 1991, the USSR government froze all the foreign currency accounts in *Vneshekonombank* (State Bank for Foreign Economic Affairs). This measure resulted in the Chinese loggers employed by the JV being unpaid for more than 6 months.[8] There were more than 400 Chinese workers including Korean-speaking Chinese from neighbouring Jirin province. The unpaid Chinese loggers threatened to leave the project. According to USSR foreign currency regulations, the JV's export earnings were to be deposited in a Vneshekonombank account before being exchanged and withdrawn in local currency. The export earnings deposited by the JV in the bank for the 6 month period were US$2.3 million while unpaid wages for the six months were US$750,000.[9] The problem was resolved soon after, but it badly hurt both the production and productivity of the Chinese loggers.

Secondly, according to Presidential Decree No. 629 announced on 14 June 1992, a new export duty was imposed on forest products. The new export duty is imposed in ECUs (European Currency Units) based upon the weight of the exported item. Due to the new tax system, the 10% export duty previously applied to the total exported

[8] *Korea Economic Daily*, 12 April 1992.
[9] *Korea Economic Daily*, 12 April 1992.

amount (ad valorem) was replaced by US$14 per cubic metre export duty on each export from 1992, and this rate was again raised to US$17 per cubic metre in May 1992.[10] This has caused the JV a significant reduction in the profit margin from exports, since logs were exported to Japan at US$102 per cubic metre. As a result of the new tax system, the JV's tax burden increased by 7%.

Thirdly, in relation to the new export duty, a 50% obligatory sale of foreign currency earnings to the Russian banks was introduced. This compulsory sale means a substantial financial loss to the JV by exchange from one currency to the other. The unstable rubles and the high inflation rate in Russia makes the JV's financial loss from the compulsory sale even greater. The impact of these institutional instabilities was damaging to the JV's operation, in particular, to the production target.

### 5.6.3. Labour

The JV successfully mobilized the necessary workforce from China. The Chinese workers were supplied through a Chinese manpower agency in Jirin Province. At the peak of operations, the Chinese workers number reached about 400. About half of them were Korean-Chinese. The JV also employed about 200 Russian workers. Most of them were villagers from Svetlaya.

At the beginning, the use of Chinese workers in the project seemed an ideal solution for the labour shortage problem in the RFE. In addition, they were inexpensive and most of the Chinese had experience in working in logging enterprises in Jirin province. The productivity of the Chinese loggers was higher than Russian loggers. They volunteered to work overtime. However, their productivity was sharply reduced by external factors. As mentioned above, failure to pay wages for more than six months as a result of freezing foreign currency accounts severely lowered the workers' morale.

Another factor that undermined the workers' productivity was the exchange rate. At the beginning of the project in 1990 Chinese loggers were paid US$300 per month, when the exchange rate was 0.6 rubles to a dollar. Little income tax was imposed on the Chinese wage. Russian loggers were paid in rubles. Their average was 700 rubles. In 1992 the exchange rate became 100 rubles per dollar. This means that in terms of rubles, the Chinese wage jumped to 30,000 rubles, which was subject to a high income tax bracket by Russian tax authorities. As a result, the Chinese wage was cut

[10] *Korea Economic Daily*, 25 November 1993.

down by a 30% income tax, which became a solid reason for their threat to leave the project. On the other hand, Chinese loggers became expensive compared to the Russians and gave a valid reason for the JV to replace them with inexpensive Russians (Won, 1992). The actual number of Chinese loggers was reduced to 150 when the author visited the site in September 1993. The number of Russian loggers still working on the site was as large as 280. Since the logging permit was not issued as originally scheduled, it became necessary to change the number of workers on site. For fear of resentment from the local community, however, the JV was not able to lay off the surplus Russian workforce to fit current capacity (Kim, 1993).

In addition, though a minor problem, a lot of reported embezzlement by Chinese workers required special attention for future dealings with a Chinese workforce in the region. They embezzled not only individual supply items like blankets and pillows but everything they could take home from logging-camp door handles to machinery parts (Kim, 1993).

Russian workers also posed problems. They were less committed to the work than Chinese and their high proportion of idle work hours lowered productivity. The weak purchasing power of the ruble demoralized the workers. By one account, the productivity of the Russian workforce on the site is less than half the Koreans' at best (Kim, 1993). By Russian labour regulation, foreign investors are responsible for providing necessary welfare including workers' compensation insurance, and a paid vacation in summer. In conclusion, using a Chinese and Russian workforce is never cheap when taking into account their low productivity and the extra cost involved especially in such a remote and underdeveloped environment.

### 5.6.4. Infrastructure

The underdeveloped infrastructure is regarded as one of the major constraints for regional development as well as for the economic activities by foreign companies in the RFE. This general assumption, however, does not apply to the case of the JV Svetlaya. Rather the JV takes full advantage of its particular location.

Svetlaya is located in the territory's least populated district, Terneiskiy Rayon. Within the Rayon, the village is situated in the even more uninhabited northeastern part. Only a few road networks are developed, mostly in the southern part of the Rayon. Svetlaya is a remote village accessible only by air or sea. A small nine seater biplane connects it to the district capital Ternei, 210 km away, from which other major cities in

the territory are only connected by air or road. It takes about 4 days to get from Vladivostok to Svetlaya by a ferry which sails along the Japan Sea coast once a month.

The village is completely isolated from other cities and the only local road is the one leading into interior logging areas used by the previous *lespromkhoz*. The 60 km long road leads to near the district boundary between Terneiskiy and Pozharskiy Rayons. See the map 5.2. Currently the JV's logging operation takes place near the end of the road, about 60 km away from the village.

The existing port was too small to ship out 1 million cubic metres of logs a year before the JV. The port, therefore, has been dredged by the JV so that two 10,000-ton log-carrying barges can come alongside the quay at the same time. Svetlaya is a ice-free port and shipping logs through the port is possible all year round. Since winter is the most productive season in the year, because of the low productivity caused by the loggers' vacation in summer and muddy surface conditions in spring, having a port operable all year round is advantageous.

The infrastructure condition in the project area is not a constraint but rather an advantage for the JV. The trucking distance from the logging site to the quay is only about 70 km and the port has been expanded to accommodate one million cubic metres of logs a year. This is preferred by the JV in contrast to the hauling distance from interior regions of Khabarovsk territory or Amur region to the Pacific coast for export, which may well be several hundred kilometres. For example, Mukhen is a forestry town where one of the major territorial forestry kombinats is located 100 km southeast of the city of Khabarovsk. From Mukhen the logging area is 104 km further away (Fujiwara *et al.*, 1992). From Mukhen to Vanino port is more than 800 km by railway. Not only the hauling distance but also securing space in railway freight cars is a major problem for exports. Having one's own port for exclusive use is a definite advantage in the RFE, where limited port capacity and seasonality cause serious congestion in most of the ports. Because of its own port facility, the JV can improve the efficiency of shipment notwithstanding of the overall inferior infrastructure of the RFE.

## 5.7. SUMMARY AND DISCUSSION

Following three years of operation, the JV Svetlaya has illustrated the RFE's reactions to FDI in forestry and demonstrated the problems related to the investment environment in forestry. The geo-economic situation that the RFE presents also has caused a particular reaction to the JV.

The JV project is currently in a bad situation. Because of the prohibition of logging in new areas, the JV's production has remained at only one fifth that of the original plan. The most serious problem threatening the continuation of the project is the huge financial loss caused by production that is smaller than originally planned.

Hyundai was very enthusiastic to form the first Korean-Russian joint venture from the beginning. The JV was a symbol of a new relationship between Korea and the USSR, which began to warm to each other after a nearly 90-year long detachment. Hyundai's effort were politically supported by the Korean government promoting new relationships with former communist countries through its own "Northern Policy". In addition to government support, Hyundai's corporate character played its role in the formation of the JV. Hyundai has been a more resource-oriented company than others in Korea. Its style has been characterized as a pioneer company in Korea. The pioneering spirit has become a long tradition of the company since its entry into many fields of business in the early period of Korean economic development (Anon., 1991a). The JV was set up at a time when greater internationalization of the Korean economy was imperative because of the trade surplus. Under this positive investment environment in Korea, the formation of the JV was realized even before the two countries formed a formal diplomatic tie.

Hyundai as a foreign investor quickly completed its share of responsibilities within the JV. It swiftly mobilized the equipment and labour force necessary to meet production targets in the early period of the JV. The JV quickly upgraded the port capacity to handle the targeted production. Hyundai did not, however, effectively react to the exogenous problems related to the JV such as the environmental dispute. These problems are almost beyond the control of foreign investors.

Despite the country's willingness to reform and integrate into the Pacific Rim economy, the investment environment in the host country has not been attractive. The main reason is political instability. The instability has been the main cause of the JV's lack of success. Among the instabilities experienced by the JV, the most crucial

one was the disallowment of the logging permit as originally contracted, because of the environmental dispute. The environmental dispute demonstrated that even a contract signed by the Russian authorities can not be enforced.

A great deal of instability also stemmed from the politics surrounding the JV. The JV had substantial political significance and was largely backed by the Korean government's "Northern Policy". For Hyundai, the JV was an opportunity to enhance the company's pioneering image in Korea. All these factors pushed Hyundai to make a rather hasty investment. The haste continued to the actual capital investment in purchasing logging and transportation machinery.

The Russian partner is also partly responsible for the hasty arrangement in the formation of the JV. As mentioned earlier, the JV was formed without respecting either the Russian regulations for native peoples' rights or the requirement for environmental impact assessment on the problem area.

The haste is also attributed to the decision making system in Korean companies. The Korean companies' decision making system is typically highly centralized in the hands of a few top executives, who make decisions either unilaterally or in small groups after consultation with the various parties involved (Steers, Shin and Ungson, 1989). The top-down or authoritarian nature of the decision making system tends to be more distinct in the owner-managed companies like Hyundai. Within such decision-making systems, a widespread consensus as to the desired course of action is hardly achievable from the bottom to the top of the company organization. The chairman of Hyundai on many occasions revealed his great enthusiasm for the projects related to Siberia and RFE development. Such personal enthusiasm of the owner himself has been largely translated into corporate strategy and strongly influenced the company's decision making related to the JV.

In relation to decision making, a lack of research by Hyundai before the investment was undertaken is partly blamed for the current state of the JV. Under the existing decision-making system, the result of the feasibility study by professional staff before investment gets little chance to be incorporated into the final decision. If the decision had been made by a more consensus-building approach from the bottom to the top of the organization as happens in Japan, the formation of the JV would not have been possible. Conversely, because of the decision-making system in Korea and in particular in the Hyundai Corporation, the creation of the JV was made possible despite the instability at the time.

Despite a large financial loss by Hyundai Resource Development Co., Ltd., the top management is interested in and committed to continuing the JV for several reasons. The JV has deep political meaning for both the nation and the company. For the simple fact that the JV is the first and the largest Korean investment in Russia gives a political meaning to its continuation. The advantage of the proximity of the RFE and the scale of its resources are well appreciated by Korea. In the long term, and from the point of view of economic cooperation with neighbouring countries, a presence in the region is viewed as an important foothold for when economic conditions and the investment environment improve. In other words, the long-term importance of the RFE, appreciated by Korea, is big enough to carry on the JV despite the short term financial loss.

Because of the Korean attitude towards the RFE, Korea's interest in the region will continue. The current difficulties are generally accepted as the price to pay for Korea's long-term commitment in the region. Through three years of operation of the JV Svetlaya, Hyundai has accumulated sizable experience in logging operations in the hitherto unknown region of the RFE, which in the future will enable the company to make more profitable investment decisions in the RFE.

## 6. FOREIGN DIRECT INVESTMENT IN THE RFE

### 6.1. Foreign Investment in Forestry

According to ROTOBO (1993), out of a total of 445 JV's registered in the RFE by the end of 1992, 30 were related to forestry investment. The forestry sector represents 7% of total foreign investment in the RFE. This is the fourth largest sector where the foreign direct investment is involved after service, fishery and construction sectors. The investments have been distributed fairly evenly across the RFE except Magadanskaya Oblast' and Kamchatskaya Oblast', where only one investment is registered in each. Nearly 50% of the total forestry investment in the RFE is concentrated in both Primorskiy Kray and Khabarovskiy Kray. In terms of the share of forestry in all subregional investments, Yakutia and Amurskaya Oblast' show the highest figures (Table 6.1).

Table 6.1. Subregional Distribution of FDI in Forestry

As of October 1992

| Subregion | No. of JV's in the RFE: All Sectors | Forestry Sector(%) | | Share of Forestry Sector(%) |
|---|---|---|---|---|
| Yakutia | 24 | 5 | (16.7) | 21 |
| Primorskiy Kray | 168 | 8 | (26.7) | 5 |
| Khabarovskiy Kray | 102 | 6 | (20.0) | 6 |
| Amurskaya Oblast' | 29 | 5 | (16.7) | 17 |
| Kamchatskaya Oblast' | 34 | 1 | (3.3) | 3 |
| Magadanskaya Oblast' | 24 | 1 | (3.3) | 4 |
| Sakhalinskaya Oblast' | 64 | 4 | (13.3) | 6 |
| Total(RFE) | 445 | 30 | (100) | 7 |

Source: ROTOBO (1993)

Several countries are involved in forestry JV's in the RFE. Among others, Korea has invested in a logging operation in Svetlaya in Primorskiy Kray. Japan has formed 7 JV's in the RFE and Siberia since 1987. Except for three of them located in Irkutskaya Oblast', all of them are in the RFE. All of the Japanese forestry investments are related to sawmilling.

Following the JV Svetlaya, other logging JV's have been unsuccessfully proposed in Khabarovskiy Kray. For example, the American Weyerhaeuser Company has been negotiating since 1990 to set up a JV with *Koppinskiy Lesokombinat* (Timber Complex) along the Japan Sea coast of Khabarovskiy Kray near Vanino port (RFEU, 1991). The negotiations have been unsuccessful so far despite the company's experimental planting of about 1 million seedlings grown in Tacoma for regeneration in Khabarovskiy Kray (Bill, 1993). Several other foreign companies, many of them from Scandinavian countries, have been involved in establishing logging JV's in the RFE. To list a few, Forest-Starma (Norway), Rowin-TOKO (UK), Archlog (Sweden), Tehdaspoo (Finland) are examples (Olsson, 1993). Like the JV Svetlaya and Weyerhaeuser, most of these companies plan to export production from the JV's, especially to the nearby Japanese market.

The JV operation in the RFE involves a lot of difficulties as discussed early in this chapter. Forestry JV's, in particular, involving a substantial area of logging, face additional opposition from their local community. For example, the Weyerhaeuser and Forest-Starma projects in Khabarovskiy Kray (Karp, 1993a), came under attack by local groups for various reasons even at the project proposal stage.

Opposition by local groups against logging forest resources by foreign JV's seems to be one of the most difficult barriers for foreign investors to overcome. The root of the opposition is related to Russia's perception of foreign investment from capitalist countries. Russians traditionally perceive foreign businessmen as coming to Russia to take profits and leave the country. This xenophobic view of foreign investment is more deeply rooted in natural resource industries like logging, since natural resources are one of the few productive resources under full control by Russia competing with foreigners (Sheingauz, 1993).

In addition to the negative views on foreign investment, the local forest industry, which has been in operation for many years in the RFE, offers potential competition to the JV's. An industry with vested interests in controlling forest resources is reluctant to allow foreigners to make profits by exploiting the same resources. Exporting forest products to a third country is viewed as a job to be done not by a JV but by themselves (Ivanovich, B., 1993). From the above, it is easy to understand why Weyerhaeuser's plan to export their production to Japan would be opposed by both local and regional communities.

## 6.2. LESSON FROM THE JV SVETLAYA

The JV Svetlaya is a product of the particular political situation at the time of its creation and its particular geographical location. Nevertheless, the following findings could be useful for future foreign investments in the RFE.

Foreign investment is a business operation in a foreign country taking advantage of partnership and a foreign investment environment. In some situations, the successful operation of a JV might be guaranteed by undertaking limited responsibility by each partner. Such a rule did not work out in the JV Svetlaya. Despite the enthusiastic start and the successful completion of Hyundai's share of responsibility, within a short period of time, the JV has experienced the problems discussed in Chapter V. Hyundai, without previous experience in Russian operations, left the production planning and operation to the Russian partner. Hyundai, limiting its role to support such an operation, remained unable to resolve the problems related to the host-country environment outside of the project. Unfortunately, the Russian partner was too weak and ineffective to handle such problems. It was even more difficult for Hyundai, which is unfamiliar with the local situation, to come forward and resolve the problems. As in Japanese strategies (Tak, 1993), it would be very important for any future JV to have a Russian partner which could exercise political influence to help

resolve problems beyond the control of the foreign partner. Although the infrastructure in the RFE is largely underdeveloped, the region is large and has a wide variety of infrastructure conditions. The location of the JV Svetlaya was well chosen and demonstrated one way to overcome infrastructure problems.

The JV also showed how to circumvent the labour shortage problem in the region. By using a labour force from neighbouring provinces of China, the JV Svetlaya successfully provided the necessary labour force supplement to the Russians employed from local areas. Judging from the geographic proximity and the similar forestry environment, the neighbouring Chinese provinces could present themselves as a potential source of labour for future JV's.

There had been no relationship between Korea and Russia for nearly 90 years before diplomatic ties formed in 1990. The JV Svetlaya was somewhat hastily formed even before the diplomatic tie without a genuine effort to understand the situation of the host country. The USSR was an unknown country to Korea and vice versa. Without knowing one another, each overestimated the other under the amicable atmosphere at the beginning of the relationship in the late 1980s. It was easy for the resource-poor Korea to overestimate the natural resource potential in the RFE. Similarly, the Korean economy first seen by Russians on and around the 1988 Seoul Olympic Games was impressive enough for them to choose Korea as an alternative partner for the development of Siberia and the RFE instead of Japan, which appeared as the most capable, though reluctant, partner to Russia. Ogawa (1993) explains well how the Russians misunderstood the two economies in Korea and Japan after visiting Seoul via Tokyo before the Olympic Games. Korea also needs to increase its understanding of Russia through further research.

## 6.3. SUMMARY AND DISCUSSION

The resources in the RFE offer a great opportunity for foreign investors in forestry. Although there are modest views on the potential of the forest resources in the RFE, the RFE is undoubtedly has a great potential for forestry from the point of view of foreign investors, especially those from resource poor countries. To them it is a matter of materialization of the potential through investment. So far the RFE is the most isolated region in Russia but is opening up to the outside in an effort to become integrated into the Asia-Pacific economy and has increased external economic activities with neighbouring countries. Foreign investment was allowed to promote regional development through capital and technology brought in with the

investment. For this, the government has legislated some preferential measures to attract foreign investment. The preferential benefits, however, are not attractive compared to these offered by other countries, and even the existing ones have been offset by the worsening domestic economic conditions. Overall, the environment has not been fully prepared for foreign investors to actively engage in productive activities in the RFE. The political and institutional instability adds to the unattractive investment environment. Forestry investments have continued in this environment with a common motivation to export the production. This export motivation has invited opposition from various local groups and competition from the indigenous forest industry, which has been long established in the region. This opposition and the competition from the local community is considered to be one of the hardest barriers for forestry investors to overcome.

## 7. POLICY IMPLICATIONS

The situation created by *perestroika* and *glasnost* in the USSR brought attention to the RFE's potential for interaction with neighbouring countries on the Pacific Rim. Foreign direct investment has been one of these interactions. Each FDI has location- and situation- specific problems and responses, but the RFE, because of its unique geographical location and the fact that it is in transition to a market economy after more than 70 years of central planning, has shown a special response to FDI. This study has examined the response of the RFE to FDI through the case study of the Korean-Russian joint venture Svetlaya.

This paper concludes with several implications of the FDI in the RFE. They are implications of the FDI for potential export growth in forest products from the RFE to the neighbouring Asia-Pacific countries, implications for regional development, implications of the JV for future foreign investment in forestry in the RFE, and lastly implications of FDI for resource and market interactions in the global context.

### 7.1. IMPLICATIONS FOR EXPORT GROWTH BY FDI

Judging from the small local market and the high cost involved in exporting to other regions in Russia, exports to the international market are a natural consequence of foreign investments in forestry. The JV Svetlaya and all the Japanese investments in forestry are mainly motivated by export promotion. This can be justified by the presence of the world's largest forest products importers in neighbouring regions. The export motivation is further confirmed by the export records of the enterprises with

foreign capital participation, which accounted for 27.7% of total RFE exports in 1992 (ERI, 1993). The exports by such enterprises account for 16.5% of total RFE exports of forest products and 76.7% of fishery products in 1992 (JETRO, 1993). In view of the lack of capital investment in value-added products and the inferior quality of such products, exports will largely be limited in the short run to logs.

Currently the JV Svetlaya exports all its production to Japan and Korea, which best serves the financial interest of the JV. Russian price liberalization will also impact the forest industry in the RFE in favour of promoting exports.

There seems no doubt that foreign investment promotes exports. There also exist factors, however, which inhibit foreign investment, consequently hindering exports. Since the export of forest products is one of the few hard-currency-earning businesses, the foreign investors may face severe competition from local industrial organizations for export markets. Local industries will not allow their forests to be used to serve the profit maximization goals of foreign investors. Local export organizations regard the export of logs as their own business. In addition, a xenophobic attitude towards foreign investment will hinder the effect on exports. In order to overcome this, the foreign partners of the JV's in the RFE need to have the Russian partners and local communities understand the mutually beneficial aspects of the foreign investment. This could mean educating the Russian partners and the local people as to the nature of a market economy.

## 7.2. IMPLICATIONS FOR REGIONAL DEVELOPMENT IN THE RFE

The geographic location naturally draws the RFE towards integration into the booming economies of the western Pacific Rim as does the regional economic policy. Since the RFE's immediate neighbours are at different levels of economic development, the RFE is in a position to choose from these countries its partners who could best serve the region's economic development.

This study has demonstrated that FDI is potentially a stronger agent for change in the regional economy of the host country than any other forms of economic activity taking place across the national boundary. Regional development, however, is not achieved by the unilateral action of foreign investment but through interaction between the forces of FDI and the hosting environment which could nourish the FDI to promote the regional development. The forces directed from FDI to the RFE have been positive and even enthusiastic as seen in the JV Svetlaya. By contrast, this study

has shown through the case study that the local environment responding to such forces has not been so positive and welcoming. The problems the JV Svetlaya has faced are one of the biggest obstacles for the future FDI's in the RFE.

To attract more FDI's for regional development, the findings of this study call for more changes inside the RFE. The changes are strongly related to casting off the natural resource illusion, which is not irrelevant to the xenophobia mentioned in the above. The natural resource illusion is a belief that an ample stock of natural resources is what makes a country rich and its products competitive (Ohmae, 1990). Such an idea only supports economic nationalism and helps keep the country's economy more isolated from the global economy. The resource illusion has kept the doors of resource-rich countries locked against beneficial forces coming from outside for many years. The only result is that these countries find themselves falling behind the resource-poor countries which used to be poorer than they were. The point here is that national or regional wealth is not in the natural resources per se but in the global market they serve. So it is a matter of how one realizes the potential of the natural resources and sells them in the global market. FDI is the vehicle to bring regional development to the RFE via global markets.

## 7.3. POLICY IMPLICATIONS FOR FDI IN THE RFE

The new situation in the RFE has now made possible what was regarded as impossible within the closed economic system of the past. Opening up the region and allowing foreign investment have made the formerly unapproachable region accessible. The investment environment in the RFE, however, is still highly problematical. For future forestry investments in the RFE this study implies the following.

Instability in the Russian political and economic system has been recognized as the main stumbling block for foreign investment in the RFE. In addition, the RFE is a newly opened and frontier-like region, which imposes extra costs on foreign investors' economic activities. Pioneering in this frontier region, however, could secure the market and supply of resources for a long time once the investors are established. This could pay off the high cost involved in pioneering the region in the first place. In order to secure a competitive position in the region in the long run, foreign investors in the RFE should be prepared for instability and for the sacrifice of short-term financial returns to their investments.

Local reaction to foreign investment is not always positive. Xenophobic attitudes toward foreign investment still linger especially over natural resources development, which is believed to be one of the areas where local industry should take control. The environmental protest against logging can also be interpreted in terms of xenophobia. Resistance tends to be amplified when the opponent is a foreign investor involved in exporting natural resources.

In order to minimize the instability and the impact of poor infrastructure, the location of investment will play a major role in determining the actual investments in the RFE in the short run. Foreign investment will be concentrated on southern subregions where better resource stocks and infrastructure conditions are found. As already revealed from investment statistics, the investment will be directed mainly at Primorskiy Kray, Khabarovskiy Kray, and Sakhalin and Amur Oblasts. Within these regions, the export-oriented FDI can have an advantage by choosing coastal areas close to ports, as in the cases of the JV Svetlaya and the Weyerhaeuser proposals. In this respect, the undeveloped coastal region of Primorskiy Kray has a great potential for future foreign investment.

One of the strong messages from the experience of JV Svetlaya for future investments is environmental concerns. Japan and North Korea have never faced major environmental problems, locally or internationally, associated with their logging in the RFE despite the fact that these projects date to the 1960s. This is not because these two countries performed better environmentally during their forestry projects than the JV Svetlaya. In fact they could well have been worse. But what is different between then and now is the fact that today's world is no longer environmentally insensitive even to the logging in a remote corner of Russia. In fact, the RFE itself has many environmentally sensitive areas because of the endangered animal and plant species, and the presence of indigenous people in the areas. The JV Svetlaya experience demonstrated that the environmental damage tends to exacerbate the local anger and protest if the damage is caused by foreign enterprise. Future investments in this region might need to avoid a direct involvement in logging as much as possible. This would favour the investments in more value-added production such as processing and manufacturing, which have been already proven by the orientation of the Japanese investments in the RFE.

This investigation can hardly conclude by encouraging immediate FDI, in view of the current instability in the RFE and all the other problems described above. The dilemma from the investors' point of view, however, is the fact that they can not wait until every problem has been settled as one can not wait for a better computer tomorrow. What is more important is to use a computer today and get the job done. Although the same logic does not suggest a delayed investment, the actual investments will hinge on the situations of investing countries. For those countries like Korea, which are desperate for logs for its economy now and seeks long-term stable supply as well, an early investment could be worth the cost of initial risks. The investment would probably be large scale if the objective is long-term security.

The investments by countries less desperate for logs and with alternative sources of supply, however, should be experimental. Japanese-style investments would be applicable here. Japan, which is relatively well informed about the RFE, is still reluctant to undertake a major investment and keeps its investments small and experimental. Other potential investors would do well to heed their experience and follow their example.

## 7.4. IMPLICATIONS FOR THE INTERACTIONS BETWEEN RESOURCE AND MARKET REGIONS

This study has demonstrated that a potential interaction could take place between resource regions in the north and market regions in the south in Northeast Asia. An interesting pattern can be observed if the result of the study is put in the global context. As mentioned at the beginning of this paper, the world's three major forest regions in the northern hemisphere are located north of and close to the world's major market regions. The northern forest regions served the southern market regions.

As the world's major market regions have shifted from Europe to the United States, the world's major forest regions also have moved from the Nordic countries to Canada.[11] Now the centre of the world's economy is again moving from the United States to East Asia, and consequently we can expect similar things to happen with the major forest regions. To predict whether or not resource-market interactions, similar to what occurred in Europe and North America, would take place in Northeast Asia would certainly require another major piece of research. If in fact they do occur, however, what will significantly distinguish Northeast Asia from the earlier experiences will be FDI as a main channel of interaction. The extent of the interactions is potentially broad

[11] Further research would be needed to confirm this observation.

because of the diverse nature of the economic conditions in the region. Leaving aside the potential problems of political instability in Russia, and the uncertainty in North Korea, the pace of integration between resource and market regions through increased TNC activities could potentially be very rapid.

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