

# Institutional innovations in the Forest industry in Russia: a case study of Irkutsk province

## Abstract

Multiple global changes are impacting Russia today. Economic transformations in Russia have prompted the establishment of new business relations, which are based on innovations in the economic, institutional and ecological spheres, including within the Forest industry. This paper focuses on the Forest sector in Irkutsk province and beyond, examining the basic problems related to the institutional innovations in the Forest industry of the province, and the major factors and conditions influencing the dynamics of institutional innovations. A brief historical background and analysis of institutional structures are also presented.

## Keywords

Irkutsk • Forest industry • innovations • institutional innovation • institutional changes • global changes

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## Introduction

*"The abundant forest resources of Russia have global value, both economic, and ecological. They are a source of lumber for Russia and all the world, they are a symbol of the wild nature untouched, and play a crucial role in stabilization of the global climate."* (S. Nilsson, International Institute for Applied Systems Analysis, Austria)

Forest comprises about 45 % of Russia's territory. The area of woodlands is 886.5 million hectares, of which 763.5 million hectares are covered by forests. In contrast, the United States has 296.0 and 209.6 ha of woodland and forest, Canada has 453.3 and 247.2 ha, Sweden 28.0 and 24.4 ha, and Finland 23.4 and 20.1 million ha respectively. The total stock of wood in Russia is about  $81.6 \times 10^9$  m<sup>3</sup>, exceeding the wood stocks of the USA, Canada, Sweden and Finland combined ( $63.4 \times 10^9$  m<sup>3</sup>). The annual increase of wood volume in Russia is  $822 \times 10^6$  m<sup>3</sup>.

The Forest sector is an important component of the national economy of Russia, contributing 1.3% to gross domestic production and 2.4% of national exports. In 2012 there were more than 5550 registered business entities operating in the Forest industry of Irkutsk province, whose business was directly related to forest management and forest product production (Table 1).

In this paper we describe the Forest sector institutional innovations in Russia, and more specifically in Irkutsk province. We provide a detailed analysis of the challenges faced by the Forest sector, including problems related to institutional transformation and ecological sustainability. In order to provide perspective we first briefly describe the history and functioning of the Forest sector.

## History of the Forest industry in Russia and Irkutsk province

Wood has been an important economic commodity in Russia for hundreds of years, both for domestic consumption and international trade. Russian exports of forest products are insignificant compared to the wood stocks available (Moiseev 2004). The opportunities for harvesting timber in Russia considerably surpass the needs of Europe through increased access to a greater proportion of the forest and the use of modern technologies. For many centuries, Irkutsk province has been a source of logs, soft resin, wood materials and, since the 1700s, industrial materials. These forests also have other uses, such as hunting, cultural-recreational activities, research, and the use of non-industrial forest products (Vaschuk 1997).

## The institutional structure of the Forest industry and its transformation

Russia is in the midst of significant cross-societal changes, including the economic and institutional spheres. The on-going economic transformations have also affected the Forest industry, providing both opportunities and difficulties for the development of regional policy. The formal study of Forest industry functioning, development and institutional transformation has only occurred in the last few decades, led by pioneers such as D. North, R. Kouze, D. Byukenen, and others. Understanding these issues is important because the Forest industry directly impacts the economic prosperity and quality of life of many citizens living in the forest regions, and the vast forest resources of Russia hold enormous national economic growth potential.

Table 1. Number of enterprises in Irkutsk province according to business activities in 2012

Services and Products	Enterprises	Entrepreneurs and farmers
<b>Harvesting industry</b>	1413	1100
<b>Forestry and Forestry services</b>	181	54
<b>Total Forest harvesting and Forestry</b>	1594	1154
<b>Wood processing</b>	2040	683
<b>Pulp &amp; paper producers</b>	68	15
including Cardboard producers	51	15

Source: Bir-Analytic System 2014. Available from: <http://bir.1prime.ru/>

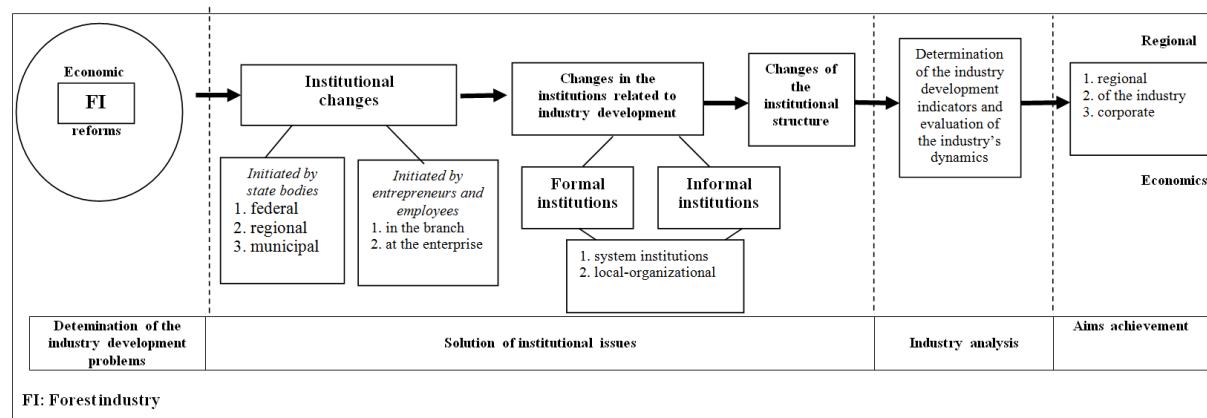


Figure 1. Institutional transformation of the Forest industry

The transformations happening in the Forest industry are frequently spontaneous and inconsistent. National and regional economic and social policy reforms significantly influence institutional transformation, and the reform of policies affecting the Forest industry often outpaces the rate at which institutional structures can respond (Dayneko & Chernikov 2012). Therefore, additional study and coordination of institutional transformation is needed to effectively and efficiently respond to policy development in multiple spheres within the region. In this paper we examine the institutions that make up the Forest industry and their transformations. For our purposes, institutions are considered to be a set of behavioural rules, customs and norms (both political and economic) of a society. In modern societies, these are formally stated in legislative and executive decisions, and are implemented (and enforced) by governmental organizations. However, institutions can also be the established mechanisms of the coordination of political and economic decision-making processes, such as elections or markets. Modern economic science defines "institution" as "a steady complex of mutual roles and relationships, and behavioral features of social and economic agents" (Grebenschikov 1998). These institutional realities impact the Forest industry. The suggested scheme of institutional changes in the Forest industry for the further evaluation of their effectiveness is presented in Figure 1.

Jack Knight (1992) thinks that "institutions are the set of rules, structuring public mutual relations in a specific way, the knowledge of which should be known to all members of a certain community". Institutions include formal rules and informal restrictions, such as conventional norms of behaviour, agreements made, internal restrictions of activity, and certain characteristics of compulsion to perform according to the conventions. Formal institutions are often created to serve the interests of those who

control institutional changes in the market economy. Social and economic institutions arise when individual habits are adopted by a society and/or by a group. Institutionalists define institutions not in the narrow sense of formal organizations, but in the wider context of socially predetermined behaviour as "the widespread and constant way of thinking or acting, which is implanted in habits of a group or in customs of the people" (Seligman & Johnson 1967). Institutions can be considered to be public capital, which can vary depending on depreciation and new investments.

#### Types of institutions

There is no uniform approach in economic theory to characterize the functional role of institutions. There are various classifications available (Gutnik 1995 or Shastitko 1999), but they usually include two types of institutions: system (*or external*) and locally-organizational (*internal*). System institutions determine the type of economic order, i.e. the dominant type of economic system. These institutions establish the key rules of economic activities; therefore, they include not only purely economic rules and norms, but also political and ethical norms, which are required for the effective functioning of an economic system. Examples of system institutions are institutions specifying and protecting property rights, making economic decisions, changing the norms of economic ethics, and so on (Weber 1990). *System forming* institutions may include all varieties of institution arising during the development of a market economy and providing an opportunity for the functioning of institutions of the upper order, such as banks, financial systems, and so on.

Institutions that structure interactions, including transactions in the open market and those within organizational structures, are called *locally-organizational*. These include such institutions as share and commodity exchanges, banks and financial firms.

Not only do they make transactions among various economic entities possible, but they reduce uncertainty and risk to some degree and reduce transaction costs. These two basic types of institution support the two primary keys to successful market economics: protecting private property and freedom to make contracts (Schumpeter 1995). The process of formalizing and standardizing these fundamental economic activities is called institutionalization.

#### **Components of institutional structure**

The institutional structure of many Russian industries (including the Forest sector) has a number of important components: 1) property rights (the legal basis to use property at one's own discretion), 2) investment institutions (banks, insurance companies, funds, etc.), 3) legislature (laws, decisions, decrees), 4) organizational structure of the Forestry sector and the specific enterprises, 5) informational and professional support (i.e., the provision of information about activities and prospects for development within the industry, 6) legal institutions that provide the development, implementation and enforcement of legal documents, 7) institutions providing professional training and education to the industry, and 8) informal institutions that facilitate cooperation and establish the norms of behaviour.

The term "institutional agreement" refers to a certain set of behavioural rules that manage behaviour under specific conditions in a field of activity. "Institutional structure", as defined by D. North (1994), is the whole set of "institutional agreements" in an economy, including organizations, legislation, customs and ideology. In this paper we focus on institutional change, as it affects specific institutions, institutional agreements and institutional structure.

Our primary thesis is that institutional structure determines the economic performance of a region and it particularly affects the efficiency of the Forest industry. The degree of institutional system development, its flexibility and ability to react to evolutionary changes considerably determines the development of the economy. In the Forest branch, it can create favourable conditions for the formation of new enterprises. This structure can be relatively static or dynamic, depending on specific historic-political conditions. Institutional structure is often determined by the comparative efficiency between alternative ways of coordinating economic activities at the time of institutional structure formation. Therefore, institutional changes should be analysed within the framework of the whole institutional structure, considering issues of property, investments, cultural norms, legislation, the management of the Forest industry, professional and information support and other institutions.

In a market economy, institutions evolve as the result of metacompetition, i.e. competition among institutions. In this competition, institutions are selected depending on their ability to cover the greatest number of interactions at the lowest cost. A set of interacting economic institutional entities, which make economic decisions under institutional conditions, is an economic system. Various economic systems differ not by kinds of economic activities nor economic processes (e.g., production, consumption, investment), but by the character of their economic institutions and their impact on economic decision-making. (Economic Education 1993)

There are three ways that institutions are controlled: formal rules, informal restrictions and enforcement of these rules and restrictions (North 1997). Reform of institutions is a complex process, requiring significant investments of money, intellect and time. Although rapid institutional transformations may be possible through political and/or legal decisions, in practice such changes are slow, especially in the Russian environment. The informal restrictions related to customs, traditions and codes of behaviour

are extremely powerful in Russian society, and they are highly resistant to conscious reform. The primary agent of institutional change is an entrepreneur, either political or economic. This recognition is not common historically, with the understanding of institutions based more on a "rules of the game" concept than on the players.

#### **The issue of the ownership**

Ownership and control of forested land is fundamental to the functioning of the Forestry sector, and the legal basis for this control has changed throughout Russian history. A system of payments to private land owners for timber cutting rights was established in the 17th century. Even before the Revolution of 1917, the public were becoming increasingly concerned that private owners were not adequately protecting the sustainability of forest resources for the use of future generations. The idea of the nationalization of forests had widespread support among the intelligentsia long before the Revolution. In the spring of 1917 all the forests of Siberia and Russia finally became State property (Declaration 1918), to be managed by the Central Administration of Forests. The main duty of the Administration was to continuously satisfy the nation-wide demand for forest resources and to provide for the continuous recovery of forests by strict adherence to basic legally-mandated forest management rules.

By 1930 the practical management of state forests was carried out by the Forest industry and the Ministry of Railways. The cutting of timber was regulated only by the needs of the lumberers, and, as a rule, cutting was done in the best forest stands (Vaschuk 1997). This situation was significantly improved by the formation of the Ministry of Forestry of the USSR and the Forestry Administration of Irkutsk province. At this time, forest resource bases (sites for harvesting) were established and allocated among the lumberers, and limits for wood production were set by Gosplan (State Planning Committee). Regulatory and monitoring functions were distributed between the bodies of the Ministry of Forestry. By 1948 the first forest resource bases adjoining the Trans-Siberian Railway had appeared, and by 1980 forest resource bases were allocated to 202 timber enterprises (Leskhозes) under 22 Ministries, with a total exploitation stock of  $2.016 \times 10^9$  cubic meters, including  $1.721 \times 10^9$  cubic meters of coniferous species.

When the Forest legislation of the Russian Federation was introduced in 1993 after the transition to a market-based economy, new forms of management were required. There was a need for strong independent owners. The financial-credit, non-price and legislative support of Forest industry entrepreneurship was required. There was a need for the components of institutional structure to become well-developed for the Forestry sector, including organizational structure reform, information provision for the industry, and personnel training, to develop a successful and sustainable Forestry industry.

#### **The legislation**

The Forest Code of RSFSR was implemented in August 1923. This Code recognized local value forests (LVF), which are smaller forests outside of large forest blocks. These included former – public countryside and settlers' wood plots, forests that were part of a household ownership (e.g., farms), and other forests that belonged to rural communities prior to nationalization, and that had no nation-wide value. LVFs were managed by raiispolkoms (district executive committees). In 1947 the Ministry of Forestry of the USSR was founded, and given responsibility for the entire forest funds of the country, including all forested land and forestry staff. The Forest Code was revised again in 1978, and it remained in force until the disintegration of the USSR. In 1996 the State Duma enacted the "Forest Code of the Russian

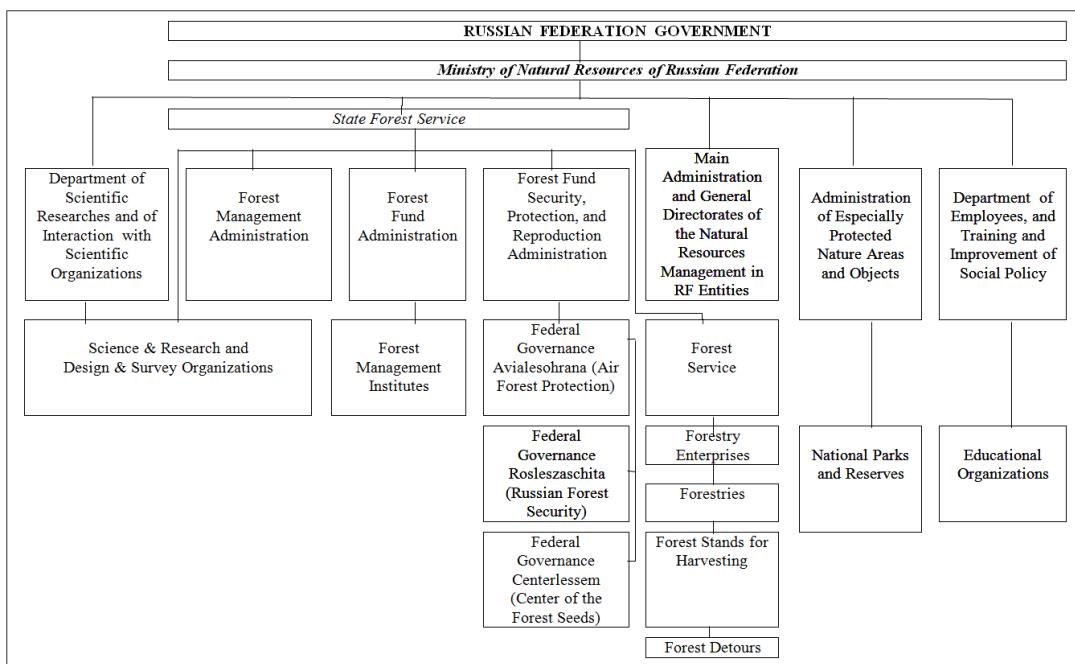


Figure 2. Organizational structure of the Forest industry

Federation" in which the forest fund of the former USSR became the property of the Russian Federation. The current Forest Code of the Russian Federation was implemented on 1 January 2007 (Lesnoye zakonodatelstvo RF 2006). However, the legal basis for Forestry in Russia remains complicated and confused. It is difficult for the Forest industry to conform to the Forestry laws and regulations because they sometimes conflict with land, water and environment protection legislation.

#### The labour staff issue and educational programs

Another important issue for the Forest industry is the shortage of professional staff. In Russia, the prestige of this profession has declined dramatically and people enter the profession either because of a lack of other opportunities, or because they are given the job by family members. There are very few experts with a high-profile education, and it is likely that Russia will have to import expertise from outside the country in the near future. Qualified process engineers, mechanics, economists, and marketing specialists, all with the knowledge of the methodology of decision making for effective management and scheduling, are in high demand by the Forest industry enterprises in the region.

#### The modern role of the state (government), private business, individuals

Under current law, the Russian government has delegated the management of all forests to the regional level, and the role of the State in the Forestry branch has significantly decreased. The role of the federal governments is to develop the Forest code and regulate trade in forest products to encourage investments; these tasks have mostly been accomplished. However, there are so many governmental organizations in Russia with jurisdiction over the Forest industry that it is not clear who is responsible for what. For example, there is a specialized division of the Ministry of Agriculture, a Federal Agency of Forestry, a Department of the Forest industry in the Ministry of Industry and Trade, the Development Council of the Timber Industry Complex under the supervision of the prime minister, and the Forest related Services and Departments in the Ministry of the Natural Resources itself.

#### Institutional innovations

All institutional transformations happening in the Forest industry of Irkutsk province can be considered innovative. Institutional innovations are the result of competing corporate and regulatory interests, reflecting the balancing of various competitive forces, including private, public, and social. The study of institutional innovations and their economic importance in the development of the Forest industry has its foundation in V. Ruttan's theory of "induced institutional innovations" (Ruttan 2005), and Laibkep's "distribution" theory of institutional changes, according to which an attitude of particular economic entities to a proposed institutional innovation is determined by the pure benefits that such an innovation might provide. If a conflict of interests arises then political negotiations begin and the required contracts (deals) are signed (Tambovcev 1999), and as proposed by I. Schumpeter (1982), J. Knight (1992), D. North (1990), V. Tambovcev (2008), A. Oleynik (2002) and others.

Institutional innovations allow organizations to scale the processes of education according to demand and an ever-changing competitive environment. A successfully implemented institutional innovation can generate other innovations at other levels, including product (for example, nano-, bio-, fast growing, services, etc.), technology (IT, wood-processing), and eco-innovations (in harvesting and forest management). An institutional innovation allows an organization to change business processes and management patterns to adapt to the market environment. The implementation of scaled institutional education strategies allows organizations to generate the required innovations of products, services, business structures, and of a management hierarchy. The mixture of old productive processes coupled with new innovations will allow forest organizations to maximize their advantages in the global market.

The prospect for institutional innovations in the Forest industry is complicated by the fact that innovations are difficult in an environment entangled by corruption and bureaucracy. Paolo Mauro (1995) first described the correlation between the risk of expropriation and corruption, and economic outcomes. There is still a question related to causation: does the corruption lead

to negative consequences, or do negative outcomes result in the development of corruption? A classic example of a so-called "extractive institution" is when a policeman asks for money to forego the prosecution of a minor violation of the law. In this case, the bribe is less than the fine. This norm of behaviour tends to institutionalize corruption (Dower 2010). Furthermore, institutional innovations are hard to implement even without bureaucratic hurdles, which often results in their failure. Examples of innovation failure include venture fairs and voucher privatization, which did not reach their set goals, and the innovations themselves were unsuccessful.

Innovations are assumed to facilitate economic growth, making a country more competitive and providing new jobs. Innovations can be the driving force for competitiveness and can spread to innovation in other related spheres. Progress towards competitive sustainable Forest industry management is required in Irkutsk province.

### **The Irkutsk region Forest industry**

The development of a complete, rational and ecologically safe plan to develop and use the natural, industrial-financial, ecological and social capital of Irkutsk province is a top priority. The forest resources of Irkutsk province are capable of providing thousands of jobs for the citizens of the country and supplying raw material to many industries of the national economy. However, Forestry is not a priority of the national forest policy. The development of a modern Russian Forest industry is also at a critical stage. Experts predict that if Russian LIC companies do not improve harvesting efficiency and modernize major production cycles in the next 10–15 years, then many large national timber processing companies will fail, and the existing industrial enterprises will be bought by foreign companies to meet raw material demand in other parts of the world. The main opportunity to increase the economic efficiency of the wood processing industry in Russia is to integrate harvesting and processing enterprises, which will decrease transaction costs, encourage innovation, concentrate and diversify resources and streamline operations.

Forests not only provide wood and economic benefits for the society, but they also provide critical ecosystem services. The forests of the Irkutsk region are of global importance for the sequestration of carbon (Vaschuk & Shvidenko 2006). Furthermore, the forests in the province contribute to the water quality of world-renowned Lake Baikal and its watershed, filtering water and contributing to stable water levels. The forests also protect soils on slopes from erosion. Additionally, forests can contribute significantly to the neutralization of the impact of emissions from industrial enterprises. The vast forests of the province are rich in biodiversity, and they attract recreationists from all over the world to enjoy the pristine beauty of the region. However, changes in climate and land use have the potential to negatively affect the forest ecosystems of the province.

According to recent surveys and in depth studies of the Forest industry of Irkutsk province (Dayneko 2014), the major purpose of all the modern institutional innovations should be to create a favourable environment for organizational, technological, ecological and product innovations, which are required for the further sustainable development of the Forest industry. In 2005 a task force of stakeholders in the Forestry sector in Irkutsk submitted a report that included 13 major recommendations for development of the LIC of the Irkutsk province, to improve the efficiency and revenues of forest enterprises in the region. Stakeholders included representatives of the Administration of Irkutsk province, the Irkutsk Customs department, the Department of Internal Affairs (forest militia), the heads of forest harvesting and exporting companies, forest industry researchers, union representatives of lumberers and forest exporters of

Irkutsk province, the Commercial and Industrial Chamber of East Siberia, and the Forestry Agency. These recommendations are to be used for the preparation of the LIC's Concept of Development for Irkutsk province until 2015. The task group paid special attention to the design and construction of hauling roads, especially all-year-round roads sponsored by the federal budget and by LIC enterprises themselves through interest free credits. The specialists noted that special attention has to be paid to the training of working and engineering personnel. The creation of innovative-implementing and educational centres (based on institutions of higher education) was proposed, which would train specialists for the Lumber Complex and improve the knowledge of management, specialists and workers. According to experts of the Forest industry, there is a need for interest free credits to purchase new equipment for the deep processing of lumber and waste products. There is a need to adopt statutes relating to the transfer of forest fund lands for renting on a competitive basis with an obligation to invest in the complex processing of the wood. The members of the task group suggested the implementation of technological exchange in the market of the timber and Pulp and Paper Complex products, which will allow the creation of an organized, transparent, and controllable timber market in Irkutsk province. According to specialists, the Irkutsk region administration should actively defend the interests of the LIC in the Government of the Russian Federation. The formation of a Task Fund for the LIC Development, amounting to 10-15 mln. roubles, was suggested to implement those recommendations. This fund would finance innovation projects, training centres for workers and the implementation of new internet technologies in the LIC's enterprises. (Napravlenia razvitiia 2006). Perhaps the most important of these is the recommendation to develop wood processing industries to greatly increase the value of exports, compared to the export of logs.

Lake Baikal is a world-class natural resource, and it is preserved by a water-protecting zone in which major cuttings are forbidden, to strengthen the protective functions of the forests. The total area of the lands of the forest fund in the water-protecting strip is 4.4 million hectares, of which 3.7 million hectares are under the supervision of the Federal Service of the Forestry of Russia. This is an example of an ecological innovation in Irkutsk province.

### **The potential effects of global changes on the Forests of Irkutsk region**

Global climate and land use changes are having multiple effects on forests worldwide. Climate change is expected to affect productivity, species range distribution and natural disturbance regimes in Irkutsk region. Land use and timber harvest regimes are also changing in Irkutsk region, with some previously uncut areas now experiencing harvest. Together, these components of global change will undoubtedly affect the composition and spatial distribution of forests, which will in turn affect the ability of the forests of Irkutsk to retain carbon and maintain biodiversity.

Mean temperatures within the province have risen significantly over the past 40 years, while precipitation has remained essentially unchanged (Vaschuk & Shvidenko 2006). Global Circulation Models (GCMs) do not completely agree on future trends for the province (Solomon 2007), but they suggest that mean temperature may increase by as much as 5 °C and precipitation will increase by about 20% by the end of the century. Warmer temperatures and increasing precipitation may increase the potential productivity of tree species. However, because tree species have unique physiological and ecological adaptations to environmental conditions, these changes may alter the competitive relationships between species and affect population abundance and forest composition, as well as shifting species

range limits. The incidence and severity of fires is likely to increase. Moderate winters may allow insect pests to become more widespread. Concurrently, the frontier of timber harvest activity is pushing into previously uncut areas.

In a recent study, a process-based forest landscape disturbance and succession model (LANDIS-II) was linked to the predictions of the Hadley GCM to study how climate change and the expansion of timber harvest into unexploited areas of the Irkutsk oblast might affect the landscape composition and pattern of forests in the region (Gustafson 2010). Increased activity of the Siberian silk moth (*Dendrolimus sibiricus superanse*) was simulated as an indirect effect of a warming climate. The results showed that forest composition (both by species and age classes) was influenced much more strongly by timber harvest and insects than by climate. The results also showed that the effect of insects on forest composition was reduced in the presence of harvesting, because harvests reduce the landscape abundance of older cohorts of host species, which are more likely to be killed by the insects. The response of total above-ground biomass responded most strongly to the harvest treatment. The climate effect was not only insignificant, but it tended to be negative. This was probably caused by the indirect effect of climate on the fire regime. The effect of insects interacted with the climate because chronic insect outbreaks favoured species that had significantly higher growth rates in the future climate, such as birch and larch. Both the harvest and insect treatments increased forest fragmentation.

These results suggest that the direct effect of climate change in Irkutsk region will not be as significant as changes in land use (harvesting) and the indirect effects of climate change (insects). Although climate change will have an effect on the species available to support the Forest industry in Irkutsk region, the industry will also affect the composition of the forests. The results showed that the future climate alone will tend to increase the abundance of larch at the expense of fir and aspen. But the combination of future climate, increased harvesting and more insect outbreaks is expected to result in an increase in the abundance of birch, aspen and larch at the expense of spruce, fir and cedar. The abundance of the commercially valuable Scots pine is expected to be fairly similar (about 22%) under all future scenarios.

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## Conclusions

We draw the following conclusions about the Forest industry of Irkutsk province from these findings: 1) institutional transformations happening in the Forest industry are frequently spontaneous and inconsistent; 2) the institutional structures of the industry are undergoing a period of profound change in response to the fundamental changes in the Russian economic system and the globalization of the forest products industry; 3) there is a need for new institutional innovations creating opportunities for other innovations, including technological, ecological and product innovations, to develop; 4) the Forest industry is facing a critical shortage of well-trained professionals; 5) the further sustainable development of the Forest industry of Irkutsk province requires not only the implementation of new harvesting technologies but the deep processing of the wood, as well as monitoring of ecological consistency and strict adherence to the forest recovery procedures; 6) global change (including climate) has the potential to change the species composition of the Irkutsk forests, which may necessitate changes in management strategies.

There is a need for the additional systematization and coordination of reform processes of the Forest industry in the region. It is a critical fact that the rate of change in policies and legislation in the region is outpacing the rate of institutional structure formation. At the same time, economic and social policy, as well as all regional policy under the reforms, significantly influences the orientation and structure of the institutions formed.

We make the following recommendations: 1. Close attention should be paid to the development of new institutional structures, because these institutions will be in place for some time, and they should be designed to be flexible to adapt to the rapidly changing conditions likely in the future. 2. There is a need to determine the effectiveness of institutional changes and to measure institutional changes by applying different methodologies, such as Q-methods (Q-methodology 2014) and cross-sectional regression analysis. 3. Investments should be made in the training of Forest industry professionals, who will provide the necessary leadership to achieve the recommendations of the Irkutsk Forest industry task force. 4. Forest managers should be directed to plan for the forest changes to be caused by timber cutting in previously uncut areas and climate change.

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