

## *Agriculture in Primorskiy Krai and Northeast Asia*

P.Ya. Baklanov, M.T. Romanov, A.A. Stepanko  
Pacific Geographical Institute  
Far East Branch Russian Academy of Sciences,  
Vladivostok

### Introduction

Northeast Asia differs greatly in population density. The differences in climatic conditions for agriculture are also vast. The basins of the three largest rivers (Yangtze, Huai He and Amur) are the main agricultural regions. However, both in Russia and China, the Amur River territories are agriculturally less developed. This area holds significant potential for food production, and in the future, agricultural development in Northeast Asia will move to the northern areas.

In Primorskiy Krai, agriculture is primarily developed in the largest agricultural zone of Northeast Asia, i.e. in the Amur River Basin. Only some small areas of agricultural land are located in the valleys of rivers flowing to the Sea of Japan.

Agroecological zoning helps estimate conditions for

agricultural development in Primorskiy Krai, including its three oblasts<sup>1</sup>, eight provinces and four districts (Figure 1). The main characteristics of natural conditions and the territorial differences in these conditions are shown in Table 1.

The whole complex of factors such as topography, soils, climate and external natural phenomena of these districts determine the following opportunities for agricultural development (Table 2).

In Primorskiy Krai, the total area of arable lands exceeds 700,500 hectares (ha). The per capita arable land is less than half of the average in Russia (0.34 ha compared with 0.71 ha). Arable lands are confined to the zone of intensive economic development and high population density. Mostly, these agriculturally developed areas are flat and suitable for cultivation.

Table 1  
Natural conditions of the cultivated districts

Province	Average temperature of the warm season ( °C )	Frost-free period (days)	Amount of precipitation (mm)	Thickness of snow cover (cm)	A sum of more active temperatures ( °C )	Vegetation period (days)
Zapadnaya (western) Sikhote Alin	16-18	105-110	750-800	> 60	1400-1800	100
Zapadnaya (western) Sikhote Alin	13-15	90-110	800-850	50-60	1400-1800	80-100
Pribrezhnaya (coastal)	To 17	100-120	700	30-40	1700-1800	100
Predgornaya (piedmont)	18-20	120-140	700-750	30-40	1600-1900	110-130
Prikhankaiskaya-Ussuriiskaya	20-25	150-160	500-650	15-20	2300-2500	160
Partizanskaya	20-25	170	650-800	20-25	2300-2550	140
Razdolnenskaya	To 20	190	900	20-25	2300-2400	140-150
Khasanskaya	20-25	195-200	700-900	10-15	2200-2600	135-140

A sum of temperatures for the period when the average daily temperature is more than 10 °C .

Compared with arable lands, haying lands and grasslands (447,800 ha) occupy lower and damp territories. Haying lands include flood plains (11%), dry plains (44%) and wetlands (45%). Besides, only 40% of these lands are suitable for mechanized cultivation. Between 1989 and 1998, similar to arable lands, the total area of haying lands and pasture decreased by 43.5% or 344,600 ha in absolute terms. Continental plantations were

mostly reduced. They decreased to 1,800 ha (more than two times).

About 28% of agricultural land is pasture. Pastures are subdivided into dry lands (68%) and the rest are wet lands. Fallow soils account for 11,300 ha located mostly in the districts with grain farming that has grown over the last few years.

<sup>1</sup> Oblast is the largest subdivision in geographical distribution of agricultural lands.

Table 2  
Potential for agricultural land use

Natural oblasts, provinces and their indexes	Actual agricultural cultivation of lands (%)	Maximum possible level of agricultural cultivation (%)	Existing agricultural lands (ha)	Possibilities for additional cultivation of agricultural lands (ha)	Possible direction of agricultural land use
E-Khankaiskaya-Ussuriiskaya Oblast	11.18	20.00	822,954	646,000	Vegetation, herbs, fruit-growing
E-a Predgornaya (piedmont) Province	4.85	10.00	214,717	228,000	Fruit-growing, vegetation, herb planting
E-b. Prikhankaiskaya-Ussuriiskaya Province	20.74	35.00	608,237	418,000	Vegetation, fruit-growing, herb planting
D-Sikhote Alin	0.63	1.00	41,130	24,690	Vegetation, herb growing, dairy-meat, cattle-breeding
D-a Western Sikhote Alin Province	1.00	1.00	21,762	-	-
D-b Tsentralnaya (central) Sikhote Alin Province	1.00	1.00	7,749	-	-
D-c Pribrezhnaya (coastal) Province	0.32	1.00	11,619	24,690	Vegetation, dairy-meat, cattle-breeding, herb planting
F-Yuzhno (south)-Primorskaya	3.40	8.80	85,976	135,700	Vegetation, fruit-growing, herb planting
F-a Partizanskaya Province	2.16	8.00	42,287	114,000	Vegetation, fruit-growing
F-b Razdolnaya Province	12.56	15.00	20,129	3,900	Herb planting
F-c Khasanskaya Province	5.70	10.00	23,560	17,770	Fruit-growing, herb planting

### The Present Status

In 1998 in Primorskiy Krai there were 498 collective agricultural enterprises. By the end of 1993, many state farms and collective farms were transformed into 160 communities of various types, 12 cooperatives, and 1 subsidiary agricultural farm of the industrial enterprise. Large numbers of joint stock companies and other enterprises with new legal status were formed. In total, only 10 collective farms and 26 state farms have retained their former legal status.

In 1992-1993, 5,110 new farms were registered, but in 1994 the total number decreased to 4,998 farms. Their total land area was estimated at 77,900 ha (15.6 ha average). By January 1995, the numbers of registered farms decreased to 4,100, whereas in 1998 it was 3,064, dropping further to only 2,426 by 2000.

In the 1990s, no principle changes occurred in the structure of sowing areas of all categories of farms (Figure 2).

From 1990, areas producing potatoes and vegetables expanded. Between 1990 and 1999 the potato fields increased by 49%, while vegetable growing plots increased by 23%. Wheat fields and other grain growing fields expanded by 132%, mainly replacing fodder areas. From 1990, total fodder area was reduced by 217,700 ha (62%) because of financial constraints and livestock reduction (Table 3).

However, the total number of individually owned sheep and goats increased because their breeding requires less grasslands and is considerably cheaper. Poultry farming also increased by 1.3 million heads, but then dropped to only 2.3 million, or 4.8 million less than in 1990.

Figure 2  
Changes in sowing areas under agricultural crops

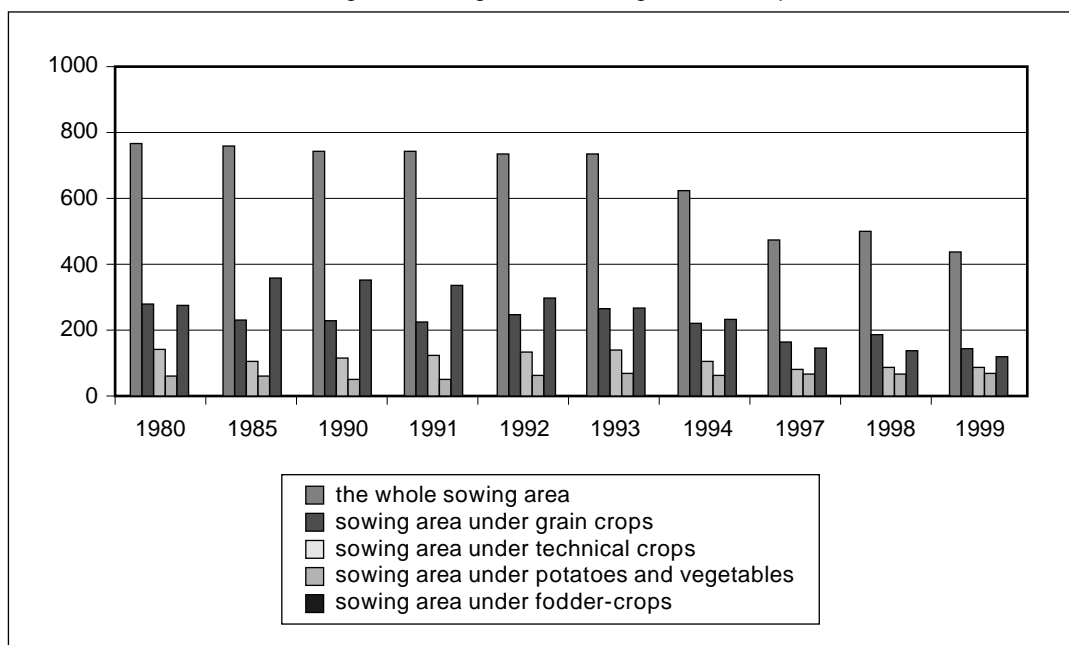


Table 3  
Productive livestock on the farms of all categories  
(thousand of heads)

Years	Large horned cattle	Including cows	Pigs	Sheep and goats	Horses
1981	432.8	161.1	462.5	9.9	10.3
1986	439.9	153.8	482.7	14.5	9.3
1991	406.4	147.0	364.0	16.4	8.8
1992	368.0	139.9	313.0	18.1	7.7
1993	338.6	132.6	299.6	19.9	7.2
1994	305.4	126.3	261.0	21.5	NA
1995	232.7	109.2	192.8	20.3	5.8
1996	196.2	99.2	136.9	23.5	5.3
1997	160.7	83.6	101.7	22.5	4.7
1998	143.1	77.9	82.7	22.4	4.0
1999	128.1	70.2	76.4	23.3	NA
2000	124.4	67.9	84.5	26.1	NA

In the 1980s, large agricultural enterprises in poultry, pig-breeding and hothouses were much more efficient. However, in the 1990s, financial conditions changed drastically, causing problems with supplies of heat and power, shortage of prefabricated fodder, fertilizers and peat. These large enterprises, however, continue to

produce 75% of poultry products and a considerable share of pork. In the 1990s, the changes in the economic policy, radical reforms and deep crisis caused financial difficulties, negatively affecting agricultural production (Figure 3 and 4).

Figure 3  
Products of livestock-breeding

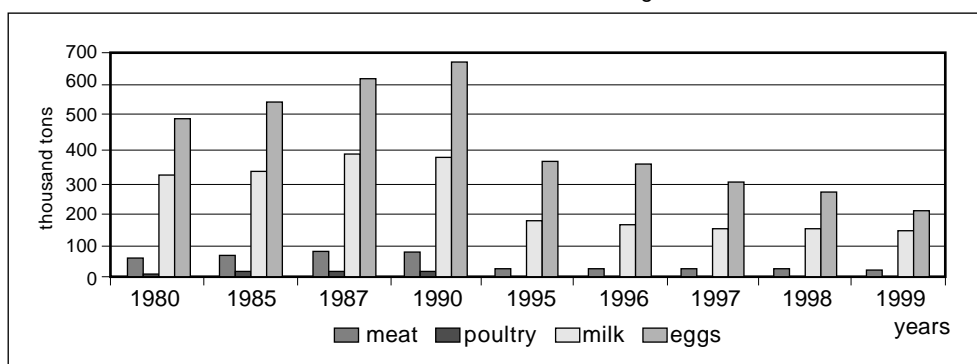
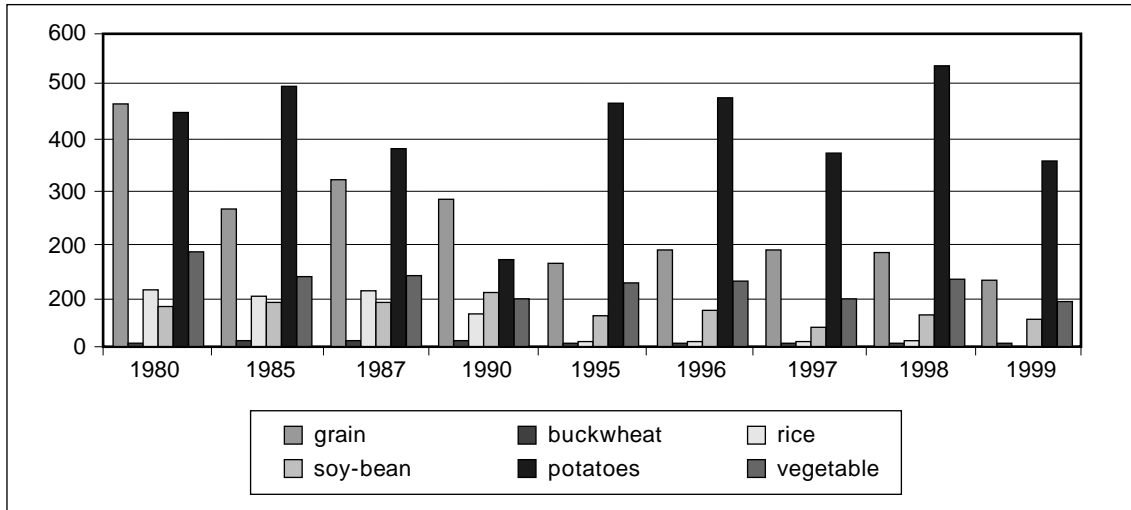


Figure 4  
Gross plant growing output (thousand tons)  
(all categories of farms)



By 1987 one could observe a slow and stable rise in agricultural production, especially cattle breeding, that is less dependent on weather. Nevertheless, since that time

(especially after 1990) one can notice a reverse tendency (Table 4).

Table 4  
Agricultural production in Primorskii Krai, 1990-1999

Years	1990	1992	1993	1994	1996	1997	1999
Volume of output, compared with the previous year (%)	93.0	86.6	89.6	77.0	98.5	85.5	79.9

Between 1990 and 1999 the production of meat, milk and eggs dropped and by 78.8%, 61.2% and 69.8% respectively. From 1987 to 1999, in physical volume the output in various branches of the agricultural sector dropped from 2 to 5 times, while rice production fell seventeen-fold.

Redistribution of land and reduction in the share of labor-intensive crops in collective farms led to the increased weight of full-time farms and individual household plots. Their combined share in the production of potatoes increased from 5% in 1990 to 93.4% in 1999, and in vegetables from 36% to 81%. The farm-based

production and individual cattle-breeding now provide 71.5% of meat, 67.8% of milk and 29.1% of eggs. Nevertheless, the main increase in output is associated with vegetable-gardens, while full-time farmers produce only 3 to 5% of the total agricultural output in Primorskii Krai.

Before 1991, one of the most serious problems that impeded developmental of the agricultural sector was the gap between wholesale prices for industrial goods for the agricultural sector and agricultural products. In the 1990s, however, this gap increased further (Table 5).

Table 5  
Prices for agricultural raw materials and industrial goods for agriculture  
(year-on-year average)

Indexes of prices	1992	1993	1994	1995
Index of prices for agricultural raw materials	7.9	8.8	4.0	2.8
Index of prices for industrial production for agricultural needs	20.1	11.0	7.6	3.2

This worsened price ratio badly affects the financial position of agricultural enterprises, which can no longer afford to buy agricultural equipment, fertilizers and seeds in the quantities required. For example, in 1997 compared with 1985, usage of mineral fertilizers dropped to 6%, whereas organic fertilizers were used at a level of 3%. During this period, the number of new tractors decreased by 125 times and harvesters by 3 times.

As a result, the yield of agricultural crops and productivity of cattle was considerably reduced. In relative per head terms, in 1997 compared with 1987, the milk production fell by 770kg (a 30% reduction). However, the total amount of egg production decreased by 10.5% with a considerably small number of hens. In addition, the 1990s saw a 30% reduction in vegetable yield when compared with the 1980s.

In 1985-1990, when agricultural production in Primorskiy Krai peaked, it provided only 53% to 61% of required meat and meat products and 45% to 48% of milk and dairy products. The bakery industry in the region was mainly dependent on grain shipments from other regions. At the same time, Primorskiy Krai was self-sufficient in poultry and potatoes.

A decline in the agricultural sector has prevailed in all categories of farms for the last two years. The number of livestock has also decreased. Total "losses" in the

agricultural farms of Primorskiy Krai in 1997 compared with 1990 as a decrease in output are shown in Table 6. It should be mentioned, however, that previous levels of output are not easy to restore due to limited purchasing power and reduced consumption. The losses were caused by both extensive and intensive factors, including the decrease of sowing areas and number of livestock. The losses caused by intensive factors were estimated by comparing indexes of intensive factors, such as productivity of animal husbandry and crop yields.

Table 6  
Estimated agricultural loss in Primorskiy Krai, 1997  
(million US\$)

Branches	Volume of output		Reduction in 1997 compared with 1990	Losses caused by		Total losses
	1990	1997		Extensive factors	Intensive factors	
Plant-growing	440.2	224.1	49.1%	36.4%	63.6%	216.1
Cattle-breeding	985.3	212.6	78.4%	71.0%	29.0%	772.7
Total	1,425.5	436.7	68.0%	63.4%	36.6%	988.8

In dollar (US) equivalent by the official rate of national currency

### Origins of the crisis

The crisis has affected both collective enterprises and individual farms. (Figure 5 and Table 7).

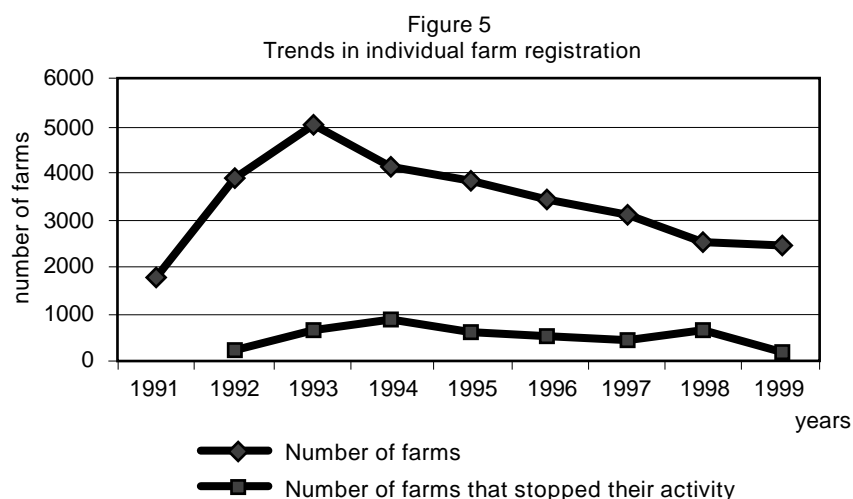


Table 7  
Trend of Individual farms

Indexes	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of farms	1,734	3,854	4,998	4,100	3,804	3,412	3,064	2,525	2,426
Total of lands assigned to farmers (thousand ha)	29.0	60.8	77.8	73.4	74.0	66.6	56.7	58.1	61.2
Average size of plot (ha)	16.7	15.8	15.6	17.9	19.5	19.5	18.5	23.0	25.2
Number of farms that stopped their activity (by increasing total)	-	171	776	1,634	2,224	2,708	3,100	3,698	3,864

The creation of new individual farms was intensive in 1991-1993, when there was a belief that the authorities seriously intended to encourage privatization and new types of economic activities in rural areas. From 1993, however, the number of individual farms began to shrink. By 1993, 605 farms were self-liquidated, followed by 858 closures in 1994, 590 in 1995, 484 in 1996, 392 in 1997, 598 in 1998, and 166 closures in 1999. In total, during all these years, 3,864 farms were self-liquidated. In other words, the number of self-liquidated farms during this short period was larger than the number of farms in

operation.

Lack of effective governmental assistance and extremely high cost of credit (100% a year and more) and lowered purchasing capacity and consumption determined the actions of both individual farmers and collective enterprises. In 1998, the total output of the individual farms decreased by 6,105 tons of grain (62%), 591 tons of soybeans (17%), 359 tons of meat (31%), 2,120 tons of milk (40%), and 874,000 (41%) of egg production. The crisis proved to be the worst since 1938 (Table 8).

Table 8  
Increase in agricultural output in all categories of farms  
(times, the 1940 indexes are adopted as a unit)

Type of production	1950	1960	1965	1970	1975	1980	1985	1990	1995	1996
Grain	0.98	1.20	1.69	2.06	1.97	2.70	1.57	1.62	0.96	1.09
Soybeans	2.19	0.99	4.59	4.41	3.84	2.90	3.40	3.82	2.07	2.47
Potatoes	1.28	1.63	1.92	2.37	2.68	2.30	2.50	0.84	2.32	2.37
Vegetables	0.26	0.99	1.23	1.51	1.27	2.00	1.45	0.62	1.28	1.29
Meat	0.39	1.50	1.70	2.40	2.05	3.80	3.93	4.53	1.52	1.50
Milk	0.98	1.60	2.00	2.30	1.52	2.00	2.09	2.32	1.13	1.05
Eggs	1.00	3.90	3.60	6.60	6.82	13.00	17.50	17.50	9.48	9.15

### External factors

Agriculture in Primorskiy Krai also depends on inter-regional and other external factors. Firstly, fertilizers, lubricants and agricultural equipment come from other regions of Russia, including the Volga River provinces, the Ural, Siberia and Khabarovskiy Krai. In the last few years, seasonal labor from China and North Korea has also been introduced.

At present, local production (foodstuffs, in particular) satisfies only 50-60% of the local needs. Food is imported from China, the United States, Australia, New Zealand and Vietnam. Imported products, such as grain, corn, rice, vegetables, fruit, meat and dairy products, compete with the local products. Some types of imported food have replaced local products completely. The volume of imports is staggering: in 1997 food imports reached US\$312 million.

In total imports, the share of meat and meat products was 31%, while the share of vegetables, fruit and processed food was 14%. The geography of imports also changed dramatically in favor of Asia-Pacific exporters, replacing traditional partners including Bulgaria, Moldavia, Kazakhstan and other Central Asian countries, as well as Southern Siberia.

In 1999, the Regional Statistical Committee reported that the combined share of 90 foreign countries in the foreign trade of Primorskiy Krai reached 96%, while the share of 11 republics of the CIS dropped to only 4%, partly because of extremely high transport costs. The combined share of China and the United States is 70% of the total external trade of Primorskiy Krai. On the other hand, in the future, when the agricultural sector recovers from a crisis, bringing new land into use and making a transition to new productive and ecologically clean technologies, it is likely that Primorskiy Krai will be able to export some types of agricultural products to the countries of the region, including Japan, China and the

Koreas.

It is indeed possible to solve the current problems, but only if the government changes its current economic policy. The experiences of such countries as China in the late 1970s, the United States in the early 1930s, Japan in the 1950s, South Korea in the 1960s and Russia's own experiences in 1907 to 1911 demonstrate that it is possible. In Primorskiy Krai, producers involved in agricultural business experience difficulties caused by tariffs for heat and electric power, transportation, equipment and fertilizers.

Also, the less favorable climate in Primorskiy Krai requires a wider use of electricity and heat, and its geography increases transportation costs. A proactive government approach to these issues could support the efficiency of the agricultural sector. As the world's experiences demonstrate, government support is necessary to launch a normal reproduction process. Conventional taxation could become an instrument of government support.

The agricultural sector of Primorskiy Krai needs large investment. Various studies and estimates reveal that it is possible to considerably increase the production of rice, soybeans, buckwheat, vegetables, and significantly expand cattle-breeding, honey production and medical plants cultivation if investment resources are available.

Various branches of food processing, including vegetable oil, canned vegetables, meat and dairy ventures could be attractive for foreign investment. Involvement of foreign investors could involve reconstruction and technical modernization of existing enterprises such as "Dalsoya" (Ussuriisk), Primorskiy Sakhar, Arsenevskiy Food Combinat, Spasskiy Canner, and meat processing and dairy plants in a number of towns. Construction of small and large enterprises and processing plants in Vladivostok, Nakhodka, Ussuriysk and the Lake Khanka environs is also possible. The average investments into

relevant projects could range between US\$1 million and US\$10-15 million, and it is realistic that the investors will see a return on their investment in 3-5 years. Considering the sizable imports of processed food and agricultural commodities by the Primorskiy Krai and other Far Eastern provinces, one can expect that both domestic and larger regional opportunities for marketing agricultural products can be explored.

**References**

Primorskii Krai. Lessons of the market reforms.

Vladivostok, FEU Press, 1997-310p.

P.Ya. Baklanov, M.T. Romanov, A.V. Moshkov et.al. Changes in the territorial structures of economy and settlement of the Far East in transiting to market economy. Vladivostok: "Zov of Taiga," 1996, 195p.

Romanov M.T. Local industrial -agrarian systems of the Far East south. Vladivostok: RAS, FEB, USSR, 1987,151 p

Stepanko A.A. Agrogeographical assessment of land resources and their use in the regions of the Far East. Vladivostok: RAS, FEB, USSR., 1992, 175 p..

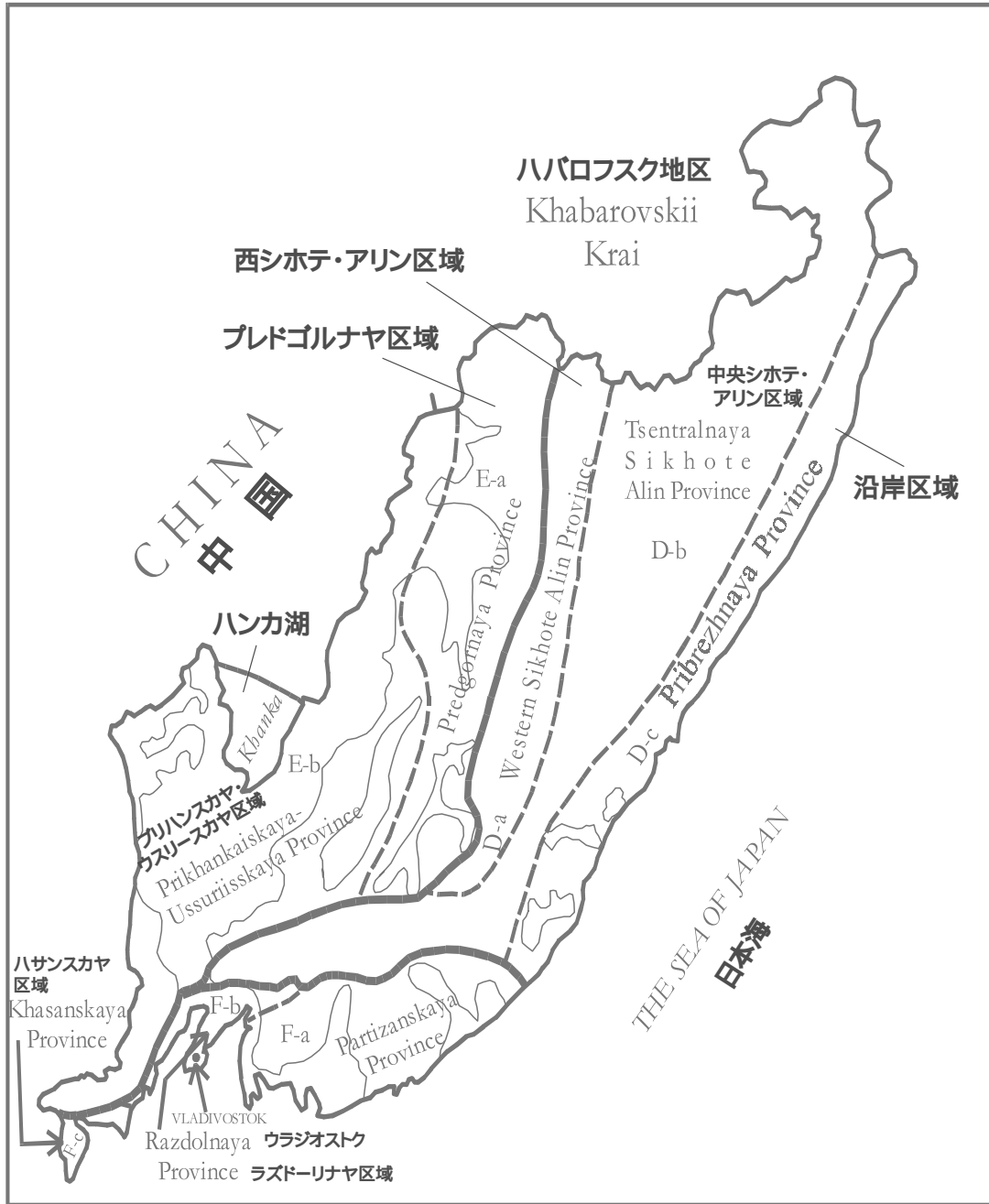


Fig. 1. Agroecological zoning of Primorski Krai

図1:沿海地方の農業地域分類

Conditional designations: 凡例:

Boundaries of: 境界:

-  - oblasts 大地区
-  - agricultural territories 小地区
-  - provinces and zones 中地区(区域)

Zoning taxons: 地区分類:

- A - oblasts; b - province
- A-大地区 b-中地区(区域)