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**MULTIPLE FUNCTIONS OF AGRICULTURE
AND RURAL COMMUNITIES IN ENVIRONMENT,
LANDSCAPE, AND TOURISM**

— A Case Study of Farm Road Improvement Projects —

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I. Introduction

Agriculture in Japan has entered an era of trade liberalization and its ability to compete in international markets is tested. It is generally recognized that Japan has adopted protectionist agricultural policies. Both Japan's non-agricultural sectors and its trading partners are demanding reductions in agricultural subsidies. Furthermore, farmers are burdened with excessive investments and land improvement projects. This frequently results in expenditures greater than farm income. However, it is growing more and more important to invest social capital in improving both agricultural productivity and the environment in rural communities. The GATT agreements reached in the Uruguay Round also recognized the role of agriculture in the preservation of the environment, and affirmed the necessity of providing agricultural protection policies and financial expenditures for agriculture.

In relation to land improvement projects, many benefits are expected, such as the improvement of rural communities, exchange between urban and rural people, and development of resort areas. From the standpoint of the rural living environment, the improvement of farm roads will have benefit people by shortening the distance to cities, and improving urban people's access to comfortable rural communities.

Farm roads play multiple roles in rural areas, including providing access to recreational and cultural facilities, enhancement of agricultural production and transportation, and supplying rural residents with goods from cities.

The paper focuses on farm road improvement projects in the Furano and Nakafurano regions of central Hokkaido, in order to assess the impact of these projects on agricultural development; it analyzes how rural communities are affected in terms of agricultural production, living conditions, and the development of recreation areas.

II. Functions of Farm Roads and Their Economic Effects on Rural Areas

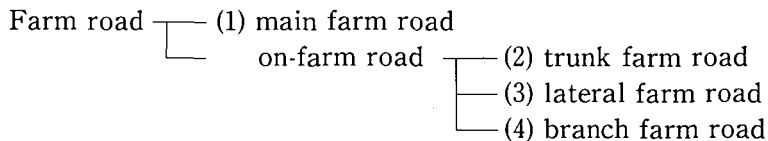
(A) Functions of farm roads

Agricultural infrastructure development projects undertake farm road improvements are part of a comprehensive agricultural policy. The aims of this policy are to maintain high-yield agricultural production, to modernize farming, and to improve the rural environment by constructing farm road networks. Thus, the purpose of farm road improvement is to achieve economic stability in farming households by enhancing agricultural production and to raise agricultural income through better farm management.

Another goal of agricultural infrastructure improvement projects is to increase the serviceability of rural communities by improving the living conditions in rural areas. These areas will not develop unless farmers' children take over the land from their parents. The population of rural communities must be maintained by stabilizing farm management and improving the living environment in agricultural regions. Farm roads and other road networks should broaden the range of activities of the local residents, and give people in rural communities the opportunity to enjoy cultural and educational facilities.

However, it is more difficult to estimate quantitatively the benefits of farm road improvement on the rural environment than to assess its direct effect on agricultural production.

Farm roads are classified according to their functions as follows:¹⁾



- (1) Main farm roads are used for agricultural production and transportation as well as for social activities.
- (2) Trunk roads are used in agricultural production including commuting from or farmhouses to fields, transporting agricultural input, and transporting agricultural products out of the fields.
- (3) Lateral roads are roads which branch from trunk roads and connect field blocks and field lots.
- (4) Branch roads are farm roads that connect field lots and are used for cultivation, pest control, and harvesting.

Rural communities in Hokkaido have a very short history of development; farm roads have been improved in conformity to the American-style block roads, "colonial field block" as they are called. That is, an area was divided into grids

each 300-ken (540 m) long. Then block roads were built along the perimeter of the grid, and trunk and lateral roads were built at 6-ken (10.8 m), 8-ken (14.4 m), or 12-ken (21.6 m) intervals according to the land condition.

(B) The economic effects of farm road improvement

In general, the economic effects of farm road improvement projects are: (1) decrease in transportation expenses, (2) reduction in man/hours required for gricultural activities, (3) increased agricultural output, and (4) decreased maintenance costs.²⁾ These economic effects can be easily quantified, and since the improvement projects are regarded as public investment, the above-mentioned criteria should be met in order to achieve adequate return on investment. In addition, the demand for and consumption of goods and services are reaching saturation levels. Thus, people in rural communities are playing more attention to the national environment^{3,4)}

(C) The "stable settlement" concept

Because of the lack social capital, people have lower living standard in rural communities than in cities. Environmental conditions in rural communities are being improved to establish "stable settlement" and "comfortable living". In other words, government policy seeks to broaden the range of citizens' socio-economic activities and enrich daily lives, providing them with a variety of cultural opportunities.

"Stable settlement" and "comfortable living" in rural communities can be achieved only through stability of farm management and regional economy. Therefore, the improvements in social capital, which encourage people to settle in rural communities should have the following goals: (1) to improve agricultural efficiency, (2) to enhance comfort and serviceability by the improving rural communities' facilities, (3) to enhance the social activities of rural inhabitants, (4) to allow urban residents to live in rural areas by improving transportation links to cities, and (5) to stimulate tourism by taking advantage of the natural environment of rural areas.⁵⁾

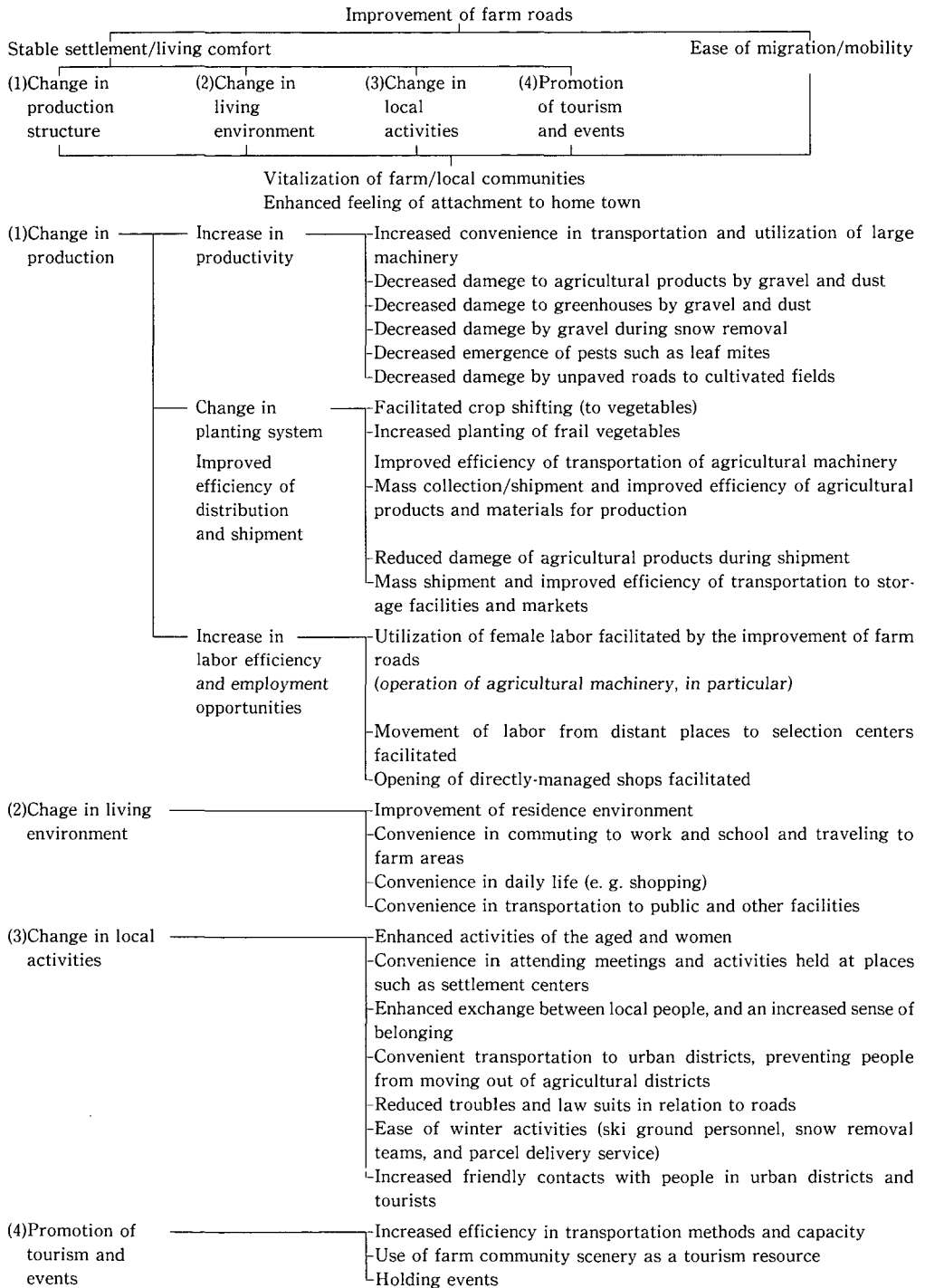
The function of farm roads is shown in a flow diagram in Table 1.

III. The Status of Farm Road Improvement

The surveyed areas of this study, Furano and Nakafurano, are not only important as agricultural regions in central Hokaido, but also contain the tourist attractions of Furano-Ashibetsu Natural Park. Furano, in particular, attracts many tourists to its ski resorts, and Nakafurano to its lavender farms.

As both towns are key points on transportation routes in central Hokkaido, national roads and prefectural roads were improved in many years ago. Over the past 10 years, farm roads have been improved to supplement these main roads.

Table 1. Flow diagram to show how farm roads influence local communities



Until 1985, farm roads were improved in order to form networks with major national roads and prefectural roads. The major farm roads in Furano have been developed by the following agricultural infrastructure improvement projects:

- (1) Farm road improvement projects by the funds of tax derived from agricultural oil use (*nomen* farm road): since 1970,
- (2) Integrated upland field improvement projects (in nine areas): since 1976,
- (3) Improvement projects for conversion paddy field into others: 1971-1977,
- (4) Reclaimed land improvement projects: since 1982,
- (5) Farm land consolidation project (in two areas): 1970-1983, and since 1974,
- (6) Integrated land improvement projects: since 1987.

Lateral farm roads have been improved under the auspices of farmland reclamation projects. In 1987, total length of roads in Furano was 728 km, the longest in Hokkaido. Of these, roads built by the municipal authorities in agricultural promotion areas has a total length of 507 km, also number one in Hokkaido, comprising 69.6% of the road length. However, the improvement rate of farm roads is 22%, in a low rank, and the pavement rate of farm roads is only 8%. The average density of roads in Furan and Nakafurano is 46 m/ha higher than in other cities in Hokkaido.

By contrast, the total length of roads in Nakafurano is 294 km; a much lower rank than of Furano. The total length of roads built by the town authorities in agricultural promotion areas is 227 km, falling in a middle range in Hokkaido. However, the road improvement rate is 23%, and the pavement rate of rural roads is merely 9%. These figures are the lowest in Hokkaido. The density of roads is 44 m/ha, which is average for all rural communities in Hokkaido.

The changes in the improvement of farm roads in Furano area are shown in Fig. 1 and Fig. 2. The *nomen* farm road-(2) in Tomioka had not been improved in 1975, but this road has played an important role as a major farm road since it was connected to a prefectural road, Kamifurano-Asahi-Nakafurano Line, extending to Furebetsu and Rokugo. Another prefectural road, Higashiyama-Furano-Teishajo Line, connects Furebetsu with the downtown area. Finally, the Rokugo-Yamabe Teishajo Line serves as the major route from Rokugo to Nunobe, while the Higashiyama-Furano-Teishajo Line leads to the Roseppu-Higashiyama area. These roads provide routes encompassing the city and farm road networks.

In the agricultural area extending north to south, from outside the downtown area to the Yamabe area, major farm roads are aligned at 60-ken (108 m) intervals in a lattice-like pattern along rice paddy fields. However, in the Furebetsu, Rokugo, Roseppu and Higashiyama areas, unimproved roads built by city and town authorities and farm roads were connected to the major farm roads in a herring bone pattern and it was often not easy to access to No. 2 major prefectural road, Tomioka-Kousei Line, from the unpaved farm roads.

Fig. 2 shows the number of road improvement 10 years later, in 1985. Farm

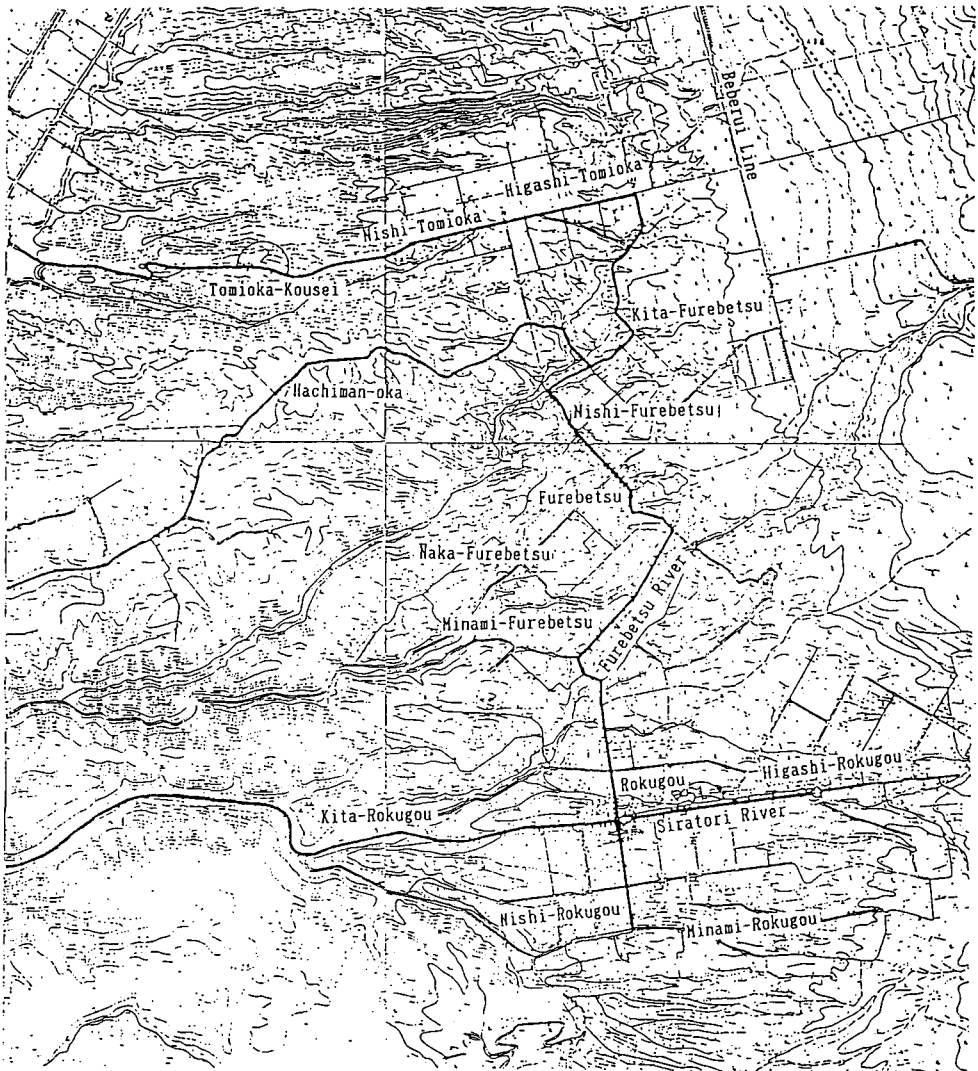


Fig. 1 Changes in the Improvement of Farm Roads in Furano Area (Tomioka, Rokugou) in 1975.

roads improvements progressed rapidly in Furebetsu, Rokugo, Roseppu, Nishitappu, and Higashiyama. Road improvement in Furebetsu and Rokugo proceeded so that the Higashiyama-Furano-Teishajo Line and the Rokugo-Yamabe-Teishajo Line were upgraded to major roads, and the farm roads running parallel or connecting with these routes were also paved or improved. The roads in these areas constitute mesh-like transportation networks. These prefectural roads and farm roads are now utilized beyond their original functions of promoting agricultural production and the daily activities of regional people.

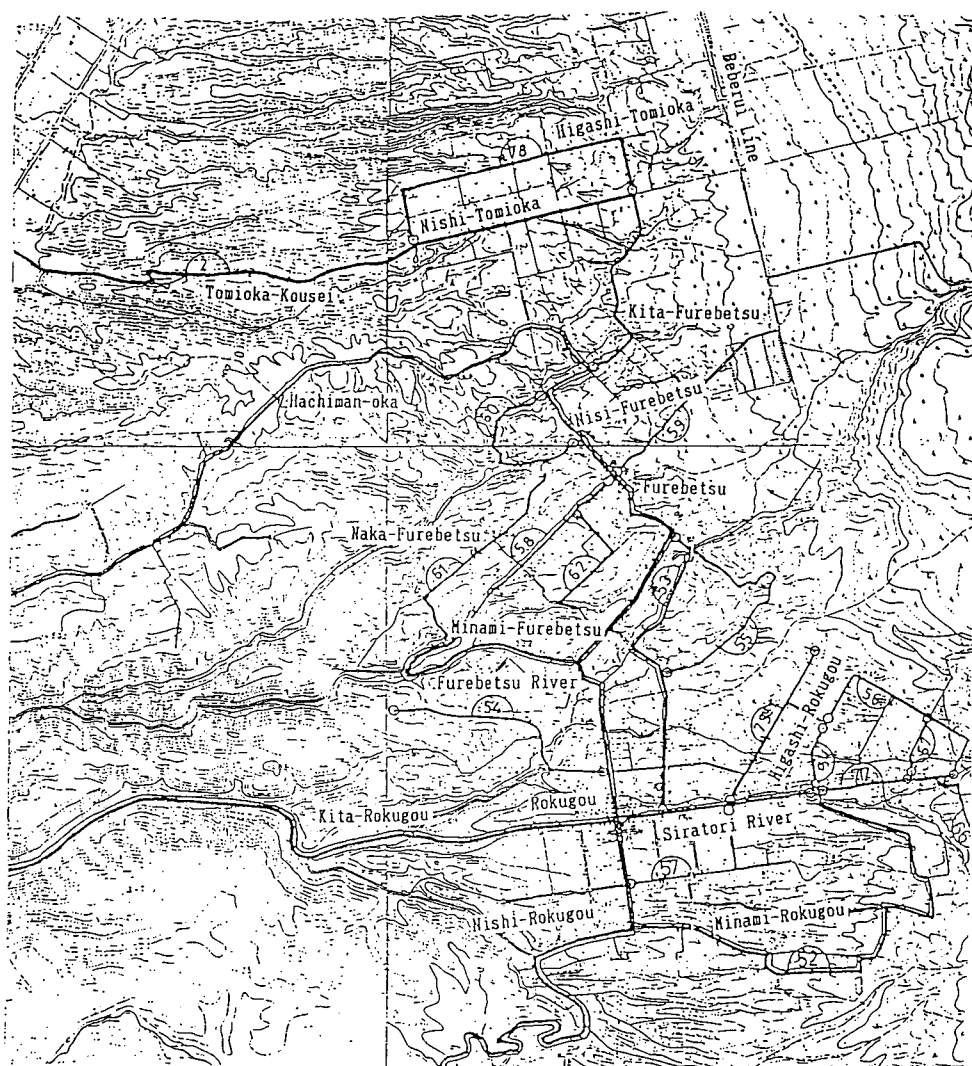


Fig. 2 Changes in the Improvement of Farm Roads in Furano Area (Tomioka, Rokugou) in 1985.

Inconvenience in rural communities stems not only from the lack of facilities nearby, but also from insufficient access to such facilities. The improvements of road networks compensate for the lack of facilities and reduce the inconvenience in people's lives. Convenient access to cities and unspoiled nature are often seen as conflicting priorities.

However, inhabitants of rural communities can enjoy the comfort of their communities if they can easily make use of urban facilities. The important factor is to improve access to urban services by improving transportation links.

The first benefit of road improvement is greater comfort in rural communities. A second benefit is greater satisfaction due to increased access to city services. This will help people to feel a greater sense of attachment to their own hometown, and a desire to remain there.

IV. Improvement of Farm Roads and Readjustment of Regional Communities

(A) Production and life-related facilities

Production-related facilities in Furano city include storage and deposit facilities for agricultural products, warehouse and selection centers, rice centers, starch factories, gas stations, agricultural input centers and an agricultural cooperative. Living facilities include agricultural co-op stores and other retail stores.

Storage facilities and selection centers are designed: (1) to be near the producers who transport their products, (2) to have the capacity to handle a large quantity of products efficiently while selecting, storing, and preparing them for the market, and (3) to be near major roads which serve as transportation arteries in order to transport products smoothly to market.

Since agricultural co-op stores and gas stations serve large areas, they are located in downtown areas rather than in farming areas with low population density. In winter a snow removal becomes important. Thus road improvement is essential for effective snow removal.

(B) Cultural and educational facilities

The largest problem in rural communities is the lack of cultural and educational opportunities and facilities. A further inconvenience is inadequate roads to these facilities and scarce means of transportation.⁶⁾

In Furano, there are citizens' community halls, children's halls, rural community halls, and community centers, thirteen elementary schools, seven junior high schools, and three senior high schools in the downtown areas of Furano, Yamabe, Higashiyama, Roseppu, Nishitappu, and Rokugo. Although each school district is small, school buses cover larger areas and, therefore, bus routes have to include more than one school district. Farm roads connecting these main roads have to be improved so that students can get to bus stops conveniently and safely.

The school bus route in the Higashiyama area runs on National Line-38 and connects with the Higashiyama-Furano-Teishajo Line. Therefore, it is important that students are able to reach bus stops on the national road and *nomen* farm roads, and also that buses run on schedule. The improvement of farm roads fulfills these requirements and facilities commuting to schools. In winter, efficient transportation to school should be ensured through snow removal. In addition, access to citizens' halls, children's halls, community halls, and commu-

nity centers is important to the social lives of people in the community. Such places are naturally concentrated in downtown areas, so that convenient transportation is a necessity for people of rural areas wishing to utilize these facilities. In Furano, a community hall is located in each area and are close to national or prefectural roads.

Community centers are distributed evenly in these areas and serve as the locus of various activities. The inhabitants of these communities require convenient transportation to these centers in order to deepen their personal relationships. Improving roads also broadens the range of opportunities afforded to senior citizens, thereby strengthening ties among rural inhabitants.

(C) Change in production structure

In order to understand the effects of the change in the structure of agricultural production, we examined that the change in the composition of cultivated crops in Furano areas. Rice production in Manabuda, west of Furano, decreased from 33% of total agricultural output in 1970 to 13% in 1984. The reduction of paddy fields and the shift to other crops resulted in an increase in wheat, barley and vegetables. Vegetable output increased sharply, from 59% to 83% of the total. In the lowlands, Onuma, Torinuma, and Ogiyama, rice production decreased from 85% to 45% of farm output; wheat and barley and vegetable production increased from 3% to 29% of the total.

In the eastern areas, rice production in Furebetsu and Rokugo decreased; the percentages in both areas are less than 1% of production. Although these areas were initially upland field or dairy farming areas, production of upland crops, included wheat, barley, various cereals, potatoes, and sugar beets, decreased in the period to 1984. On the other hand, vegetable production increased sharply from 8% in 1970 to over 50%. As for vegetables, the production of onions and carrots increased. This is due not only to farmers' preference for crops, but also to the fact that shipment to markets has improved because of better selection and storage facilities, improvement of the transportation networks, and development of more efficient means of transportation. The increase in production of leafy vegetables, "frail" vegetables can be largely attributed to reduced crop damage and greater freshness, made possibly by road improvements.

V. The Role of Farm Roads in Tourism

(A) Sightseeing areas in Furano region

Farm roads and other roads have the following functions in terms of tourism:

- (1) Serving as transportation networks for people and goods to tourist areas.
- (2) Contributing to the aesthetic value of scenic areas by blending with the landscape.
- (3) Acting as staging area for events.

The Furano-Nakafurano regions are major resort areas blessed with abundance of natural beauty in and around Taisetsuzan National Park, prefectural parks and various other tourist attractions. Therefore, function (1) is particularly important, with much improved traffic networks fulfilling this function. However, requirements for tourism are changing. In the future, there will be a greater demand for resort tourism of the residential type, which provides tourists with the opportunity to experience nature. Thus, function (2) and (3) will become important factors for tourism development in rural areas.

Hokkaido has a short history and few historical tourism sites. However, when one considers residential or experience tourism, this lack of history may be beneficial. Therefore, if farm roads are equipped with functions (2) and (3), they may greatly contribute to the promotion of future tourism.

(B) The role of sightseeing areas and farm roads in the Furano area

Many famous sightseeing areas are concentrated to the west of Furano city. Among them, Furano and Kitanomine ski areas, Lavender Park, and Ashibetsudake mountain-climbing area are particularly well-known. These "old" sightseeing areas are close to Furano. They are conveniently located close to Furano, Nunobe, and Yamabe rail stations, and to the national road. Convenient access to transportation has contributed to the development of tourism in the area.

On the other hand, the hills to the west of the urban area have become newly developed tourist sites in recent years. These "newly-discovered and created" sightseeing areas are tourism resources which had been hidden in rural areas, unrecognized by people living there. Farm roads in the Rokugo area have been upgraded rapidly in the past 10 years, and have contributed to the promotion of tourism.

The prefectural roads and the farm roads running from Rokugo to Roseppu and Nishitappu present wonderful views of hilly landscapes. Since these farm roads have not yet been improved, the Higashiyama-Furano-Teishajo Line is used to connect Rokugo and Nishitappu. If this road is improved, it may become a valuable asset in terms of transportation efficiency and tourism.

VI. Summary

Farm road improvement has had a greater impact than the commonly recognized economic effects of lowering transportation and labor costs, increased agricultural production, and decreased maintenance costs for farms. Improvement of environmental conditions in rural communities can lead to "stable settlement." Furthermore, when farm roads are connected with other roads, they increase the efficiency of regional economy and the ease with which urbanites can enjoy the benefits of rural life.

Farm road improvement has produced synergies: Farm road improvement

made the collection and shipping of agricultural products more efficient. It has also made shopping, commuting to school, and use of public facilities more convenient. In addition, a more complete snow removal system made possible by farm road improvement makes winter activities easier.

The change in agricultural production structure is particularly important. Rice cultivation has been largely replaced by vegetables, since farm road improvement has contributed to prevention of storm damage and product deterioration during transport. A further benefit is a more coordinated system of shipment of produce.

Farm roads play an important role as sightseeing roads in Furano. Particularly in recent years, the Rokugo area has become a new tourist attraction, with farm roads increasingly used for tourism. Moreover, farm road improvement has contributed to the magnificent landscapes.

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