

Effective Food Chain Management in the Wild Berries Business of Russian Rural Economies

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Abstract

The transition from a central-planned economy to a market one in Russia has created a lot of economic and social problems in rural areas. In many instances, survival of the rural population depends not only on income obtained from the agricultural sector but on the income received from forestry, traditional crafts, and also from income derived from people coming to the country for a vacation. One of the traditional sources of rural income is the sale of wild berries. In our article we analyzed the activity of one of the private firms processing wild berries. This firm has encountered several problems in new economic environment. The main problem is following. Some “pickers” have decided not to pick up berries that would be for sale during the next season, and this is threatening the survival of the private enterprise.

Problem Statement

The analysis of food purchasing per person at the regional level¹ has revealed a necessity for the improvement of diets for the lower-income population. One of the ways to solve this problem is increasing the consumption of berry products as a component of a meal. The high level of consumption of berry products, especially fresh ones, has a positive effect on health and life span of people.

The consumption of potato and bread has increased in Russia since 1991 at the expense of foodstuffs delivering protein, mineral substances, and vitamins. As a result of this food pattern, the population starts to decline both as a result of natural reduction of numbers, and in part by the deterioration of the gene pool. Consumption of berries would provide needed nutrition components such as vitamins, minerals, and biological active materials to prevent this from process.

In the central European part of Russia, the development of berry markets is one of nontraditional direction of economical development. These market products are represented by cultural and wild varieties of berries. The main production of cultural berries is centered around large industrial centers, and in the European part of Russia, the main supply area of wild berries is represented in the northern regions, where forests cover a large part of the area. Here, the high content of biologically active materials and vitamins make wild berries a popular product for consumers, especially those from urban areas. Additionally wild berries are traditionally used in national medicine for preventive health to maintain health and to treat a number of diseases (Kruglyakova, G.V., 1990; Kazheev, A.K. and Smirnov, Y.I., 1992).

The following chain can represent the structure of the wild berry market. First, pickers go to the forest and pick wild berries; next, buyers who are usually mediators representing a processing company, come to the main location of berry resources and buy berries. The mediators provide storage, packaging, transportation, and the primary processing of berries. Finally they sell wild berries to local processing company in Kostroma city or other companies located outside of the region

Because of this market structure the competition among firms for the most expedient conditions of resource management is very common and has a very strong impact on competitiveness of processing companies.

Objectives

The objectives of this study are:

- 1) to identify the reasons behind the pickers' behavior;
- 2) to determine the effective strategy of supply management.

The sale of wild berries for some families in rural areas can account for as much as two thirds of the family's annual income but the current logistic system is not allowing the number of families that may earn money in this market to increase. In order to determine why this is happening, we need to characterize the regional particularities and their impacts on the behavior of sellers.

The economic characteristics of Kostroma region

The Kostroma region is located 340 km to the northeast of Moscow (the capital of Russia) on the Volga River. Primary industrial sectors include manufacturing (mostly electricity), forestry, and agriculture (predominantly dairy and meet, grain, flax).

¹ The region is Kostroma region, Russia

The population of the region was 774,500 in 2001. Among the regions of the central part of Russia, the Kostroma region has the lowest population. The population is distributed in the territory non-uniformly. The greatest density is in the southwestern areas on the Volga – 150 persons per 1 sq. km. while the lowest population density is characterized in the northeastern part of the region – 3-5 persons per sq. km. The main tendency of the last few years has been towards a reduction of area population. Currently the share of the rural Kostroma population is 34%.

The region is rich in natural forests that cover 72% of its territory. With respect to operational stocks of wood, the region is number one in the central part of Russia. The region is also recognized as setting the standard for a national landscape in the central part of Russia. This is an extremely vast territory encompassing 60,100 sq. km, with a low population density (12.9 people on 1sq. km). The low level of industrial influence, and the absence of harmful, ecologically dangerous manufacturing plants create conditions for the formation of an ecologically clear district.

The following features of the Kostroma region might affect efficiency of berry market operation on the regional level:

- Concentration of the most industrial enterprises and effective agricultural enterprises in the southwestern part of the region while in the northeast (the biggest part of region) forestry and agriculture are the main industries.
- Only twenty percent of agricultural enterprises (most of them are located in the southwestern part of the region) are profitable and they cannot provide enough income for rural families. Many rural inhabitants pick and sell wild berries to local buyers to supplement their income.
- Currently a safe ecological situation exists in the territory with the absence of significant metallurgical and chemical manufacture, industrially significant stocks of minerals. This helps to keep a good quality of wild berries.
- The intense social conditions including a high level of unemployment and absence of jobs, decrease of population, and growth of densities of urban population are all serious problems. The development of wild berries market activity is a great challenge to improve the situation in some rural areas.

During the last few years, there have been significant changes in the structure of family income. The most significant distinction can be observed when comparing 1994 to 1993. The share of an individual's salary has decreased 1.9 times. For an economy where most of the population is hired workers, it means, that in addition to their major jobs, secondary and other forms of employment (which often are not registered anywhere and are not taxed) start to develop. At the same time, other sources of personal income increased by 35 % between 1996-2000. Another income source is the sale of wild berries by rural and partly urban populations (Panteleeva, O. and Harlamova, G. N., 1998; Panteleeva O., 2002).

The characteristics of berries market in Kostroma region

As we mentioned above, berry - market products are represented by cultural and wild varieties of berries. The main production of cultural berries is concentrated around the cities and basically used for family consumption. Cultural berries are cultivated on 540 hectares. Since 1990 there has been an increase in the lands of cultural berries on 150 hectares, but no future increase is forecasted. The average gross yield of raspberry, strawberry and other kinds of cultural berries is 3.7 thousand tons per year. Only one agricultural enterprise produces cultural berries, but the purpose of its activity in this area is cultivation of small plants. The main production of cultural berries is concentrated in personal part-time farms. Only 9.1 % of the total number of such farms owners are engaged in the market of berries (table1). The largest share of

berry supply lies with wild varieties of berries. Operational stocks of bilberries are about 7,000 tons, cranberries-1,700, cowberries–1,260 tons depending on seasonal weather conditions.

Rural pickers represent 14 % of the total population in rural areas and only 9.8 % of the sale of wild berries. This means that on average, 2,080 persons from rural areas participate in the supply of wild berries. Data were collected via extensive interviews of people who live in rural settings and sell wild berries to private enterprises. 240 people were interviewed in the 12 areas. Respondents were randomly selected from people who grow cultural berries or pick up wild berries in the forest. Only 112 respondents were marketing berries.

Table 1: Characteristics of the population engaged in sales of berries.

| | Type of berries | |
|--|-----------------|-------|
| | cultural | wild |
| Number of families owning lands for internal use (dacha), thousands | 68,0 | - |
| including those who are engaged in cultivation of berries | 32,5 | - |
| Number of rural people who are of working age, thousands | - | 148,4 |
| Percentage of rural population engaged in picking wild berries, % | - | 14,3 |
| Percentage of rural and urban population engaged in sale of berries, % | 9,1 | 9,8 |

The berry market has the following characteristics:

Supply of wild berries is impacted by both weather conditions in the production season, and the level of social and economic development in a particular region;

Perishable nature of some varieties of berries produced, on the one hand, necessity of availability of storehouses, and with other - tendency of the suppliers in as much as possible short time to realize fresh berries;

The concentration of consumption of berries in cities, that necessitates its sales through a different kind of mediator;

Wild berries seem like “gifts of a forest,” when the participation of the labor forces in their production is minimum. The main labor costs are connected to prolongation of the process of production such as picking up, packaging, transportation, storage, and primary processing;

Some share of wild berries go towards personal consumption by the rural and urban population.

Major factors affecting the efficiency of the supply chain of the berry market:

Based on the available research works (Kruglyakova, G.V., 1990; Russian Scientific and Research Institute of Forestry, 1990), we can note several factors effective resource management:

Territory accessibility. This impact the level of transportation systems development in the region, i.e. expansion of types of roads used in the calculation of 1000 hectares of the area. The territory is fully accessible if the expansion of roads is more than 2 kilometers per 1000 hectares of the area;

Density of rural population, which is characterized by the number of the inhabitants per 1 sq. km of territory;

Existence of wild berries in the forest that is specific weight of the areas covered by wild berries plants in general area covered by forest;

Wild berries yield, expressed in kilograms per 1 hectare.

The level of acceptance is a ratio reflecting the volume of wild berry sales in the operational stocks of berries on a specific area.

In general, there is a group of eight areas, where the level of acceptance twice exceeds average level (table 2). This is because of the high density of urban population in this area. Urban population buys wild berries for family consumption. Rural and partly urban inhabitants go to forest that is located near cities but not reach in operational stocks of wild berries.

Table 2: Factors influencing storage activities of the wild berry market

| | Groups of areas on a level of exception, % | | | The average |
|--|--|---------|-------|-------------|
| | < 2.9 | 3.0-5.8 | > 5.9 | |
| Number of areas | 10 | 6 | 8 | 24 |
| Level of acceptance, % | 0.9 | 4.1 | 15.3 | 7.0 |
| Existence of wild berries in forest, % | 3.3 | 1.1 | 2.7 | 2.6 |
| Wild berries yield, kg per hectare | 32.2 | 35.3 | 45.6 | 36.8 |
| Density of rural population, inhabitants per 1 sq.km | 8.3 | 7.4 | 24.0 | 13.5 |
| Territory accessibility, % | 80 | 100 | 100 | 95 |

These areas are characterized by high density of the population, full accessibility to the different territories. However, in 16 areas only 4.1 % of operational stocks of wild berries were sold at the market. The regression analysis has shown that only - 41 % of variation in dependent variable (the acceptance level) is explained by variation in the explanatory variables. The dependent variable is the level of acceptance, independent variables include the presence of wild berry plants in forest (factor 1); yield of wild berry plants (factor 2); density of rural population (factor 3); territory accessibility (factor 4). The equation is: $Y = 14.4 - 0.77 X_1 - 0.35 X_2 - 0.36 X_3 - 0.24 X_4$. The variation of the explanatory variables included in the model explains approximately 41 % of variation of the dependent variable. Regarding to our major hypothesis we found the following evidences. The estimated coefficients for all factors have a negative sign. The increase of the density of rural population decreases the rate of acceptance, although rural population is the main labor force for wild berries picking. The estimated coefficient for productivity of wild berry plants is - 0,35. This means that if the wild berries yield increases by 1 kg per hectare, the level of acceptance decreases by 0,35 %. So, we can conclude that there are other factors effected wild berries resource management.

The other factors that might influence the level of acceptance of wild berries are:

- the number of storage facilities in a particular area;
- availability of financial resources of processing companies during a season.

Duration of season for different varieties of wild berries is from two weeks to 4 weeks;

- different forms of organization of picking process and technical equipment of the suppliers. This helps reduce expenses of processing companies for buying fresh berries.

However, with the development of this market all of the factors can be affected by changes in the economic environment of wild berries resource management.

The widely used form of organization of company activity at the fresh berry market is buying small-sized boxes from the rural population. In this case the main task of the supply chain management is to provide a good price for suppliers. This price should stimulate selling wild berries to storage places of specific companies. Usually the level of prices depends on the yields of wild berries plants, type of forest, kind of berries, and the social situation in an area.

Table 3: Ratio of prices and labor costs

| | Ratio to bilberry | |
|----------|-------------------|--------------|
| | prices | labor per kg |
| Bilberry | 1.00 | 1.00 |
| Cowberry | 0.77 | 0.52 |

| | | |
|------------|------|------|
| Cranberry | 0.69 | 0.46 |
| Cloudberry | 1.73 | 0.56 |

Usually a picker spends 48 % more time for picking up 1 kg of bilberry that is more perishable berry than cowberries. The price of bilberry is 23 % higher in this case. At the same time the price of cloudberry paid to pickers is 73 % higher although pickers spend less time for picking up cloudberry than bilberry. In many cases the prices paid by a processing company to pickers depend on the demand from company using wild berries in production of, for example, dairy products. Actually current wild berry price increases (table 4) are supported by an increased level of sale.

Table 4: Average prices of 1 kg of wild berries during a season (US dollars) and volume of sales, tons.

| | Year | | | | | |
|-------------------|------|-------|------|------|------|-------|
| | 1994 | 1995 | 1996 | 1998 | 2000 | 2001 |
| Bilberry: price | 0.55 | 0.79 | 1.02 | 0.98 | 0.63 | 0.85 |
| volume of sale | 29.3 | 10.0 | 2.6 | 12 | 1.0 | 25.0 |
| Cowberry: price | 1.00 | 1.70 | 1.45 | 0.70 | 0.55 | 0.65 |
| volume of sale | 9.4 | 123.3 | 80.3 | 48 | 18.0 | 150.0 |
| Cranberry: price | 1.05 | 1.45 | 0.95 | 0.77 | 0.41 | 0.70 |
| volume of sale | 66.4 | 157.0 | 50.0 | 12 | 19.2 | 50.0 |
| Cloudberry: price | 2.21 | 2.42 | 3.80 | 1.68 | 1.11 | - |
| volume of sale | 11.1 | 16.2 | 22.8 | 21.5 | - | - |

The processing company encountered a problem when experienced people left the business and the company needed to look for new pickers. 45 % of respondents would not go to pick up berries during the next season, 21% of respondents mentioned that they would go to pick up berries in the forest only for personal consumption. In according to our survey the main source of the improvement of economic situation is stabilization of the social situation and an opportunity to get other jobs outside of rural areas of Kostroma region.

The decrease of the actual income of the population is the strong challenging factor for the sale of collected berries to storage firms or on an unorganized market; for example, along roads. The growth of incomes produces an increase for the internal need of berries. It means that people who used to pick up berries in the forest do not do that anymore and prefer to buy fresh or processed berries in shops.

Results and Conclusions

The market for wild berries has a specific structure and the efficiency of production has a very high dependence on the economic relations between sellers of wild berries in rural areas and buyer that is represented the private enterprise, which processes these products in the city. As the main link between pickers represented mostly by rural population and buyers represented by processing companies based on the prices given for picked berries, the enterprises need to plan their activity for next season according to the prediction of the yield of wild berries. In most cases, the market prices have a high dependence on the level of the yield.

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