

Fragmentation of Agricultural Land and Farmers' Business Decisions. Scattered Fields in the Farms in Bulgaria and Japan

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Summary: The fragmentation of cultivated agricultural land is considered as a main obstacle to modern agricultural development. More often, the problem is analysed on macro level – state policy. The suggested measures include: sanctions for abandoning land (land taxes), stimulus for ownership exchange (free of taxes land transactions in particular conditions), support for cooperation without change of the ownership (access to additional public finance in case of cooperation), direct government intervention (state land consolidation agencies), and etc.

In this study we take a look on the individual farmers in order to see how they find their own ways to overcome the negative consequences born from the fragmentation of the land they cultivate. A literature observation and a field study in Bulgaria and Japan were conducted for this purpose. Data were collected, summarised and analysed, and conclusions drawn down.

The survey did hold out the reasons for fragmentation of land – historical and modern,

the present state in both countries, and the logical connection between the fragmentation and the decision of farmers for organisation of their business. This connection was clearly shown in three types of decisions – choice and location of crops, models of land utilization, and design of the territorial structure of the farm.

Final suggestions were formulated based on the practice of the Japanese farmers as their experience in the area is richer. We do believe that these suggestions could be used by their Bulgarian farmers also.

Key words: agricultural land utilization, farmers' business decisions analysis, agricultural development.

JEL: Q15, Q12, O13.

Introduction

Positive results for Bulgarian agriculture were born by the rural reform in the country after 1990. The farmers' machinery was renewed, new products and technologies were introduced, modern forms for market exchange were developed, and etc. But negatives took also place. One of the widely discussed is the fragmentation of the agricultural land evolved directly from the model of rural

reform chosen in Bulgaria – land restitution, based on the ownership in 1946.

Usually, various macro level measures are suggested for copying the problem with land fragmentation. Such as sanctions for abandoning land (land taxes), stimulus for ownership exchange (free of taxes land transactions in particular conditions), support for cooperation without change of the ownership (access to additional public finance in case of cooperation), direct government intervention (state land consolidation agencies), and etc. One point of view on the problem is often neglected – the farmers' one. How do they try to solve it?

The agricultural land fragmentation is not only Bulgarian or transitional problem. It is typical for the most of the countries, except those where the land ownership has been always large (USA), or in case of long historical period of evolution leading to consolidation of the land through market (UK).

This article presents a part of one comparative study on the problem of agricultural land fragmentation in Bulgaria and Japan. The authors try to view it from the farmers' point of view. That is why they prefer to use the term "scattered fields". The main thesis is that the existence of scattered fields in a farm influences farmers' business decisions – for the choice and territorial placement of the crops, for the model of land use, for the design of the farms' structure.

The Study

Representative data on the problem of land fragmentation on farm (micro) level do not exist. Because of this lack, our analysis is based mainly on own field study in both countries. It includes:

For Bulgaria:

- investigation of 12 farms in region Plovdiv;
- investigation of 9 farm households in regions Plovdiv and Ruse;
- interviews of officers from Ministry of agriculture and related agencies, and from municipal agricultural offices.

For Japan – investigation of farms in prefectures Tatebayashi, Ora-gun, Gunma, Chiba, Oita.

Appearance of Scattered Fields in Japan

The rural reform in Japan starts in October 1946 and includes three main measures:

- the agricultural land ownership is restricted up to 1 ha on average for the country;
- the government buys the land of non-resident owners and sells it to the tenants;
- the prices of both transactions are fixed on a level that does not make the large owners (land lords) extremely rich and supports the development of the new owners (previous tenants);

The ownership on 1,705,000 ha is transformed to July 1951 in this way during the first stage of the reform. As a result the rented agricultural land in the country decreases to 10 % in 1950 from 52 % in 1941 (Hosogai, 1977, p. 42).

The second stage of the reform begins with the adoption of a new Law for agricultural land in October 1952. It suspends leasing of agricultural land in fact. The land lords disappear and in 1959 the only actors in Japan agriculture are farmers which own the land they cultivate.

This reform leads to some positive social results, but scattered fields in Japanese farms are also born from it. Yet in 1950 (first stage of the

reform) the picture of land ownership in Japan is different in comparison with the most developed countries in Europe (table 1).

Table 1. Size of the farms and fields in Japan and Europe, 1950 (ha)

	Denmark	France	West Germany	Switzerland	Japan
Average size of a farm	15	14	6.8	5.35	0.9
Average size of a field	-	0.4 – 0.9	0.67	0.51	0.14

Source: Kayo, N., 1977.

A process of land consolidation is following later but even today the farms in Japan are relatively small scaled (table 2).

Table 2. Farm size in modern time (ha)

Japan (2005)	Bulgaria (2003)	USA (2002)	Germany (2003)	France (2003)	England (2003)	Australia (2001)
1.8	6.9	178.4	41.2	45.3	57.4	3240.9

Sources:

Japan: Census of Cultivated Area and Planted Area, 2005.

Bulgaria: Statistical Bureau of EC, 2003.

USA: Census of Agriculture, 2002.

European countries: Agriculture in the European Union Statistical and Economic Information, 2004.

Australia: Agricultural Census, 2001.

Agricultural development with scattered fields.

First period (1945-1959)

The rural reform in Japan (especially its second stage) coincides with a period of rapid increase of the population and shortage of food in the country. The newly evolved farmers meet high

demand of their products (mainly rice) that supports their development. Something more a Staple Food Control Law, guaranteed high prices for farmers, has been adopted.

No change in land ownership is needed in this positive economic situation. Each farmer easily covers the costs and makes profit from his activities. The picture of scattered fields in the farms remains stable for a long period of around 25 years (table 3).

Table 3. Scattered fields in rice production

Farm size (ha)	Number of scattered fields in one farm		
	1941	1953	1965
over 3	9.95		7.53
2.5 – 3.0	9.08	9.15	8.03
2.0 – 2.5			8.11
1.5 – 2.0	9.09		7.97
1.0 – 1.5	8.04	8.40	7.24
0.5 – 1.0	6.45	6.58	5.73
less than 0.5	4.01	3.56	3.25
Average		6.00	5.24

Sources:

1) Japan Agricultural Co-operative: Report of Optimum Size (1941).

2) Ministry of Agriculture, Forestry and Fisher: Report on Land Utilization in Winter (1953).

3) Ministry of Agriculture, Forestry and Fisher Census of Agriculture (1965).

Second period (1960-1975)

The fast economic development of Japan ensures high income for the people in the country and changes their style of living and especially food preferences. The average consumption of rice per person per year decreases to 100 kg. in 1969 from 118 kg. in 1962. A surplus of rice in the country for the same year is 7.2 million tons. Its production is financed by the government based on the actual regulation. There is no more public

consent for such kind of policy of ineffective agriculture support. The restriction on agricultural land ownership is abandoned in 1962. Set aside schemes are introduced in 1971. The most of the barriers for easy and cheap land trade are abolished and farmers' cooperation stimulated.

This policy aim land consolidation for higher efficiency but face two obstacles. Firstly, establishment of a well functioning rural land market is not an easy task. Its lack during the previous years bothers a real estimation of the various land plots value and their trade or exchange. Secondly, the economic progress of the country increases the demand of land for non-agricultural purposes – industry, transport, urban development. The capitalised income from selling land is much higher than those from farming (especially in rice production). Farmers are attracted to sell plots and thus the land become more and more fragmented, and cooperation more and more hard.

Third period (after 1975)

The production of rice continues to exceed the demand, and the farms continue to be small and with scattered fields despite of all measures during the second period of the reform. Pure market agriculture is the only possible way of development according the government in this situation. Staple Food Control Law has been abolished in 1981, administrative obstacles against leasing of agriculture land suppressed, various marketing modes for increasing the efficiency evolved.

Step by step, the market mechanism starts to work and the amount of exchanged (traded or rented) land ownership grows up after 1975 (figure 1).

The figure shows that obviously leasing is preferred than purchase of a land. The most of the large farms in some regions of the country are created mainly in this manner (figure 2).

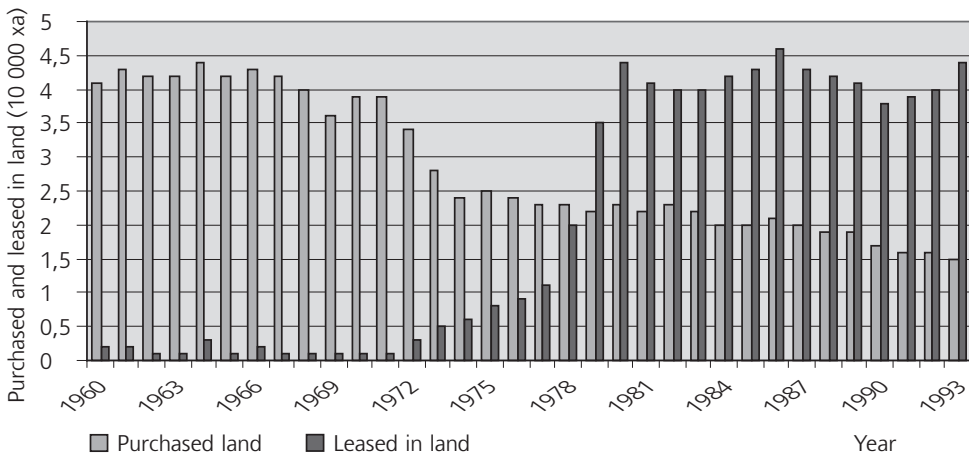


Figure 1. Transferred rights over agricultural land (1960 – 1994)
 Source: Statistical Year Book, 1996. Statistical Department, Ministry of Agriculture, Forestry and Fisheries

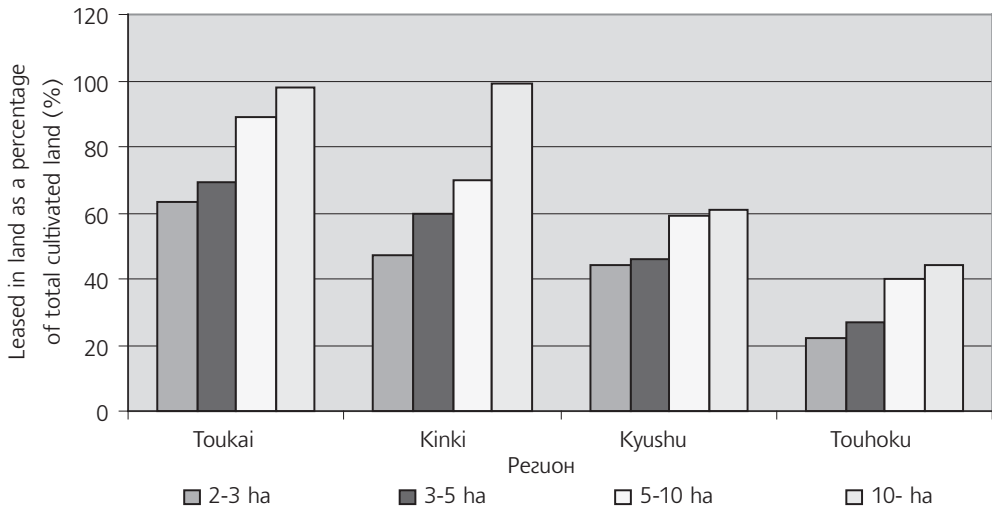


Figure 2. Leased land (1960 – 1994)

Source: Statistical Year Book, 1996. Statistical Department, Ministry of Agriculture, Forestry and Fisheries

Fragmentation of Agricultural Land in Bulgaria

The history of Bulgarian agriculture after 1989 could be divided on two periods. During the first (1991 – 2000) a rural reform is undertaken. The land is given back to its owners before communism, state owned farms are destroyed, and the agriculture is liberalized. The second (after 2000) period is a period of development. Production and financial indicators of the farms grow up, slow but permanent growth of the sector as a whole is accumulated.

One of the negative results from these years is a fragmentation of the agricultural land. It happened because of three reasons. The first one is the model of the rural reform in Bulgaria. The restitution is done based on the land property rights in 1946. At that time the ownership on agricultural land has been fragmented. The same picture was reproduced after 1991. The second reason is legal – the inheritance right. According to Bulgarian legislation each heir-at-law has rights on a part of all heritage. Normally, the heirs divided the land to parts and each of them received a small plot. The third reason is financial. Lack of capital in the beginning of

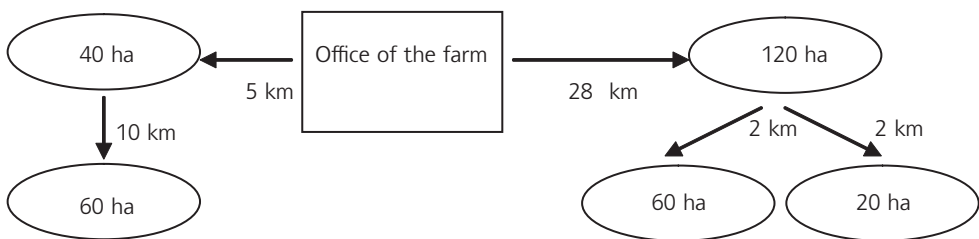


Figure 3. Scattered fields in a wheat production, a farm in Plovdiv region

Source: Field study

the transition, no access to bank credits, late start of EU support programs, etc. negative financial factors forced Bulgarian farmers to chose leasing, not purchase of land as a main way for enlargement of their farms. Leasing of land ever leads to continuous fragmentation of land. Our study shows that the average number of scattered fields in a farm in 2003 is 3.1, and the distance between them is large (figure 3).

Comparative Analysis of Scattered Fields in Bulgaria and Japan

The short historical review above shows how the scattered fields in both countries were born. A more deep analysis describes similarities and differences in the picture of land ownership in Bulgaria and Japan today:

- scattered fields appeared as a result of the rural reform in both countries;
- the farms in both countries include scattered fields. But Bulgarian farms are much larger

(6.9 ha average size) than those of Japan (1.8 ha) (table 1).

- the fragmentation of agricultural land continue to increase because the leasing of land is the main way for farms' enlargement in both countries;
- leasing of land is connected to high transaction costs (finding of "free" plots and their owners, negotiations, drawing down a contract, enforcement, and etc.);
- special measures for transaction costs decreasing are in place in Japan, while in Bulgaria the parties in the transaction have to pay these costs.

Scattered Fields and Farmers' Business Decisions

As it has been mentioned above, we are interested in farmers' ways to solve the problems with scattered fields in their farms. During our study, we have discovered the following tools employed by Japanese farmers:

Table 4. Distance between farmers house and horticulture fields

Distance (m)	Protected horticulture				Protected horticulture			
	Number of fields	Area (ha)	Share of all fields (%)	Share of all area (%)	Number of fields	Area (ha)	Share of all fields (%)	Share of all area (%)
less than 200	4	70	22.2	22.0	6	72	21.4	24.4
200-400	6	115	33.4	36.2	9	95	31.2	32.0
400-600	4	33	22.2	10.4	7	73	25.0	24.7
600-800	2	60	11.1	18.9	3	38	10.7	12.9
800-1000					1	5	3.7	1.6
1000-1200								
1200-1400					2	13	7.1	4.4
1400-1600								
1600-1800	2	40	11.1	11.5				
1800-2000								
over 2000								
	18	318	100	100	28	296	100	100

Source: Field study.

1. Crop location. The farmers tend to estimate the nearer to their houses plots higher that farer, even they are of better quality. Labour intensive crops are being located at the nearer plots, more investments and more improvements are being done there, and finally their artificial fertility increases those of the others. Farmers pay more attention on the nearer fields and neglect farer. Horticulture (labour intensive production) is a typical example (table 4). Farmers locate these crops near to their home ever.
2. Land utilization. The distance from the farmers home is a significant factor in the decisions for leasing land, and for utilization of the own land

Table 5. Distance from farmers house to fields location of idle and rented land

Distance (m)	Idle land				Rented land			
	Number of fields	Area (ha)	Share of all fields (%)	Share of all area (%)	Number of fields	Πλοωι (xa)	Share of all fields (%)	Share of all area (%)
less than 200					1	3	4	1.7
200-400					5	89	20	31.1
400-600					6	57	24	19.9
600-800					8	81	32	28.3
800-1000					3	45	8	15.7
1000-1200					1	6	4	2.1
1200-1400	2	37	38.3	48.7				
1400-1600	3	26	50.0	34.2				
1600-1800								
1800-2000								
over 2000	1	13	16.7	17.1				
	6	76	100	100	25	286	100	100

Source: Field study.

Table 6. Modelling of the order of land utilization in small-scattered fields

Location	Indicators			Features of filed use	
	Sphere	Distance from the house (m)	Type of the fields	Location of main crop	Idle and leased land
Inside village	1	0 – 400	Inside fields	50 % of vegetables (protected and open fields)	Distance leased in land
	2	400 – 800		Vegetables (protected and open fields) and paddy fields	
	3	800 – 1200	Outside fields	Paddy fields	Distance cultivated or idle land
	4	1200 – 1600		Paddy fields	
Outside village		over 1600		Paddy fields	

Source: Field study.

as well. More often farmers abandon farer field and try to lease in near land (table 5).

3. Modelling of the farm. Various are possible approaches in building the farm. Our study shows that Japanese farmers follow a model including a set of spheres of land with different utilization around their houses. This model is presented in table 6.

Conclusion

Agricultural land fragmentation could be overcome by various support measures of the government or local authorities. Its negative consequences may be also decreased by farmers themselves. This study demonstrates the solutions of Japanese farmers in three directions – choice and location of crops, models of land utilization, and design of the territorial structure of the farm. Similar methods could be applied by Bulgarian farmers as well, after adaptation to the local conditions, of course. We do believe that Japanese experience may be used for solving the problems of scattered fields in Bulgarian farms.

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