

Research Paper

Measuring the Rate of Fragmentation and Dispersion of Arable Lands in East Azarbaijan province, Iran

Mohammad Shokati Amghani¹, *Khalil Kalantari², Ali Asadi², Hossein Shabanali Fami²

1. Ph.D. Graduated of Agricultural Development, Department of Agricultural Development and Management, Faculty of Agricultural Economics & Development, University of Tehran, Karaj, Iran.

2. Professor, Department of Agricultural Development and Management, Faculty of Agricultural Economics & Development, University of Tehran, Karaj, Iran.



Citation: Shokati Amghani, M., Kalantari, Kh., Asadi, A., & Shabanali Fami, H., (2019). [Measuring the Rate of Fragmentation and Dispersion of Arable Lands in East Azarbaijan province, Iran (Persian)]. *Journal of Rural Research*, 9(4), 520-535, <http://dx.doi.org/10.22059/jrur.2018.263135.1271>

doi: <http://dx.doi.org/10.22059/jrur.2018.263135.1271>

Received: 01 Sep. 2018

Accepted: 17 Oct. 2018

ABSTRACT

The rate of land fragmentation refers to a problem in land management that can limit agricultural development and reduce the opportunities for sustainable rural development. The purpose of this research was to identify land fragmentation and dispersion variables and to develop indices to measure those variables. The statistical population of the research consisted of agricultural land holders in East Azarbaijan province (N = 212926). A sample size of 380 people was determined by using Cochran's formula. They were selected by stratified random sampling. The data gathering tool was a questionnaire whose validity was examined by using the comments of the researchers and the experts at the Land Affairs Organization. Some local information about the land was obtained and analyzed by using the cadastre database of Land Administration of East Azarbaijan province. The results showed that Bonab and Bostan Abad counties, with the average land area of 2.28 and 13.71 hectares respectively, have the smallest and the largest pieces of land. In terms of dispersion, the lands in Bonab and Oscou counties, with the average distance of 3.8 and 1.4 kilometers from each other and from the village center, had the highest and the lowest rate of dispersion respectively. In terms of land fragmentation and dispersion rates, obtained through the chemok index, Shabestar and Bostan Abad counties, with the rate of 3.8 and 1.3 km / ha, had the most and the least fragmented and dispersed agricultural lands respectively.

Key words:

land fragmentation, land dispersion, land consolidation, land reallocation, east Azarbaijan province

Extended Abstract**1. Introduction**

Agricultural land in Iran is divided into small and distant parcels owned by landholders. The rate of fragmentation is seven parcels on average for every landholder in Iran. Sometimes, the distance between two parcels of a landholder is several ki-

lometers. Low productivity, high production costs, waste of production resources, prevented suitable agronomic patterns, inefficient farm management, lack of effective use of machinery, disparity among farmers, undermined social cohesion in the rural society, poverty, and rural migration are all the consequences of agricultural land fragmentation and dispersion. Considering that the pattern of agricultural land distribution is affected by various key variables such as the population of landholders, land area, status of production base sources as well as human,

*** Corresponding Author:**

Khalil Kalantari, PhD

Address: Department of Agricultural Development and Management, Faculty of Agricultural Economics & Development, University of Tehran, Karaj, Iran

Tel: +98 (912) 1385004

E-mail: khkalan@ut.ac.ir

social, and natural factors, it is first and foremost necessary to develop agriculture through modification of facilities and policies. The status of agricultural land has been evaluated in terms of the number of landholders, the area of parcels, the number of parcels, the distance between parts, the shape of parts, and the rate of land fragmentation and dispersion.

2. Methodology

The purpose of this research was to evaluate the variables of land fragmentation and dispersion by developing corresponding indices to measure it. The statistical population of the research consisted of agricultural land holders in East *Azərbaycan* province (N = 212926). The sample size was 380 people as determined by Cochran's formula. Because of the dispersion of the statistical population and their relative heterogeneity, sampling of the participants and their villages was carried out by a random method in two stages. It should be noted that the basis for the selection of areas was the existence of a cadastral map of the agricultural lands in that area. In the first stage, according to the cadastral maps, 20 counties in the East *Azərbaycan* province were selected in a proportional stratified sampling. In the second stage, four villages were selected purposefully from each county.

3. Results

Based on the research results, the average number of family laborers in the agricultural sector was two, with an average of 34 years of agricultural activity. The total average number of agricultural parcels was found to be six at the county level. The county of Osku with nine parcels had the highest average of agricultural parcels, but Bonab with an average of two parcels ranked the lowest. The maximum number of parcels was 65 in Bostanabad. The results also showed that, in terms of land fragmentation, Bonab County with averagely 2.28 hectares and Bostanabad County with 13.17 hectares ranked the highest and the lowest. In terms of land dispersion, Bonab and Osku counties had the highest and the lowest rates respectively. The parcels of landholders in these two counties were averagely 3.8 km and 1.4 km away from each other and from the center of the village. Finally, in terms of the rate of fragmentation and dispersion of arable lands obtained through the Schmook index, Shabestar and Bostan Abad counties, with an average of 3.8 and 1.3 km / ha, had the highest and the lowest ranks.

4. Discussion

The distance of the parts of each exploiter from each other and from the village center (as a farmer's home) was measured, and then the average distance values were calculated. The parcels of Bonab County are located at an average distance of 3.8 km, with more dispersion than in the center of the village. In Shabestar, the parcels are located at an average distance of 3.3 miles from each other and from the center of the village, which, in terms of scattering, has the second highest rank among the studied cities. The lowest rate of land dispersion of 1.4 km is related to the parcels of the county of Osku.

5. Conclusion

Through measuring the fragmentation of parcels in the study area, it was shown that all the studied parcels are located at an average distance of 2.78 km from each other and from the farmers' homes. Indeed, the farming lands and the gardens are respectively at the mean distances of 2.75 and 2.60 kilometers from each other and from the residential areas. So, it is easy to see that the parcels are fragmented far apart, and the farmers are motivated by plenty of money to fragment their parcels. This finding is consistent with the results of the studies by Karouzis (1977) and Küsek (2014). Also, Karouzis (1977), who studied the time wasted on the distance traveled by farmers to reach their fragmented parcels, pointed out that farmers had to travel approximately 4,000 kilometers annually in this regard. In the present study, measuring the rates of fragmentation and dispersion through the Schmook index showed that the parcels were fragmented and dispersed for 1.3 km/ha. This is a very small average value for a parcel. The values for Shabestar and Bostanabad counties, with the highest and lowest rates of land fragmentation and dispersion, were 8.3 and 1.3 km/ha respectively. Therefore, it is highly suggested that the Land Administration of East *Azərbaycan* implement land consolidation plans as a priority.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declared no conflicts of interest