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Land consolidation success in paddy fields of northern Iran: An assessment based on farmers' satisfaction

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ABSTRACT

Land consolidation (LC) promotes the economic development of rural areas, creating a sustainable future in agricultural production, but its success relies largely upon farmers' satisfaction and adoption. However, factors affecting the success of LC are not well understood. This study analyzed farmers' satisfaction by a LC project in paddy fields of Masal County in Guilan Province of northern Iran. Data were collected through a structured questionnaire from 385 farmers. Most farmers were small-scale farmers with up to 3 lots, but a significant proportion (26.5%) had more than 5 lots. Older farmers, farmers with increased family workforce, income, and number of parcels had higher level of satisfaction and were more positive towards LC. Factor analysis summarized farmers' satisfaction by LC in four factors, namely, i) economic efficiency (related to production cost and revenue) (16.93% of the variance), ii) working conditions (related to physical conditions and working schedules) (16.73% of the variance), iii) technical efficiency (related to better use of resources and inputs) (12.34% of the variance), and iv) land productivity (related to intensification of land use) (9.04% of the variance), which all together explained 54.9% of the total variance of effective factors in farmers' satisfaction. Based on these four factors, most farmers (64.8%) were highly satisfied by LC and were named enthusiastic, while the remaining farmers (35.2%) expressed moderate satisfaction and were more cautious (named conservatives) than the first group. Findings provide insights into farmers' behavior when participating in LC projects and are expected to provide a basis for easy implementation of future LC projects. The government should create awareness of the economic benefits of LC to farmers and provide damage compensation especially for small-scale farmers in cases where the consolidated lands are not given in due time and therefore farmers miss one or two planting seasons.

1. Introduction

Land consolidation (LC) is an important measure to achieve dynamic balance of arable land, ensure the security of food supply, and contribute to sustainable use of land resource (Zhang et al., 2014; Hiironen and Riekkinen, 2016; Luo and Timothy, 2017). It combines the fragmentized land in one property or part of a property in a manner that reduces the number of its parts. In other words, LC is a spatial land management tool that aims to resolve the land fragmentation problem (Pašakarnis and Maliene, 2010). Thus, LC eliminates land fragmentation in favor of land productivity and improve rural production and living conditions (Du et al., 2018), through a process of concentration of plots or rejuvenation of abandoned land, which is usually accompanied by construction of new roads, irrigation facilities, and other auxiliary services (Moradi et al., 2013; Long, 2014). Recently, the academic community has paid more attention to rural LC than in the past, focusing on its potential (Yin et al., 2011; Liu et al., 2013).

The most common benefits of an optimal LC project are: greater efficiency in land use and productivity through allocation of a farm in few parcels close to the farmstead (Jiang et al., 2017), which provides considerable economic benefits to the farmers (Hiironen and Riekkinen, 2016). In addition, LC reduces the amount of unused land in-between the parcels. Moreover, positive ecological effects occur because large parcels may allow the use of improved production methods (Golichenari et al., 2014), thus decreasing adverse environmental effects of farming, such as nitrite and phosphate production, as well as improving water resource planning. A recent study from China noted much positive impact of LC on multifunctionality of agriculture, despite a slightly impaired ecological benefit in some provinces (Guo et al., 2015). Participatory rural LC has achieved great success and

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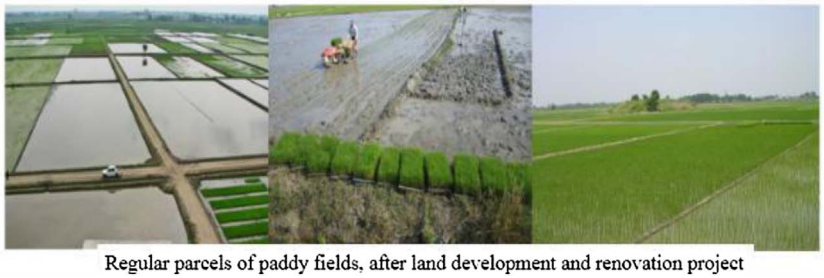
Lack of drainage, inappropriate road situation and boundary, before land development and renovation project



Regular parcels of paddy fields, after land development and renovation project

Fig. 1. Differences after development of a renovation project.

contributed positively to slowing rural depopulation (Cay et al., 2010; Hartvigsen, 2014; Li et al., 2014). LC and on-farm improvement is considered an ongoing project of the under-construction projects in the agricultural sector in Iran. This project, in which the traditional paddy fields are modernized, formally started in the late 1980s in the country and so far, over 76,000 ha of paddy fields in Guilan Province have been consolidated and improved. Mechanization, increasing production per unit area, reducing costs and, most importantly, cultivation of a second crop after rice are the benefits of implementing LC in paddy fields (Islamic Republic News Agency, 2017). Differences after implementation of the development and renovation project in paddy fields of Guilan lands are shown in Fig. 1.

In recent years, a number of studies have been conducted to assess the situation of agricultural LC. Abdollahzadeh et al. (2016) investigated the effect of LC projects on agricultural sustainability. The results showed that there was a significant difference between farmers with consolidated land and farmers with traditional land in terms of ecological and economic dimensions. Traditional land showed higher ecological sustainability than consolidated land, while the latter was better than traditional land in economic dimensions. In addition, Long (2014) attempted to probe the mechanism of pushing forward rural spatial restructuring in China by carrying out LC and achieving urban-rural integration development in the future. Also, based on the results of Ebrahimi et al. (2012), the effects of LC can be summarized in five factors: social, instructional, environmental, economic, and institutional. Cay et al. (2010) compared the effects of different land reallocation models on the success of LC projects. Based on this research, LC projects are implemented not only for reallocation of land, but are also grouped together with other activities, such as irrigation, drainage, road systems, land levelling and improvements.

Although the results generally indicate that as a legislative instrument LC has been quite successful in most cases, it must be noted that the objectives, methodologies, and procedures of LC can differ significantly between countries and cultures, owing to particular place-based environmental, historical, social, and political conditions (Eichenauer and Joeris, 1994; Bonfanti et al., 1997; Borec, 2000; Crecente et al., 2002; Iscan, 2010; Lisec et al., 2014). There is, therefore, a need for a wider empirical base of studies that will help understand LC performance in different contexts. Public performance evaluation theories indicate that production and service should be evaluated based upon public satisfaction and provision of high-performance services. The performance evaluation of LC is no exception. Imbalances between supply and demand in rural LC can be addressed scientifically, beginning with an understanding of household satisfaction and internal impact assessments, the results of which can be used to improve rural community satisfaction and promote sustainable development.

Despite attempts initiated to boost agricultural production through LC, several LC projects failed to make satisfactory progress due to resistance of the landowners, interpersonal disputes, and weak land revenue administration. There is widespread acceptance that the success of LC depends largely on farmers' satisfaction and adoption (Yaslioglu et al., 2009; Kupidura et al., 2014; Lisec et al., 2014). In particular, small farmers and land tenants can be afraid of losing their job and ultimately be evicted due to extensive farm mechanization facilitated by LC (Niroula and Thapa, 2005). Hence, assessing LC success factors is a crucial step to improve the acceptance of this project. The main purpose of this study was to analyze the level of satisfaction and success of land consolidation and renovation project from the point of view of paddy farmers in Masal County of Guilan Province. The findings are expected to provide useful insights into farmers' behavior when participating in LC and serve as a basis for easy implementation of future LC projects.

2. Methodology

2.1. Study location and selection of sample

The study was conducted in Masal County of Guilan Province in northern Iran. Guilan Province is characterized by rice cultivation, which is favored by water availability and soil fertility combined with the temperate climate of the province. Apart from rice, other major agricultural products in this province are peanuts, tea, olives, fruits, and vegetables. Due to high rice cultivation, the province is considered the center of rice production in the country (Fahmideh et al., 2017). Masal County, one of the northern counties of the Caspian Sea in North of Iran, is located in northwest of Guilan Province. The county is subdivided into two districts: the Central District and the Shanderman District with four rural districts and 98 villages. The study population comprised of all paddy farmers amounting to 8134 people according to the latest report of Jihad-e Agriculture Office (Agricultural Organization) of Masal County. According to the table for determining the least sample size from a given population (Bartlett et al., 2001), 385 farmers were selected for the study, using a multistage cluster sampling method from four sub-districts of Masal County: Masal, Taskooh, Shanderman, and Sheikhneshin.