

Research Paper

Land use Intensification in Rural Farming Systems: Components and Determinants

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ABSTRACT

Land use intensification refers to the increase of land productivity and yield through human activities. Despite the potential challenge of unsustainability, land use intensification is the main approach of developing agriculture and meeting the increasing food demand. It also serves as a measure for the evaluation of agricultural efficiency. This study is an attempt to evaluate and analyze the intensification of legume cultivation in Khorramdasht rural areas of Khomain County. The statistical sample of the study consisted of 183 stakeholders, and the data were gathered primarily via field work with a question-naire whose validity was confirmed formally and its reliability was statistically assessed with a pretest. Land use intensity, as the main variable, was quantitatively operationalized and measured based on a normalized weighted linear combination of the components, specialized cropping, proportioned mean farm area, productivity level, machinery coefficient and fallow period intensity. The relative weights were calculated through factor analysis followed by the normalization of the first component's factor loadings. Despite the large area under legume cultivation, the results revealed that nearly 98 percent of the farms are intensified below the average level while only 2.2 percent are above it. The increment of land-use intensity is technically easier to achieve in systems that are currently at a low intensification levels, but low land-use intensities do not necessarily imply strong development and yield increase in the future. In this regard, the process of land use intensification has led to a marked divergence of the economic performance in the study area. At the same time, poor agricultural policies and management practices call for more attention and deliberate planning procedures in the future.

Key words:

Intensification, Agricultural land use, Rural farming systems, Legume cultivation, Khomain

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Extended Abstract

1. Introduction

Intensification refers to the increase of land productivity and yield through human activities and only takes human-induced productivity into account. De-

spite the potential challenge of unsustainability, land use intensification has been the main approach of agricultural development to meet the increasing food demand since the green revolution. It has also been a measure for the evaluation of agricultural efficiency. It is defined as a process of increasing the utilization or productivity of land currently under production, and it differs from the

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expansion or extension of land under cultivation. Indeed, intensification is a process of raising the land productivity over time through increasing the yield of a product of one form or another on a per unit area basis. This form of development is normally associated with shorter fallow periods, the simplification of agro-ecosystems, the use of irrigation, and the application of external inputs such as synthetic pesticides, fertilizers, improved crop varieties and farm equipment. It also involves more investment in land and labor force, improvement of soil fertility, crop specialization, generalization of private ownership, commercial agriculture, increase of food security, expansion of technological livelihood, and industrialization.

2. Methodology

This study is an attempt to evaluate and analyze the intensification of legume cultivation in Khorramdasht rural areas of Khomayn County in Markazi Province. Through a survey method and based on the primary data, assessment was first performed of the rate of legume cultivation intensification. Land use intensification was defined by reviewing the literatures and its determinants were interpreted statistically. The study area was Khorramdasht, a rural district located at 49° 39' to 50° 04'E and 33° 37' to 33° 50'N. At the time of the study, it had a population of 5453. One of the areas there is Ghurchi-Bashi, which is celebrated for its good-quality legume. The study is a descriptive and cross-sectional survey. The statistical sample consists of 183 stakeholders distributed in 25 villages of the region. The data were gathered primarily via field work with a questionnaire the validity and reliability of which were confirmed formally and assessed statistically with a pretest respectively. It contained three parts including the respondents' demographic information, productive attributes, and a large number of items regarding intensification and its determinants.

3. Results

In the study area, the dominant type of farming was detected to be on bipartite or integrated farms extending up to five hectares. An increase has occurred in the number of farms along with an increase in their total areas. However, the farming system of the region, despite most rural areas across the country, is not so fragmented and dispersed. The main variable of the study, i.e. land use intensity, was quantitatively operationalized and measured based on a normalized weighted linear combination of such components as specialized cropping, proportioned mean farm area, productivity level, machinery coefficient and fallow period intensity, ranging from 0 to 1. The corresponding weights were calculated through factor analysis and

by normalizing the first component's factor loadings. Machinery, fallow intensity and productivity were detected as the most important components of legume cultivation intensification in the region. The computed stakeholders' degrees of farming intensification were normalized from 0 to 1 and classified in the three categories of low, moderate and high, based on their frequency distribution histogram. Despite the large areas under legume cultivation, the results revealed that nearly 98 percent of the farming system was intensified below the average level while only 2.2 percent were intensified above that level. The most significant differences among the three intensity groups were in terms of the last three components mentioned above with the highest weights in a linear combination.

4. Discussion

Further analysis of the striking differences in land use intensity among the three groups revealed that the process of land use intensification has led to a marked divergence in the economic performance of the study area. At the same time, poor agricultural policies and management practices call for more attention and deliberate planning procedures. Agricultural development in developing countries depends highly on the increase in agricultural productivity, associated with a shift from extensive to intensive land use methods. While developed countries have generally experienced a gradual land use intensification process, farmers in many developing countries have experienced very rapid changes in their farming systems.

5. Conclusion

Although agricultural land use intensification has often led to considerable improvements in farmers' livelihood, it has also created new circumstances in farming such that the intensified agriculture can be said to be the opposite of sustainable agriculture. Additionally, although the increment of land use intensity is technically easier to achieve in systems that are currently at low intensification levels, low land use intensities do not necessarily imply strong development and yield increase in the future. Therefore, the measure of land use intensity is a more adequate tool for assessing long-term developments in agriculture. It is also more appropriate as a surrogate for the general state of agricultural development.

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Conflict of Interest

The authors declared no conflicts of interest