

Agricultural Land Intensification Practices in Nawalparasi District (West)

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Abstract

Land intensification is the process whereby land use activity is delicate through increasing yield per unit area and by crop intensification. The present study has examined the agricultural land intensification practices in different parts of Nawalparasi District. This study has used primary and secondary data. Primary data has been produced from household survey, focus group discussion, and key informant interview and field observation. Furthermore, published and unpublished reports such as profiles, annual progress reports, research articles, maps and images have been used to create secondary data. It is observed that farmers have practiced to cultivate many crops than the past to increase production even in the same area of land, changing crop and varieties within the particular crop and priority has been given to market oriented production of agricultural commodities like vegetables, livestock rising and diary product, poultry farming, and bee-keeping activities.

Keywords : cropping intensity, farm inputs, food security, production, technology

Introduction

Agricultural land intensification is the process whereby land use activity is heightened through an increase in production on a same plot of agricultural land by raising in the amount or kind of labour or the use of a new technology invested in the integration of crops that yield more food (Scarborough, 2012). The development of agriculture sector is means for the development of national economy that provides employment opportunities to more than 66 percent of the total population and contributes about 35.12 percent in the national GDP in Nepal (MoF, 2014). Whereas, Nepal is facing problem of food deficit due to the rapid growing population on the one hand and not improving in the level of production of agricultural crops on the other ((MoAD, 2015). Agricultural intensification is possible to meet the increased food demands of the enlarged population (Schroeder, 1985). It is also preferable when there is very little

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scope for expansion of cultivation of land due to the pressure of bigger population (Pingali & Rosegrant, 2001). The production level of agricultural can be increased either through expansion of cropping area or adaptation of intensification practices (Khanal, 2002). Agricultural intensification is considered as a major agricultural development prospect for developing countries like Nepal. Hence, intensification practices have been rising specifically in periphery area of urban centers of Nepal for more than two decades (Raut, Sitaula, & Bajracharya, 2010). Increasing irrigation facilities indicates an improvement in cropping intensity over the period. Intensification is an important approach in agricultural development and enriching economic and social conditions of farmers (Mozumdar, 2012).

Farmers are adopting intensification practices in New Zealand through improved practices in farm fertilizer and pesticide inputs (MacLeod & Moller, 2006). There is changing in cropping pattern from two crops to three/four crops and inter-cropping is applied for the intensification of agricultural land in China (Wu et al., 2009). There have been notified the increasing trends in use of inputs such as, modern farm technologies like tractors and threshers, chemical fertilizers, irrigation and hybrid seeds in Chitwan district of Nepal (Bhandari & Ghimire, 2016). Boserup (1981) highlighted the intensification to enhance more investments in land improvement such as, irrigation, high yielding variety of seeds, chemical fertilizers, pesticides etc. The practices of intercropping and crop rotation, changes from one crop to another, and changes in the varieties within the particular crop have been observed in Nigeria (Thapa & Yila, 2012). In this connection, present study has been assessed the agricultural land intensification practices in different parts of Nawalparasi District for how they have managed agricultural land management activities.

Method

Both primary and secondary data has been used for this study. Primary data has been generated from household survey. All together 93 households (31 households from each site) have surveyed with semi structured questionnaire. Information on cropping area, cropping pattern and cropping intensity by the farmers has been collected through face to face household questionnaire survey. Focus Group Discussion and Key Informant Interview has been conducted for firsthand knowledge about the community and agricultural activities. Field observation has been accomplished for identification of parcels and trend of their utilization through cadastral and topographic maps. Parcels have been identified through the provided land registration certificates (lalpurja) by farmers in the field and verification has been carried out in dis-

tract land revenue office. In addition, the available published/unpublished reports and research articles, profiles, maps and images have been used to create secondary data. Both qualitative and quantitative techniques have been used for the data generation and compilation.

Study Area

Nawalparasi (west) district is located in Lumbini Province of Nepal and extended between 27°20' 45'' to 27°41'36'' north latitude and 83°34'23'' to 83°53'58'' east longitude. This district (Nawalparasi: Bardaghat-Susta West) has incorporated into three municipalities and four rural municipalities (MoFALD, 2017). During the field work, the district was divided into 56 VDCs, 7 Municipalities, 15 Ilakas and 6 Constituencies (MoFALD, 2015). Out of these, three VDCs (Jahada, Palhi and Ramnagar) have been selected for detail field survey based on biophysical and socio-economic characteristics. Ward number 3 of Jahada VDC (here after refer Jahada), ward number 9 of Palhi VDC (here after refer Palhi) and ward number 5 of Ramnagar VDC (hereafter refer Ramnagar) were selected randomly for detail study (Figure 1). These VDCs have been restructured under Bardaghat municipality for Jahada, under Sunwal municipality for Ramnagar and under Palhi Nandan rural municipality for Palhi at present (MoFALD, 2017).

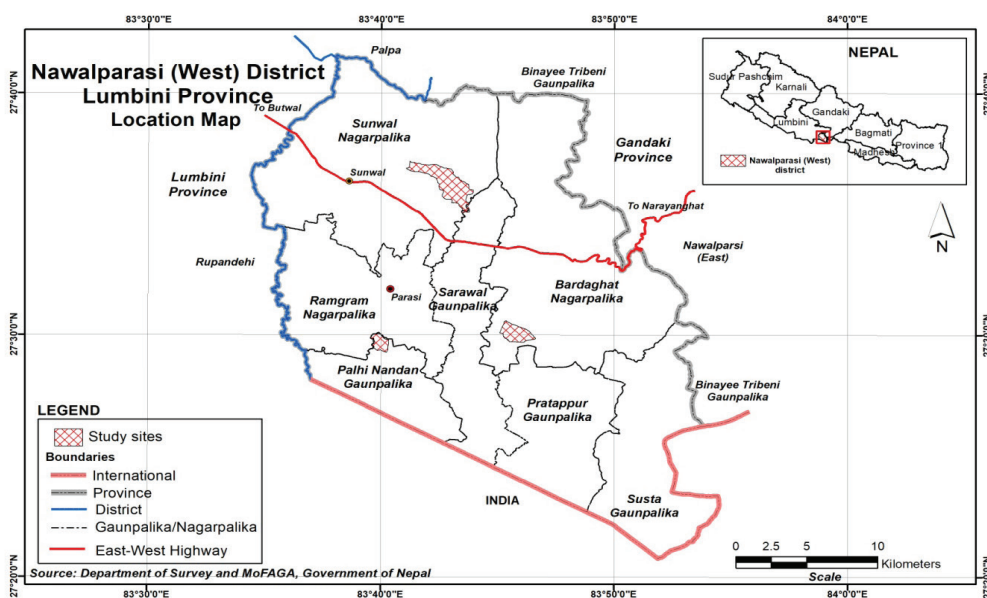


Figure 1: Location map

Result and Discussion

Cropping Intensity

The intensity of crop refers to the use of a field several times during a cropping year. It is one of the types to measure of land efficiency, which is defined as the extent to which the net area is cropped or sown. The change in cropping intensity has also considered the practice of land intensification which found varies by location.

The higher cropping intensity means that a higher portion of the net area is being cropped more than once during one agricultural year. This also implies higher productivity per unit of arable land during one agricultural year. There has been a change in the cropping intensity. The result shows cropping intensity has increased in the study area with the increasing of irrigation facilities. The value of cropping intensity is ranging from 141 to 226 in all three sites. It is found that cropping intensity has increased from 178 to 193 in Palhi and from 162 to 226 in Ramnagar due to the availability of increasing irrigation facilities but it has decreased in Jahada from 160 to 141 during the study period due to not availability of sufficient irrigation facilities with comparison of better facilities in base year. The cropping intensity is found less than national average (185) and district average (197) in Jahada but it is more than national and district average in Ramnagar(CBS, 2013)(Figure 2).

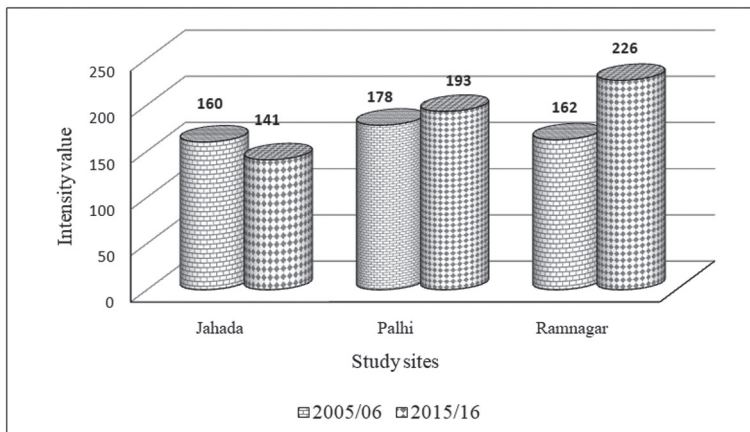


Figure 2: Changing Trends of Cropping Intensity

Cropping Pattern

The measurement of cropping pattern is fundamental to an understanding of spatial management of agriculture. This study found that crop land is under different cropping pattern such as Paddy, Paddy + Wheat/Oilseed/Pulse and Paddy + Wheat / Vegetables / Pulse / Oilseeds + Maize. Paddy is the dominant crop in all the study sites

like in other Tarai areas of Nepal. Table 1 shows the trend of change in the study area and its percentage under different crop combination. Area under single crop has decreased in all three study sites, whereas area under two or three has increased in Jahada and Palhi. But area under two crops has decreased in Ramnagar from 65.1 percent to 45.2 percent during the study period. Contrarily enough, area under three crops has significantly increased from 13.6 to 48.4 percent during the same period in Ramnagar. It shows that cropping intensity is highly increasing in Ramanagar than Jahada and Palhi. Most of the agricultural land in the study sites has been found as intense based on the cropping pattern.

Table 1
Changes in cropping pattern (area in ha.)

| Number of crops | Crops | Jahada | | Palhi | | Ramnagar | |
|-----------------|---------------------------|---------|---------|---------|---------|----------|---------|
| | | 2005/06 | 2015/16 | 2005/06 | 2015/16 | 2005/06 | 2015/16 |
| Single crop | Paddy | 13.354 | 5.533 | 10.404 | 1.314 | 3.510 | 0.920 |
| | Paddy+Wheat / | | | | | | |
| Two crops | Oilseeds /Pulses | 18.827 | 18.449 | 46.850 | 32.686 | 10.727 | 6.480 |
| | Paddy + Wheat/Vegetables/ | | | | | | |
| Three crops | Pulse/Oilseeds + Maize | 4.305 | 4.612 | 2.200 | 6.694 | 2.241 | 6.949 |
| | Total area | 36.487 | 28.595 | 59.454 | 40.695 | 16.478 | 14.348 |

Source: Field Survey, 2015/16

Table 2 shows changes in number and area of parcels by different crops in study sites. This study has found that maximum numbers and area of parcels have changed from Paddy + Wheat to Paddy+Wheat /Oilseeds/Pulses crops in all study sites. However, highest area under the Paddy + Wheat to Paddy + Wheat/Vegetables/ Pulse/Oilseeds + Maize (three crops) has found in Ramnagar than other two sites. This indicates monoculture of paddy is still in practice in some areas of all study sites. However, the area occupied by monoculture has found smaller than other cropping area during the study period. Farmers have practiced to grow more than one crop and also covered most of the area of parcel.

Table 2

Changes in number and area (ha) of crops by parcels

| Study sites | Identified Parcels | | Paddy to Paddy (No change) | | Paddy+Wheat to Paddy+Wheat / Oilseeds/Pulses | | Paddy+Wheat to Paddy + Wheat/Vegetables/ Pulse/Oilseeds + Maize | |
|-------------|--------------------|------|-------------------------------|------|--|------|---|------|
| | No | Area | No | Area | No | Area | No | Area |
| Jahada | 37 | 21.4 | 15 | 4.1 | 16 | 13.8 | 6 | 3.4 |
| Palhi | 42 | 17.5 | 11 | 0.6 | 26 | 14.1 | 5 | 2.9 |
| Ramnagar | 51 | 10.3 | 9 | 0.7 | 24 | 4.6 | 18 | 5.0 |

Source: Cadastral Maps and Field Survey, 2015/16

It is found that 28.5 percent of total parcels (35.1 percent in Jahada, 33.3 percent in Palhi and 19.6 percent in Ramnagar) have been used for intensified agriculture farming in the parcels particularly close to residence/house than some farther location (Table 3 and Figure 2, 3, 4). In terms of area, 42.5 percent of the total area has been found under intensification practices.

Table3

Crop intensification practices by parcels (area in ha)

| Study sites | Total parcels | Area | Identified parcels* | Area | Intensified parcels** | Area |
|-------------|---------------|-------|---------------------|------|-----------------------|-------|
| Jahada | 59 | 28.60 | 37 | 21.4 | 13(35.1%) | 9.61 |
| Palhi | 76 | 40.70 | 42 | 17.5 | 14(33.3%) | 8.71 |
| Ramnagar | 88 | 14.35 | 51 | 10.3 | 10(19.6%) | 2.54 |
| Total | 223 | 83.65 | 130 | 49.2 | 37(28.5%) | 20.90 |

Source: Calculated from Field Survey Data

Note:

* *All the parcels have not identified on the map as well as on the ground due to the not availability of land ownership certificates and hesitation on sharing by farmers.*

***Intensified parcels indicate that plots with 3 crops per year and repeated the same crops in a plot.*

Furthermore, it has found that farmers have adopted intensification practices in the study sites to increase agricultural production through the changes from one crop to another and change in the varieties within the particular crop. The study found changes in crops and its varieties in 57.1 percent of total cultivated land in the study sites within study period. Moreover, it has been changing in the varieties of paddy from local to improved (*Mansuli, Janaki, Sabitri, Gorakhnath to Radha-7, Radha-14,*

Hardinath-2, Gorkhnath-509) or from one species of local to another species of local seeds or from one species of improved to another species of improved seeds in about 61.1 percent of land in the study sites. Such change in varieties has also been reported in 23.9 percent area in wheat (*Gautam, Aditya, Bhirkuti, UP 262, Tilottama*) and 11.1 percent area in maize (*Rampur-2, Rampur Composite, Manakamana-4, Khumal Hybrid-2*)(Dhakal, 2019).

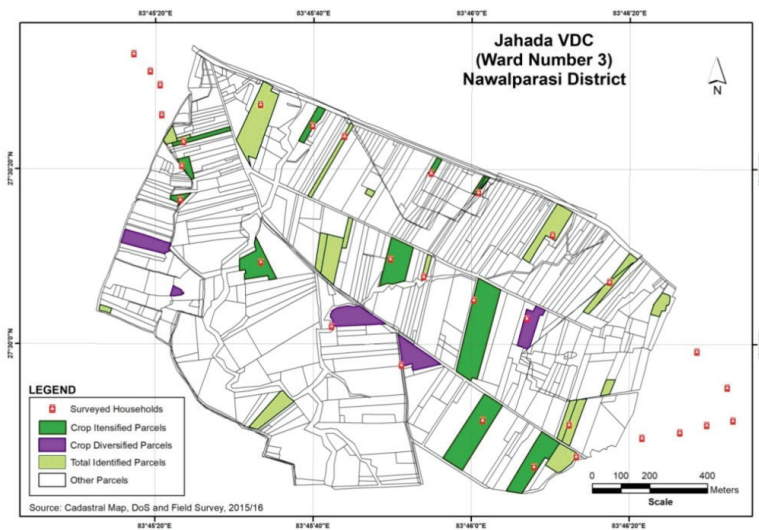


Figure 2: Crop intensification practices by parcels in Jahada

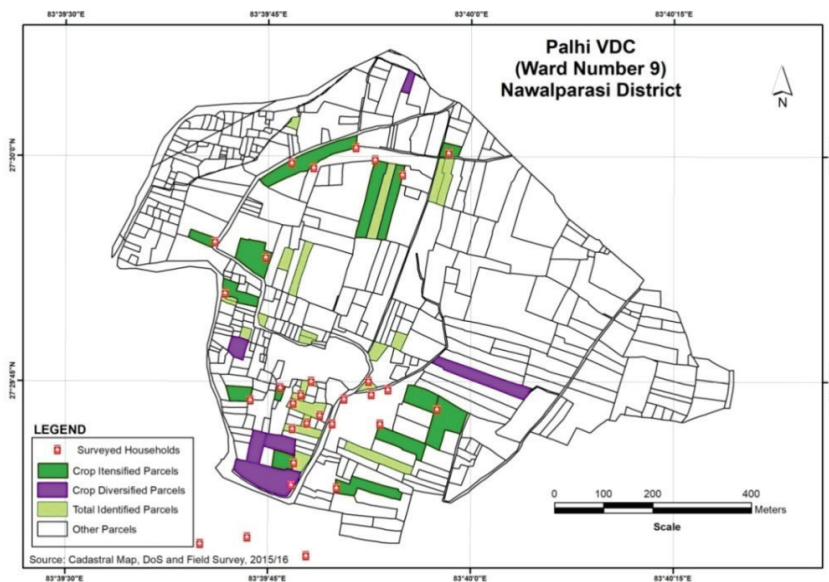


Figure 3: Crop intensification practices by parcels in Palhi

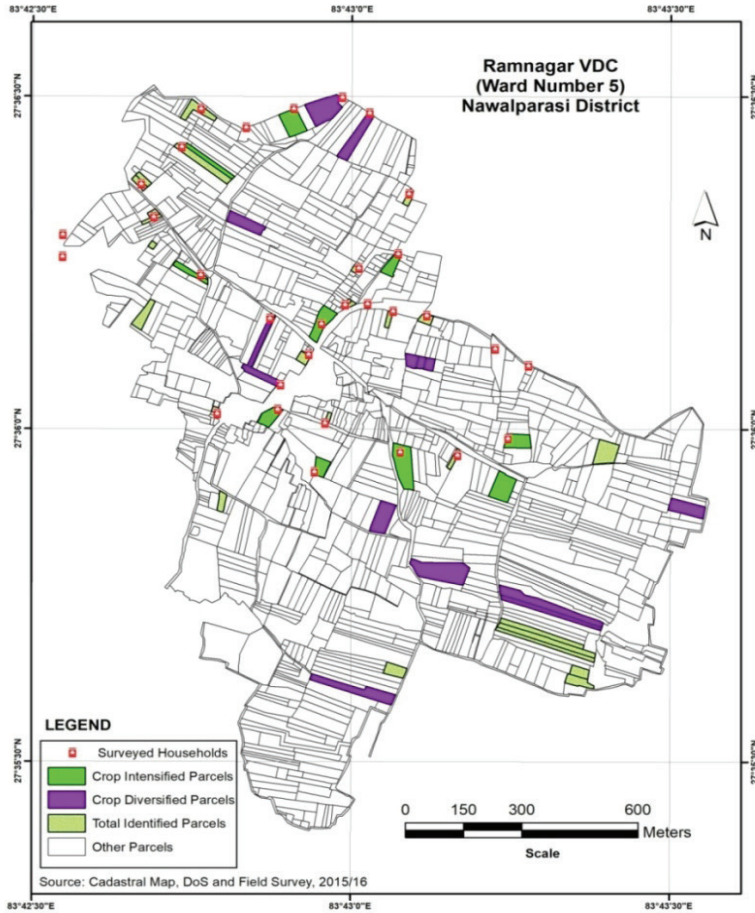


Figure 4: Crop intensification practices by parcels in Ramnagar

Conclusion

Crop production can be increased by extents of existing agricultural land or another alternative is to bring additional land under cultivation by expanding into marginal lands which becomes an impossible task in most of the areas that being utilization of land for construction of infrastructure like buildings and roads . Hence, of the available options, increasing cropping intensity and yields per unit area are the only available options to feed an ever increasing population. Primary constraints to achieving food security are the low yield per unit area, high population pressure, and negligible scope for expansion of the area of land for cultivation. Under these circumstances available options will be crop intensification through the use of modern technologies, especially seeds, fertilizer, irrigation, mechanization of agricultural

production, post-harvest processing, storage, marketing and development of new technologies and infrastructure networks.

This study has found the crop land status of individual farmer. Land owner cum farmers invest more than share cropper in the study sites. Similar view is also found in the study of Skonhofs(1999)in resource exploitation model. He stated that perception of farmer to be driving in a dynamic setting of investment in the land, and farmers invest more in land for the economic benefit. Similarly, this study has found cropping pattern and crop intensity as well as intensive use of manure and agricultural labours which is related to conservation agriculture model (Ruttan, 1985).In addition, study has found the market oriented production of agricultural commodities like vegetables, gardening, and livestock rising.

It is concluded that farmers have adopted intensification practices in the study sites to increase agricultural production through the changes from one/single crop to more crops and change in the varieties within the particular crop. It is found that change in crops and its varieties in 57.1 percent of total cultivated land in the study sites within study period. Farmers have practiced to cultivate many crops than the past to increase production even in the same area of land. Most of the agricultural land in the study sites has been found as intense based on the cropping pattern. The cropping intensity is highly increasing in Ramanagar than Jahada and Palhi from 65.1 percent to 45.2 percent during the study period. It is found that 28.5 percent of total parcels and 42.5 percent of area has been found under intensification practices.

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