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CONSOLIDATING FRAGMENTED FIELDS: A PATH TOWARD EFFICIENT FARM MANAGEMENT

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ABSTRACT

Small and highly fragmented operational land holdings at varying spatial scale is one of the biggest challenges in agricultural development. The structure of landholding plays a pivotal role in shaping efficiency, productivity, and overall growth of an agricultural region. The task of farm management becomes significant in not only improving the present farming practices but also to identify the external factors which obstructs farmers opportunities and motivations to increase the production and farm income. Land holding fragmentation in the study area, stems primarily from the deeply entrenched system of law of inheritance in which land is passed down through generations leading to progressively smaller and more dispersed plots. Land fragmentation not only affects management practices related to land but also the decision-making process of a farmer related to the structure of the farm. Conversely land consolidation emerges as a potential solution to restructure the agricultural landscape by reorganizing fragmented landholdings into a larger and more manageable holdings. By analyzing the interplay between land fragmentation and land consolidation, this abstract underscore the gravity and urgency for a strategic land consolidation approach aimed at reorganizing fragmented land holdings into larger

and more manageable parcels to enhance better farm management. The specific objective of the study is to investigate the spatial distribution of fragmented holdings to highlight the significance of land consolidation as a pre-requisite for farm management in Bassi tehsil. In this essence, an attempt has been made to show that how consolidation and semi consolidation will benefit and modify the farm structure. Also, an action plan has been prepared for effective management of farms in the study area.

Keywords: Land Fragmentation, Law of Inheritance, Land Consolidation and Farm Management

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1. Introduction

With rapid technological advancements in the agriculture, importance of Farm management cannot be ignored. Farm management studies are necessary for better management of an agricultural farm. Farming is both a business and a way of life in our country. By centralizing management and resources, farming can enhance overall farm efficiency and profitability.

Reddy (1962) finds out relationship between selected socio-economic characteristics of farmers and adoption of improved farm practices. The -difference in level of adoption may be due to facts that how the farmer obtain information about improved farm practices, how the farmer with different socio-economic characteristics utilize different sources of information and the effect of different information sources are related to various types of improved practices.

Schickele (1966) gave examples regarding farm development planning that the Food and Agricultural Development Council, started in 1954, start a series of farm managements seminars throughout the far eastern region which were centered around the key problems of forward looking farm development planning and the adoption of farm planning and budgeting methods to local conditions in the various countries. Agarwal 1968 analyse the effects of consolidation of holdings on the number and size of plots both in respect of 'ownership' and 'operationar' holdings.

Regarding the new technology in agriculture Sidhu, Singh and Gill (1975) concluded that modern agriculture is characterized by the use of high yield varieties, fertilizers, new farm

machinery and equipment, plant protection measures and better soil and water management. Simon (1977) considered decision making an important aspect in farm management. Steps of a well defined process helps decision maker to make a decision in a logical and organised manner. He distinguishes few phases namely intelligence, design, choice and review. In decision making process he included planning, implementation and control.

Attwood (1980) discusses the unique challenges of Irish farm structure and the policies designed to address issues like land mobility, the impact of the Common Agricultural Policy (CAP), and the overall health of Irish agriculture.

Grabowski (1990) concluded that Farm size can affect land management in many ways. Large holders are often more able than small holders to maintain traditional fallowing practices. They also can set aside a large portion of their holdings for non-food uses such as pasture or woodlot and other land-use practices that help control soil loss and fertility depletion. Moreover, because these farmers are also comparatively wealthy, they can invest more in inputs and improvements that will raise their long-term productivity. Gurjar (1990) gave emphasize on the wise management of farms in his study of Morel Dam Command Area in Rajasthan that welfare of a modern farm family depends mainly on how well the farm operator can grow and market his products. He pointed out that farm records and economic information about farm business are important in managing a farm profit on a regular basis. Rougoor (1998) investigated that the success of farms, to a great extent can be explained with differences in management capacities of framers. Doye et al. (2002) investigated that a farm is well managed, only when it can generate the funds to finance its sustainable development and thereby its survival in today's fast changing environment. However, a sophisticated management is a challenging and time-consuming task, and has to be organized as efficiently as possible.

Calencez 2007, investigated that three quarters of all agricultural land in Moldova is privately owned and the ratio of agricultural land in Moldova is one of the highest in the world. Therefore, its rational and effective use is vital for the country. Winkler (2008) investigated that farm records and accounts are important tools in farm management and concluded that there is a need to encourage the documentation even at the small-scale farmer level of all activities on the farm as well as the expenses and the returns in physical as well as monetary terms within the frame work of general farmer education programme. Munnangi et.al. considered land consolidation (LC) as the most important and ignored land reform in India but Uttar Pradesh (UP) is the only state in India that is currently implementing it. Cheng et al. (2015) in their study analyzes farmland fragmentation in South Jiangsu Province, China, from 1985 to 2010, revealing a 24% decrease in total farmland area and increased fragmentation,

with core farmland diminishing and islet farmland rising. Despite a slowdown in fragmentation rates post-2008, the findings highlight the need for policies aimed at preserving contiguous farmlands to enhance connectivity and mitigate ecological damage.

Study Area

Bassi Tehsil is located in the east of Jaipur district between 26°40’ North and 26°59’ North latitudes and longitudes 75°54’ East to 76°20’ East. National Highway No. 11 passes through Bassi as shown in figure 1.0. The study area has a total geographical area of 650.69 sq. km. The study area comprises of 215 villages in all, of which 210 are inhabited while 05 villages are uninhabited. There are 5 ILR circle namely Banskhov, Bassi, Devgaun, Kanota and Toonga with 44 Gram Panchayats and 43 Patwar Mandal.

There are 3 Census Towns namely Bassi, Kanota & Baskhov and 1 Municipal Board Bassi in the study region. Fig 1.0

Major portion of Bassi Tehsil is geomorphologically varied. The study area is characterized by varied physiographic features dominated by semi-arid conditions, non-irrigated land and prevalence of land fragmentation. Under such circumstances, without proper planning, sustainable development of agriculture is a difficult task. Hence concept of farm management has been interpreted in a wide variety of ways. The total land of the study area has been broadly classified as arable and non-arable, which further have been subdivided. The arable category accounted with more than 73 per cent area, which suggests that the study area has sufficient agricultural land and the agriculture area could be increased by converting barren and fallow land into fertile land. However, availability of irrigation facilities is must which remains a challenge in semi-arid conditions without proper watershed development.

Objectives

To investigate the spatial distribution of fragmented landholdings to highlight the significance of land consolidation as a pre-requisite for farm management in Bassi tehsil and also to prepare an action plan for effective management of farms in the study area.

Data

A substantial amount of secondary data both published and unpublished was collected from various Government Departments like: Districts Census Hand Book 2011 Jaipur, District Gazetteer, District Statistical outline 2016. Village Boundaries is obtained from the maps from Census 2011. Primary data information has been collected from respondent household with the help of structured field schedule while conducting the field survey during 2014-15 and 2015-16. Field visits and pilot survey in Kharif and Rabi seasons, has been done for the collection of socio economic, land holding and data related to management, by personal interview with the help of schedule.

Methodology

The study area comprises of 215 villages in all. About 10 per cent villages have been sampled from six physiographic units of the study area.Total 22 villages have been selected. Each sample village had been classified into five size classes according to Agriculture Census 2010-2011. The categorized size are marginal size class (less than 1 hectares), small size class (2-4 hectares), semi-medium size class (4-10 hectares) and large size class (above 10 hectares). Further 10 per cent. primary data information had been collected from respondent household with the help of structured field schedule. Field visits and pilot survey in Kharif and Rabi

seasons during 2014-15 and 2015-16, has been done for the collection of socio economic, land holding and data related to management, by personal interview with the help of schedule. The data related to socio economic conditions and farm management aspects are related to population, age structure, education, labor, livestock and farm machinery and farm building, holding and field plot distribution and land consolidation aspects, basic problems of the farmers related to their farm and suggestions given by the households have been selected based on stratified random sampling.

Bassi Tehsil is one of the densely populated Tehsil of Jaipur district. The total population of Bassi Tehsil as per the 2011 census is 2,83,594 person with 1,47,383 male and 1,36,211 is females. Population Density is 433 persons per square kilometer. Education levels for the total sample were not high. 42.23 per cent are literate while 57.77 per cent people are illiterate.

Distribution of Operational Land Holdings and Fragmented Field Plots

The land holding distribution in the Bassi Tehsil is highly uneven. The average size of operational holdings of the sample holdings is 1.42 hectare. The level of land fragmentation can be observed by the fact that more than 2 plots per holdings are there with less than 1 hectare area. More than 2000 filed plots under 817 operational land holdings are operating in 1157 in hectare area. The average size of the field plot comes to only 0.57 hectares as shown in table 1.0.

Table 1.0: Number of plots and operational holding

Field plot distribution	Number of holdings	Number of plots	Total area (hectare)	Average area of plot	Average area of holding	Average number of plots
1 plot	**355**	**355**	**212.73**	**0.60**	**0.60**	**1.00**
2 – 3 plots	**299**	**718**	**341.20**	**0.47**	**1.14**	**2.40**
4 – 5 plots	**95**	**417**	**191.33**	**0.46**	**2.01**	**4.39**
6 – 9 plots	**53**	**398**	**263.77**	**0.66**	**4.97**	**7.51**
Over 10 plots	**15**	**159**	**148.53**	**0.93**	**9.90**	**10.60**
Total	**817**	**2047**	**1157.56**	**0.57**	**1.42**	**2.51**

Source: Based on field survey by the researcher in the agriculture year 2015-16

Spatial Distribution of Land Fragmentation

The spatial distributional pattern of operational land holdings, their field plots and shape of the sample village are shown in the figure 1.1 and 1.2. It is clearly visualized that the scattered pattern is closely related with the increasing size of the holdings. As regards the shape, no uniform pattern of field plots seen. However, the plots shape seems to be rather regular in the more distant periphery of the settlement in comparison to the in situ fields to the villages.

Fig 1.1

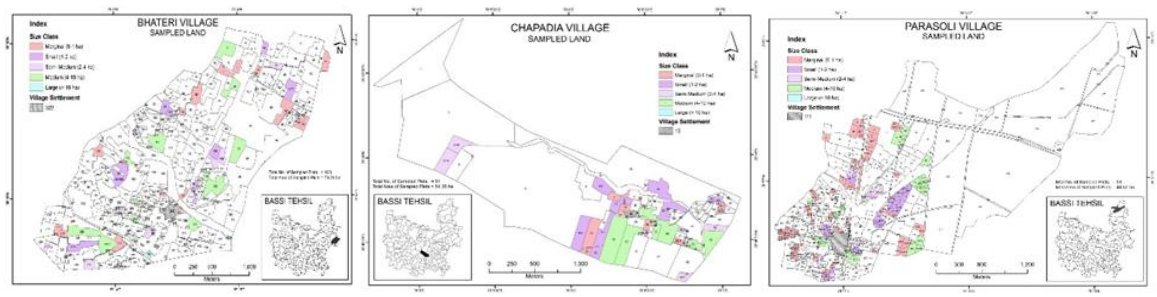

Fig 1.2

Source: Cadastral Map Land Revenue and Settlement office Jaipur

Land Consolidation: A Pre-requisite

Land consolidation is the core of effective farm management. Farmers can become more competitive, when they reduce land fragmentation and increase their farm size. In a general sense, land consolidation is described as the pooling together of fragmented rural land resources within a certain territory and their reallocation, in an aggregated pattern, for improved land utilization. The benefits of land consolidation are greater efficiency and productivity, consolidated larger parcels of better shape, farms became close to the farmstead, reduces the amount of unused land in-between the parcels and larger parcels enable farmers to use fewer

intensive methods. Also land consolidation is important for efficient organization the farmland, appropriate crop rotation, effective uses the factors of production, such as large machinery equipment and efficient use labor.

There is no law and legislation in the state of Rajasthan dealing with land fragmentation issues. In consequence no worthwhile efforts could be made in the direction of land consolidation. However, protection of Tribal Land is strictly implemented. The state government of Rajasthan has accepted the policy of prohibiting the transfer of land from tribal's to non-tribal and for restoration of alienated tribal lands to them (mentioned in section 42 of Rajasthan tenancy acts and according to press information bureau, government of Rajasthan).

An important program of central government is under implementation namely the Digital India Land Records Modernization Programme (DILRMP) launched in 2008, aimed to modernize management of land records, minimize scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the country. The major components of the programme are computerization of all land records including mutations, digitization of maps and integration of textual and spatial data, survey/re-survey and updation of all survey and settlement records including creation of original cadastral records wherever necessary, computerization of registration and its integration with the land records maintenance system, development of core Geospatial Information System (GIS) and capacity building. However the registration of land rights is a time consuming process but it is an appreciable initiative in row of agricultural land reform.

Consolidation at Local Level

Certain parameters have been taken considering a land holding as semi-consolidated as if a farmer can manage and supervise his plot even if located nearby. Semi consolidation is a situation in which a farmer had exchanged the field plots not necessarily for enlargement but to supervise and manage his scattered field plots. it will give him the opportunity to irrigate his field plots and make his livestock move from one field to another.

This could be explained as consolidation taking place to reduce the distance between two parcels for enhancing supervision and management, change of territory (switching the parcels on one side of the road) and for enlargement of the land holdings by exchanging of nearby parcels with scattered ones.

Table 1.2 Reported consolidated and semi-consolidated land holdings in Bassi Tehsil at house hold level

Size class In hectare	Number of respondent households	Number of reported consolidated holdings	Percentage of the total consolidation holdings	Number of reported semi-consolidated holdings	Percentage of the total consolidation holdings	Total consolidation holdings	Percentage of the total
Marginal (below 1)	526	21	56.76	08	42.10	29	51.78
Small (1-2)	154	8	21.62	03	15.79	11	19.64
Semi medium (2-4)	76	5	13.51	02	10.53	07	12.50
Medium (4-10)	53	3	8.11	-	-	03	5.36
Large (Above 10)	08	-	-	06	31.58	06	10.71
Total	817	37	100.00	19	100.00	56	100.00

Source: Based on field survey by the researcher in the agriculture year2014-15 and 2015-16

At local level of 817 households there are 37 reported consolidated land holdings among all size classes. Semi-consolidation is quite apparent with 19 reported consolidated holdings out of the total 817 respondents. The farmers of marginal size class are reportedly only 21 of the total respondents. However, it is gathered from the field study that the local farmers are interested in enlarging and making their scattered small fragmented field plots nearer. By getting their filed plots nearer to another field plots make them to better manage their fields plots by giving proper supervision. Irrigation facility can be easily provided; livestock could be easy to move from one place to another.

No sign of land consolidation is found in large size class while no sign of semi-consolidation is found among medium size class. Total consolidated holdings including semi consolidation number 56. Marginal Size Class clubbed with small holding size accounted with 71.42 per cent land consolidation while 17.86 per cent land consolidation is found among semi - medium and medium size class combinedly large size class constitute only 10.71 per cent in regard of semi consolidation as indicated in the Table 1.2

The consolidated operations at local level in Bassi Tehsil have resulted in considerable reduction in labour inputs as well as reduction in the cost of these inputs. Before consolidation and semi consolidation the man days were 220 days reduced to 140 days after consolidation. A positive change has also been noticed in tractor days which reduced to 63 days from 129 days after consolidation. The overall cost has been reduced to above 30 per cent after the consolidation as indicated in the Table 1.3.

Table 1.3: Input and costs before and after consolidation at household level

Work	Man-days		Tractor		Cost (Rs)	
	Before	After	Before	After	Before	After
Ploughing	56	32	42	30	20,000	13400
Manuring	29	28	12	08	9000	6500
Sowing	18	12	10	10	6800	4600
Irrigation	15	08	8	3	4200	2000
Weeding	20	15	-	-	1300	1000
Harvesting	15	12	-	-	4050	3600
Threshing	15	10	25	12	4000	3400
Other	52	23	32	-	7400	4800
Total	220	140	129	63	56,750	39,300

Source: Based on field survey by the researcher in the agriculture year2014-15 and 2015-16

This is also observed that consolidation and semi consolidation operations though exist at local level but the capacity of an individual farmer and his village is often inadequate to overcome the related difficulties involved in this kind of land exchange adjustment. In fact, no efforts government and local self-government institutions found in the studied tehsil. However, protection of tribal land is strictly implemented. The state Government has accepted the policy of prohibiting the transfer of land for restoration of alienated tribal land to them. Moreover, an important program of central government is under implementation namely (DILRMP).

Planning the Distribution of Fragmented Land

Consolidation is of course the other side of the coin to fragmentation Consolidation of land holdings means bringing together the various small plots of land of a farmer scattered all over the village as one compact block, either through purchase or exchange of land with others.

BHATERI VILLAGE

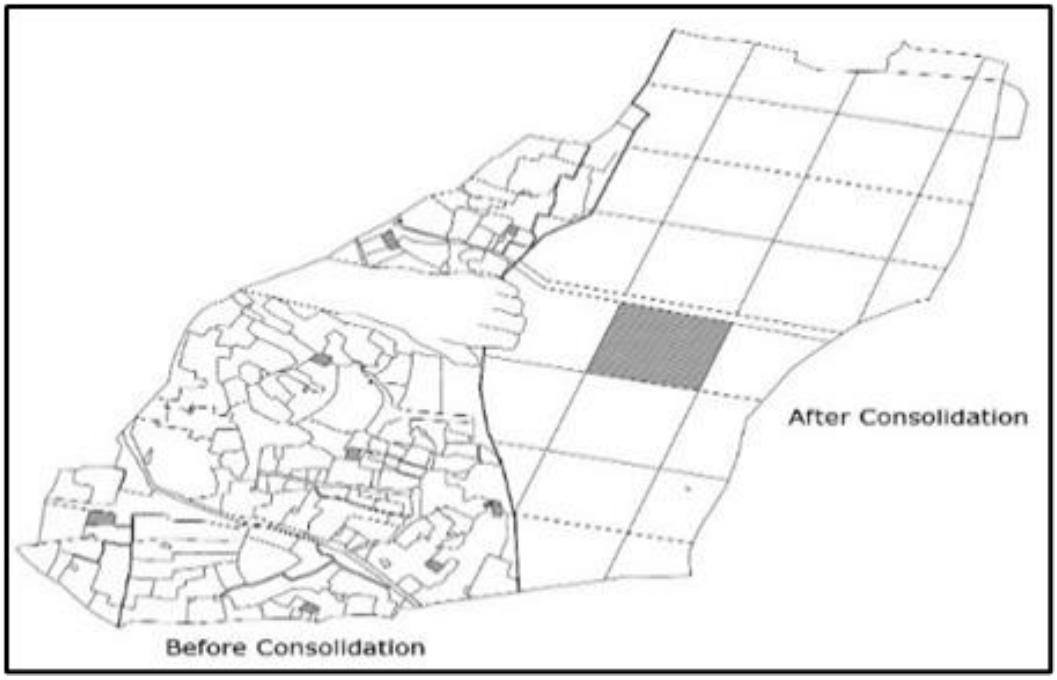

Fig. 1.2: Consolidation Planning

Source: Illustrated by Researcher

BHATERI VILLAGE

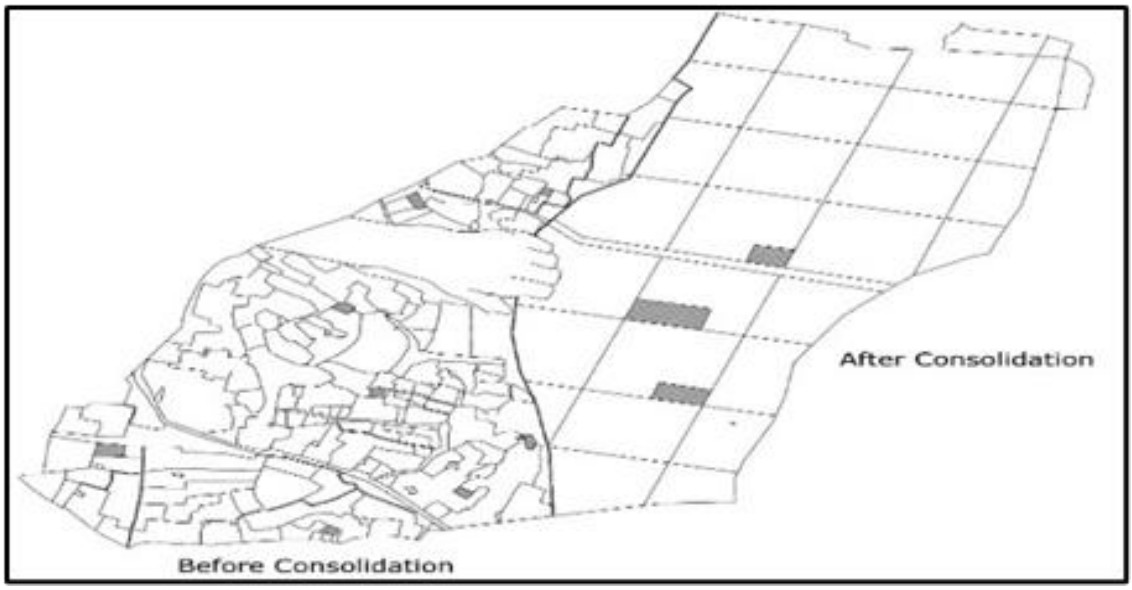

Fig. 1.3: Semi - Consolidation Planning

Source: Illustrated by Researcher

The State of field plots before and after consolidation

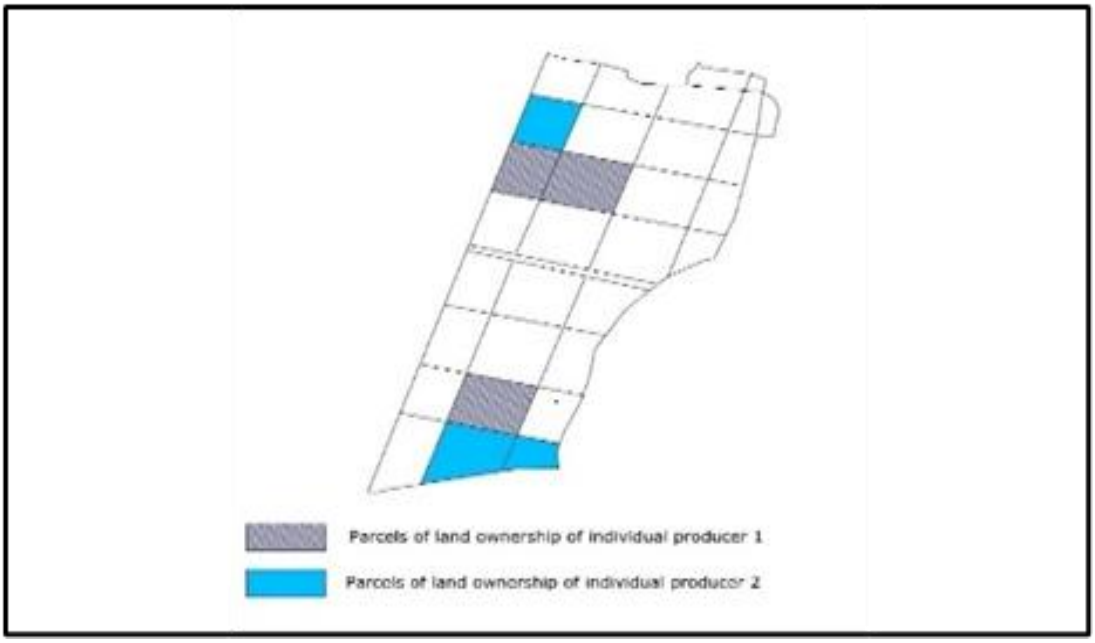

Fig. 1.4: Before the Exchange

Source: Illustrated by Researcher

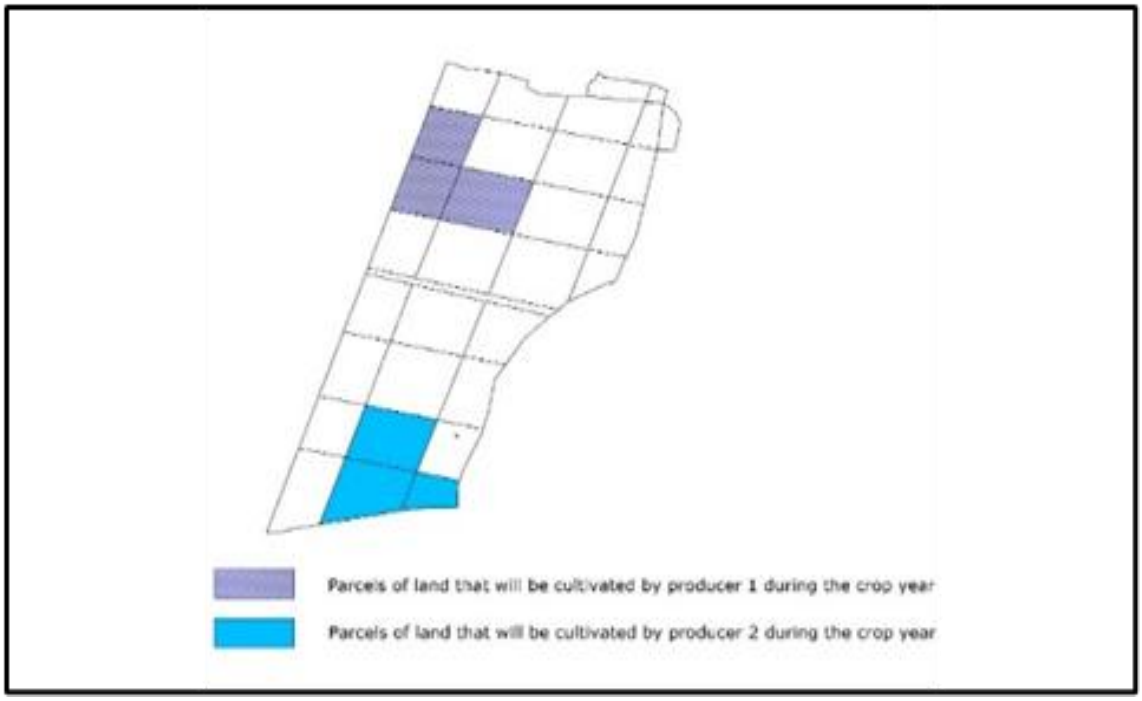

Fig. 1.5: After the Exchange

Source: Illustrated by Research

An attempt has been made taking Bhateri village as an example to show that how consolidation and semi consolidation will benefit and modify the farm structure on as shown in the Figure 1.2 to 1.3. An effort has also been made to formulate action plan for land consolidation as indicated in the Figure 1.6

After Semi – Consolidation

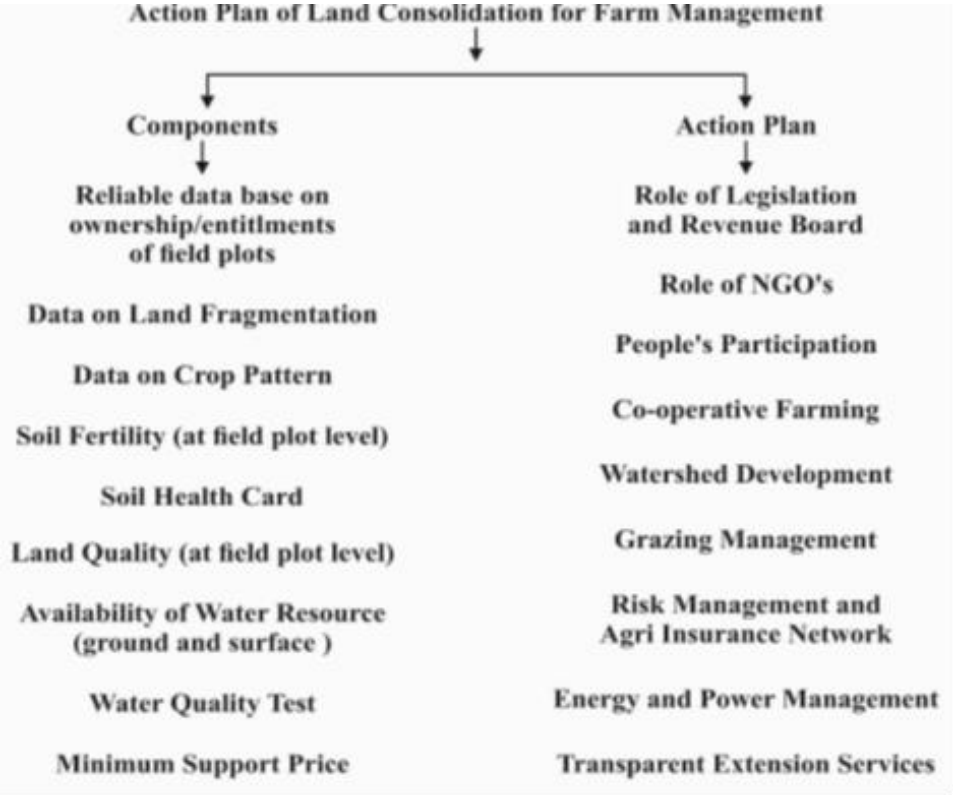

fig1.6 Source: Evolved by the researcher

Source: Evolved by the researcher

SUMMARY AND CONCLUSION

At present, the state does not have a clear-cut agricultural policy, or a mechanism to encourage land consolidation. Since land consolidation is a part of land management and land administration policy, it is the state that should define the policy for the long-term perspective in this field. Land consolidation must be seen as a tool in developing rural areas. This tool needs to be embedded in an overall strategy on spatial development/planning at micro level.

In this context, local self-government could play a vital role. The success of democracy depends on the decentralization of power.The Local Self-government generally unites the people and encourages them to participate in its activities without any bias or prejudice.

Through this system, power can be properly decentralized and prospects regarding proper distribution of land could be maintained.

Higher level of public awareness is required, in particular on the part of government, if land consolidation is to be accepted as a possible strategy for rural development in any tehsil or district. An essential contribution for public awareness could be made through pilot projects.

It is generally agreed that the successful implementation of land consolidation schemes at government or local level depends to a major degree on the atmosphere in the village. The real issue is to coordinate educational and informational efforts in such a way that consolidation measures attempt to go beyond a mere exchange of landed property and comprise measures for enlarging uneconomic small holdings

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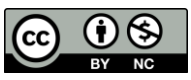

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