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Land Types and Field Patterns in a Punjab Village: An Evolutionary Interpretation of Dhanowali

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ABSTRACT

Land types and field patterns are intimately related. The objective of the present paper is to interpret the evolutionary relationship of land types with field patterns and to recommend strategies to save agricultural fields from encroachments by fast expanding settlements. Land types and field pattern maps of different time period from 1884 to 2016 have been rebuilt with the help of unpublished maps and primary data for the study village Dhanowali located in tehsil and district of Jalandhar in Punjab. The study reveals that due to many factors, land types have improved and field patterns have been changing. The fields are fully brought under irrigation in a phased manner but their numbers are declining fast due to encroachment by rapidly expanding settlements. It can be controlled through redevelopment strategies.

Keywords: Dhanowali, evolutionary interpretation, field patterns, land type, Punjab.

1. INTRODUCTION

Field pattern is one of the most important visible components of rural cultural landscape in the structure of Rural Settlements Geography. Field patterns are created by interaction of human beings with nature. An agrarian community builds a long lasting association with land and invent field patterns. Field pattern is the organization and distribution of pockets of land in terms of size and shape.

Attributes of field patterns such as size, shape and distribution change with the change in the elements of local geography. These elements are land types, slope of the land, soil types, climate, and distance from the settlement, the system of land divisions, social customs and cultural practices. The quality of land type is evaluated on the basis of quality of soil, the source of irrigation, the inherent fertility and productivity of land and the distance of fields from the *abadi-deh* (*settlement*).

The study of field patterns Punjab is important in light of remarkable success it has achieved in agriculture after the adoption of green revolution. Loss of precious cultivated land due to conversion from agriculture to non-agricultural activities in the villages of Punjab in recent past is the greatest challenge of the present time faced by our society. The importance of field patterns has been discussed by a few writers. Mukerji in his paper "Field Pattern in a Telangana Village" stated that a cultural geographer can observe and interpret the field patterns in relation to different physical and human elements (Mukerji, 1962). Indian geographers have described relationships of land types with the field patterns in a limited manner. Manku has discussed relationship of land types with field patterns in his study on *Gujar* settlements piedmont region of Punjab(Manku,1986). Singh (2004) in his study *Evolution of Field Pattern in a Punjab Village* concluded that land types influence field patterns and both are intimately related both spatially and temporally. The 2009 issue of *Survey of Advances in Research* in the book *Geography of India: Selected Themes* published by Indian Council of Social Science Research Bhat has shown concern about the small coverage of the study of field patterns in India (Bhat, 2009). Due to the limited studies undertaken on field patterns, Nangia has strongly recommended to undertake evolutionary interpretation of field patterns in context to physical and human factors in different areas (Nangia, 2009). The present study on evolutionary interpretation of relationship of land types with field patterns in Dhanowali village of central Punjab is undertaken in this context.

Objectives

The objectives of the present paper are to interpret the evolutionary relationship of land types with field patterns within a framework of historical, social, cultural, political, administrative and technological factors and to recommend strategies to save agricultural fields from encroachments by fast expanding settlements in a Punjab village.

2. METHODOLOGY

Studies conducted by Indian geographers on the core elements of rural landscape are not only rare but also suffer from methodological inadequacies. Generally large areas are selected for purposes of study followed by identification of physiographic regions within these large areas. The elements of rural settlements are analyzed by fitting them within each predetermined region. This strengthens the physical deterministic approach, which implies that rural landscape is nothing but the creation of the physical environment milieu. Thus the traditional methodology has been restricted to the philosophy of environmental determinism (Grover, 1985). Cultural historical, social and economic factors also play important role in the evolution of land types and field patterns. An attempt in this direction has been made in the present study to undertake an evolutionary interpretation of land types and field patterns of a single village having homogeneous ecological setting named Dhanowali from the *Bist Jalandhar Doab* plains located in tehsil and district of Jalandhar in Punjab. Punjab is basically a state with plain topography. An effective research on evolution of land types and field patterns can be done for a single village. Srinivas has also strongly advocated productiveness of single village studies (Srinivas, 1977). A study based on in depth knowledge of one individual village provides a complete picture of rural landscape in India in context to its socio-cultural matrix (Grover, 2004).

Sources of Data and Method of Study

Primary data is used in the present study. Land type and field pattern maps of different time periods from 1884 to 2016 have been drawn with the help of primary data and unpublished maps for the study village

Dhanowali located in tehsil and district of Jalandhar in Punjab. The village *Patwari* (government official dealing with land records) has provided the current data for 2016. The data and required maps for the year 1884, 1914, 1958 and 1990 was obtained from *Kanungo* (government official dealing with land records at tehsil level), Revenue Office of Jalandhar district and from the office of Director Land Records, Punjab. The field wise data on property units with *Khasra* numbers (recognition numbers) for different years was obtained recorded in the *Shajra Kishtawars* of the village Dhanowali. The land type data is obtained from *Misal hakiats/Jamabandis* (property record books) and *Khasra Gardavari (*book of crop harvest).

The Study Village

The study village Dhanowali is located on the alluvial upland plains of Jalandhar district in Punjab (Figure 1). The village forms a part of the *Bist Doab* region of Punjab. It is situated at the periphery of Jalandhar city along the Grand Trunk road (NH-1) from Jalandhar to Phagwara. The total area of the village is 210 hectares.

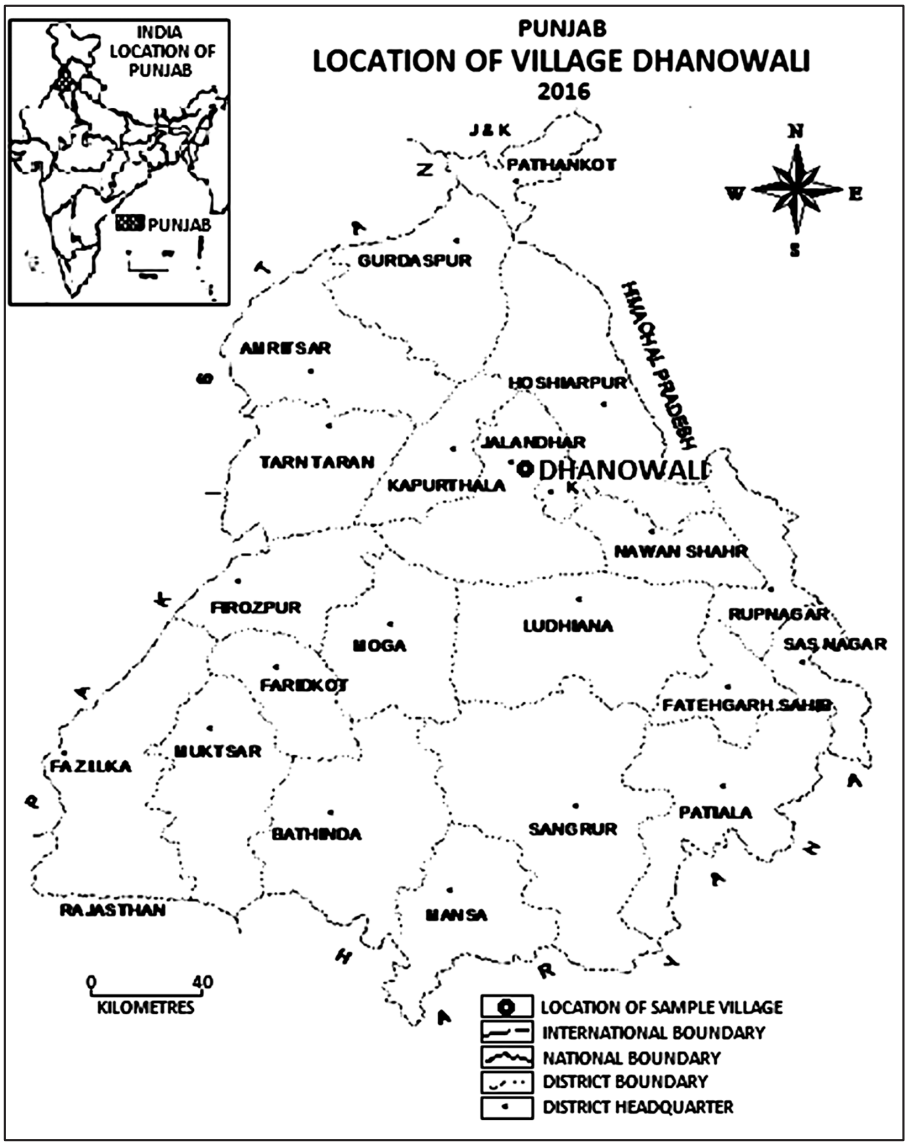

Figure 1

Tube-wells have been replaced by submersible pumps in the fields due to fast falling of water-table in Punjab after the introduction of paddy cultivation. The land is alluvial and its soils range from clay loam to sand. The continental type climate is experienced. Winters are cold and summers are hot. More rainfall comes in summers from the monsoons and some amount of rain comes in winters from western disturbances. Agriculture is the dominant occupation. The rural communities of the study village are comprised of different class-owners of land; owner-cultivators, tenants and agricultural labourers. The agricultural system is mainly commercial. Wheat, paddy, and potato are the main commercial crops. *Saoni* (summer) and *Harri* (winter) are the two cropping seasons of the village. Green Revolution technology is used in the village. Tractors have completely replaced the bullock plough. *Jat Randhawa* is the founder and dominant caste engaged in agriculture. Many other castes also own agricultural fields in the study village. Per-capita size of holding is less than one *killa* (an area of 198 feet x 220 feet or 8 *kanals*, equivalent to one acre) due to large number of land owners.

3. RESULTS AND DISCUSSION

Land Types and Field Patterns in 1884

The field map of the earliest year 1884 was comprised of many land types characterized by variations in inherent fertility and productivity (Figure 2). The land types of this period in the study village include *nyayi chahi*, *meera chahi*, *tibba*, *banjar kadim* and *banjar jadid*. *Nyayi* means the best quality highly manured land situated in the close proximity to the *abadi-deh* (settlement). The term *chahi* denotes the land which is being irrigated by a *chah* (a well or a tube-well). Out of the total 970 fields of the study village only 5.77 per cent (56) fields belong to *nyayi chahi* land type due to poor availability of irrigation facilities and manures (Table 1). *Meera chahi* is that land which is found away from the *abadi-deh* (settlement) in the village territory. More than 39 per cent (383) fields belong to *meera chahi* land type due to availability of irrigation facilities by wells. A *tibba* is an irregular sandy land through which water percolates very fast. It is unfavourable for cultivation. Majority of the fields 520 (53.60 per cent) belong to *tibba* land type indicating large incidence of *barani* (rain-fed) cultivation. Such fields are scattered in all the directions of the village periphery. The terms *banjar kadim* and *banjar jadid* denotes fallow lands. *Banjar jadid* is the land which has been left without cultivation for three crop seasons and *banjar kadim* term is used for land which has not been cultivated for more than eight crop seasons. Such land types are poor in their natural fertility and therefore are left fallow after growing crops for some time so that their fertility improves naturally. The *banjar kadim* and *banjar jaded* land types were small in number. Fields belonging to such land types were relatively large in size. Land types have also played a role in the expansion of cultivated land in different directions of the village territory by the cultural group settled here in the beginning.

According to *shajra nasab* (genealogical tree) 1884 the study village Dhanowali was first owned by a *Jat Randhawa* caste family who came here from Amritsar district of Punjab. They found the land vacant and acquired the village territory by clearing the forests. The boundaries of the village were marked largely by *tibbas* and forests. The process of converting the village territory into cultivated land was started immediately because agriculture was the main occupation. The entire village land was not brought under cultivation simultaneously. The land was brought under cultivation gradually in different directions of the village indifferent phases of the processes of settling. The land near the *abadi-deh* (settlement) was first to be brought under cultivation. In the first phase of processes of settling the cultivated land was extended

Table 1
Village Dhanowali: Evolution of Land Types of Cultivated Fields

Year	*Land Type*	*Number of Fields*	*Percentage in Total Number of Fields*	*Area Covered (Kanal-Merla)*	*Percentage in Total Cultivated Area Covered*
1884	NyayiChahi	56	5.77	192-03	4.68
	MeeraChahi	383	39.48	1431-15	34.91
	Tibba	520	53.60	2330-09	56.80
	Banjar Kadim	10	01.03	147-11	3.60
	Banjar Jadid	1	00.10	02-03	0.05
	Total	970	100.00	4104-01	100.00
1914	Chahi	772	53.8	2495-02	61.75
	Banjar Kadim	74	5.1	147-17	3.65
	Banjar Jadid	45	3.1	27-00	0.67
	BaraniAwal	34	2.4	129-11	3.20
	BaraniDaum	439	30.6	1009-06	24.97
	BaraniSaum	72	5.0	231-10	5.74
	Total	1434	100.0	4040-06	100.0
1958	Chahi	708	67.8	2496	67.7
	Banjar Kadim	36	3.4	32	0.9
	Banjar Jadid	19	1.8	24	0.6
	Barani	281	26.9	1136	30.8
	Total	1044	100.0	3688-00	100.0
1990	Chahi	1004	99.80	3544-11	99.81
	Barani	1	0.10	5.06	0.14
	Banjar Jadid	1	0.10	1.02	0.03
	Total	1006	100.00	3550-19	100.00
2016	Chahi	954	100.00	2980-13	100.00
	Total	954	100.00	2980-13	100.00

Source: Jamabandi of Village Dhanowali-1884, 1914, 1958, 1990 and 2016.

to the north and north-east direction of the *abadi-deh* (settlement). Land near the eastern and north-eastern parts of the village was brought under cultivation in the second phase of processes of settling due to its high fertility. In the subsequent stages of processes of settling, cultivated land was extended in the south and south-eastern direction of the *abadi-deh* (settlement) and to the other peripheral parts of the village in the last phases. These phases are indicated by the quality of land types and smaller size of fields which show higher degree of sub-divisions.

The fields are larger in size where the incidence of sub-divisions is less. Such sub-divisions of fields are essentially the effect of operation of Hindu law of inheritance, principle of equitable distribution of benefits and handicaps and principle of compensation. The law of inheritance in the study area is that all the sons of a man will share equally in his land regardless of their age with a fair distribution of advantages and handicaps. The principle of compensation also operates in the study village whereby the proportion of land owned by different sons in different land types varies. Anyone who desires maximum share in the best land type is offered less number of fields which are also small and those with a limited share in

the best land type may have several fields of large size in poor land types. The elongated rectangular and strip shape of fields at that stage would have been determined by the local micro-topography of the land, poor sources of irrigation, bullock plough and poor farm implements. The alignment of the fields varies in different directions of the village territory due to local micro-topography and for easy supply of water to the fields. Many of the elongated rectangular strip fields are oriented to the field roads for easy movement of human beings and cattle (Figure 2).

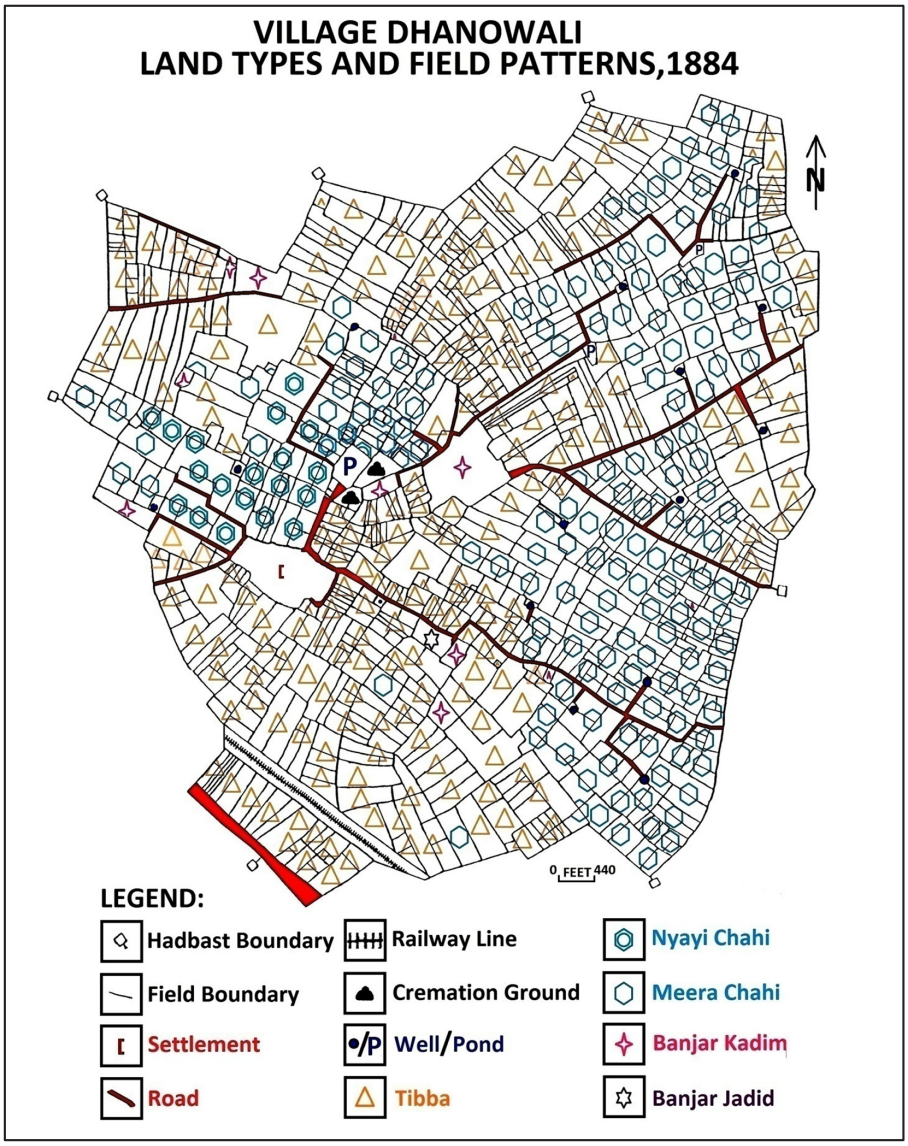

Figure 2

Land Types and Field Patterns in the Pre-Consolidation (1914) Phase

Pre-consolidation land types in the field map of 1914 include *chahi*, *banjar kadim*, *banjar jadid*, *barani awal*, *barani daum and barani saum* (Figure 3). The predominant land type in the pre-consolidation phase is *chahi* covering more than half of the cultivated fields and about sixty-twoper cent of the total cultivated land (Table 1). The number of *banjar kadim* and *banjar jadid* fields has increased due to the conversion of *tibba* land types

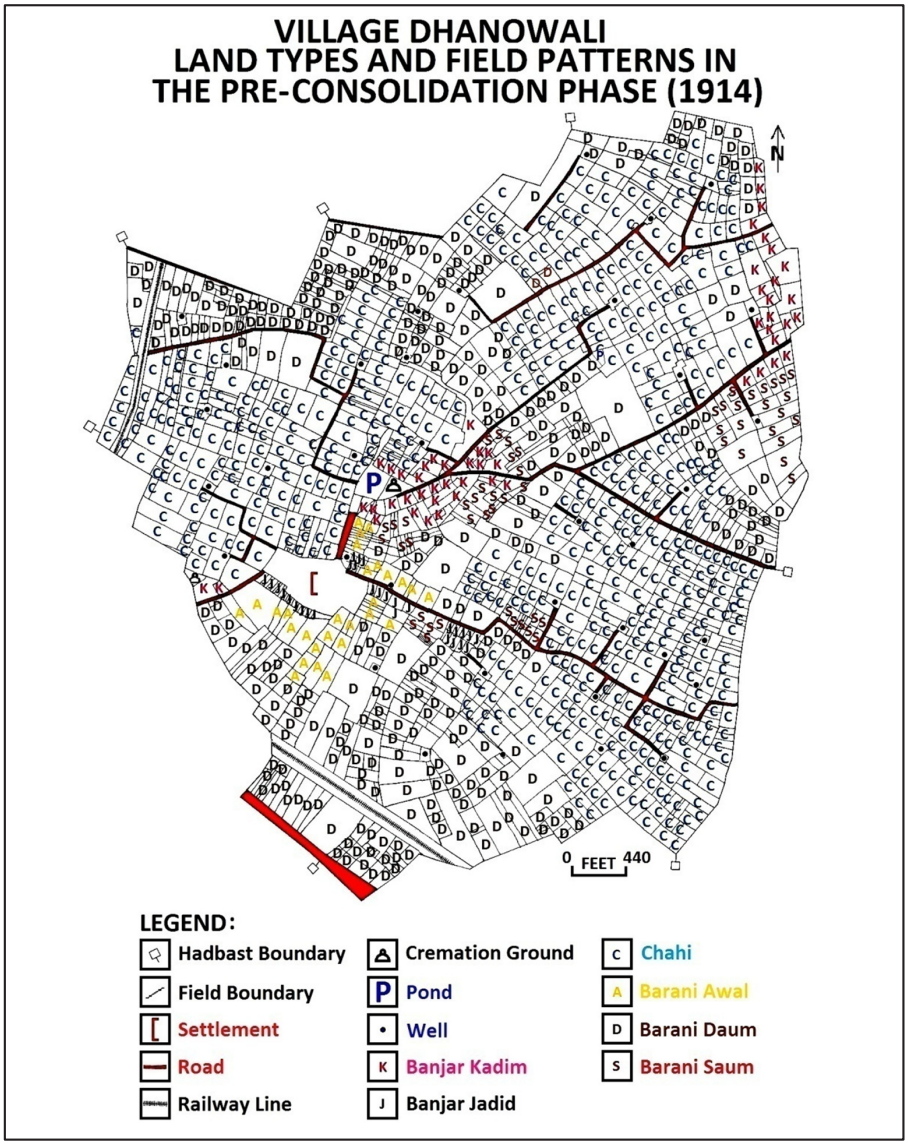

Figure 3

of the year 1884. The term *barani* signifies non-irrigated sandy land having low inherent fertility and productivity. *Barani* land has further been divided into three types; *barani awal, barani daum and barani saum* on the basis of distance of fields from the *abadi-deh* (settlement), inherent fertility and use of manures. *Awal* means first ranking or superior, *daum* refers second ranking or inferior and *saum* signifies third ranking most inferior land type. *Barani awal* has lesser proportion of sand and can retain water for long time. *Barani awal* land is found in the neighbourhood of *abadi-deh (settlement)* and therefore is highly manured. The amount of sand is more in *barani daum* and this land type is generally found away from the *barani awal* land type. *Barani saum*, the inferior most cultivated land type is almost sandy and therefore cannot retain water for long time. It is found near the village periphery away from *barani daum* land type. A few pockets of *barani saum* land types are also found in the interior parts due to their sandy character. *Chahi* land type is found only in the north-west direction of *abadi-deh* (settlement) whereas in all other directions, land types of low productivity *banjar jadid, banjar kadim* and all three sub-types of *barani* land types surrounds the *abadi-deh* (settlement).

The percentage share of *barani* fields in the total number of fields is 38 per cent and their share in the total cultivated area of the village is 34 per cent. Among *barani* land types, *barani daum* constitutes maximum 30 per cent in the total number of fields and 25 per cent in the total cultivated area. Fields of different sizes are found in every land types in different directions of the village territory, but *chahi* fields are smaller than the *barani* fields because of their more sub-divisions.

Land Types and Field Patterns in the Post-Consolidation (1958) Phase

The irregularities of evolved field landscape have disappeared after consolidation in the study village. The field patterns have transformed totally in post-consolidation (1958) period. There is a considerable improvement in land types of post-consolidation period. Many previously *barani* (rain-fed) fields were transformed into *chahi* (irrigated) land type fields (Figure 4).

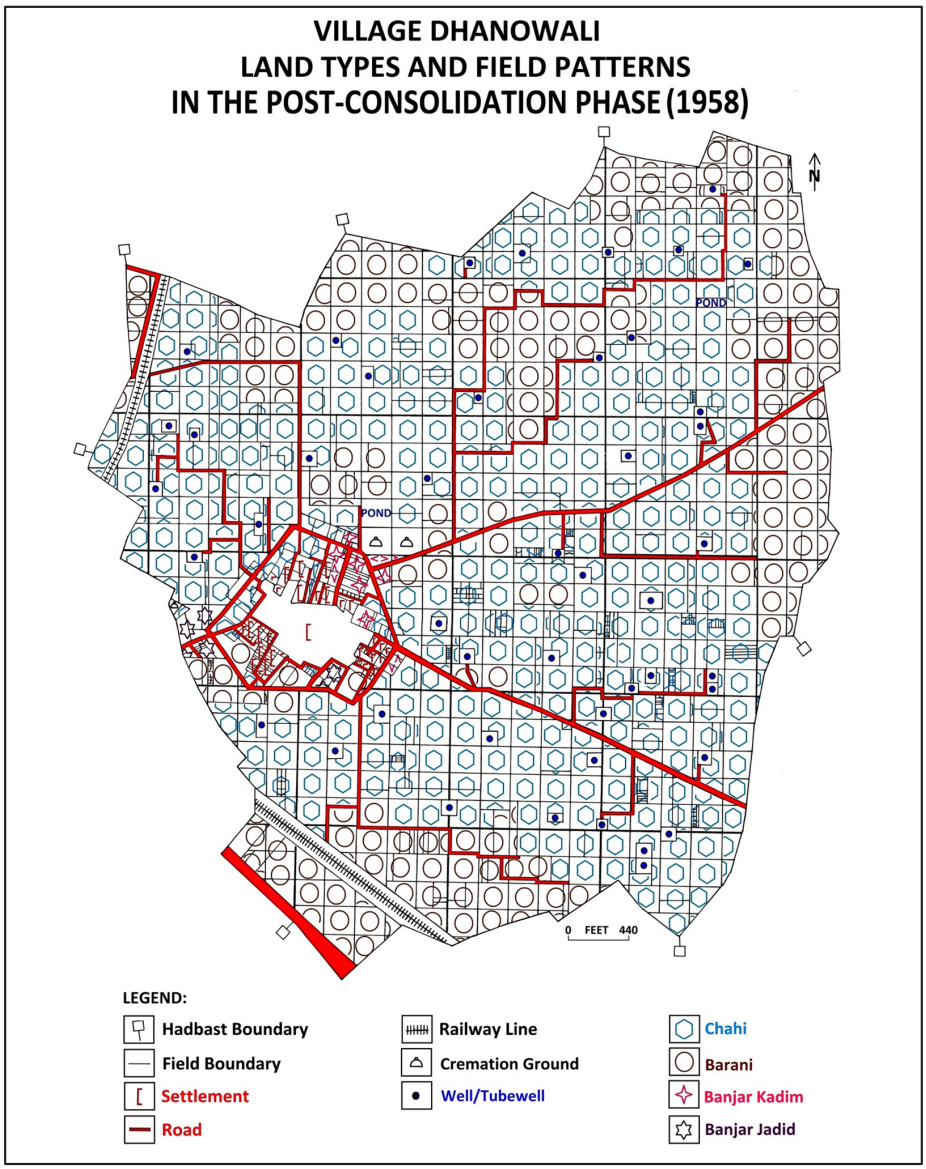

Figure 4

The percentage of *chahi* fields to the total cultivated fields and percentage of cultivated area under *chahi* land type fields both have increased from 53.8 per cent to 67.8 per cent and from 62 per cent to 68 per cent respectively from1914 to1958 (Table 1). The number of fields and cultivated area under *banjar kadim* and *banjar jadid* land types has also been reduced. The number of fields have reduced due to the process of consolidation of holdings by which most of the small fields of less than eight *kanals* (a unit of land measurement, comprising an area of about 600 yards) were converted into uniform size of one *killa* (198 feet x 220 feet or 8 *kanals*). *Banjar kadim* and *banjar jadid* land type fields are found near the *phirni* (circular road around *abadi-deh*, settlement). The number of *barani* fields and area under them has also reduced. This has become possible due to increase in area under irrigation as the number of tube-wells has increased from 36 in 1914 to 46 in 1958 (Table 2).

Table 2
Village Dhanowali: Number of Wells /Tube-Wells

Year	*Number of Wells/Tube-Wells*
1884	15
1914	36
1958	46
1990	60
2016	65

Source: Jamabandi of Village Dhanowali-1884, 1914, 1958, 1990 and 2016.

Most of the *barani* fields are found near the village territory due to their less attraction by the owners. *Chahi* fields are found both near and away from the *abadi-deh* (settlement) but *chahi* fields are relatively smaller than the *barani* fields in the post-consolidation phase. In the *chahi* (irrigated) land type the size of the fields is small as every person wants to have a share in irrigated land type and this leads to more division of *chahi* fields. In the *barani* land type size of the fields is large due to their low productivity and inherent fertility. In 1958 about 30 per cent of the cultivated area and 27 per cent fields were under *barani* land type. More than 3 per cent fields belonged to *banjar kadim* and only 1.8 per cent fields fell in the category of *banjar jadid* land types due to the sub-division of the earlier large sized fields. Due to the adoption of Green Revolution technology through assured irrigation in1966 in Punjab land types have improved to the maximum extent in the study village also in the 1990field map (Figure 5). Almost all the cultivated fields and cultivated area (99.80per cent) have been brought under irrigation in 1990 (Table 1, Figure 5). *Barani and banjar jadid* land types together account for only two fields (0.20 per cent of the total cultivated fields) and cover an area of only 6 *kanal-8 marla* (0.19 per cent of total cultivated area).

4. RECENT LAND TYPES AND FIELDPATTERNS

Existing land types and field patterns in 2016 field map reveals that there exists no relationship between the distance from the *abadi-deh* (settlement) and productivity and fertility of land due to the use of chemical fertilizers and irrigation facilities. All 954 fields (100 per cent) belong to *chahi* (irrigated) land type (Table 1, Figure 6).

Both the number and size of fields is declining due to increase in the number of owners and encroachment of fields by fast expanding settlements. The number of fields under *chahi* land type has

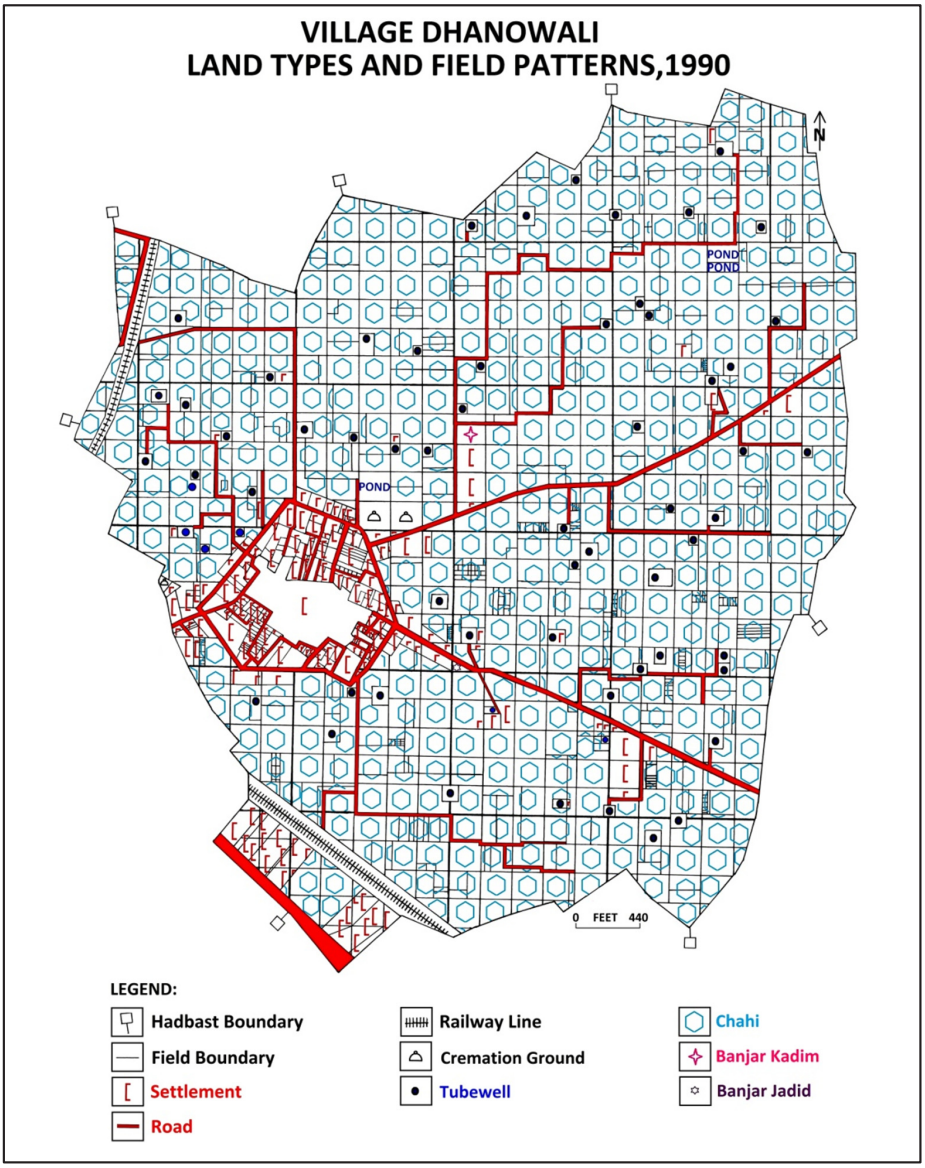

Figure 5

decreased from 1004 in 1990 to 954 fields in 2016 showing a 5.0 per cent fall (Table 1). Area under cultivation has fallen by 16 per cent between 1990 and 2016 due to continuous encroachment of cultivated fields by the fast expanding settlements (Figure 6). More than 28 per cent area of the village has become *gairmumkin* (uncultivable) from the year 1884 to 2016 at an annual rate of 0.21 per cent. This rate of loss of precious land has more than doubled (0.54 per cent) in recent years from 1990 to 2016. The cultivable land near the *abadi-deh* (settlement), village roads and NH-1 is encroached more by *gairmumkin* (uncultivable) land uses such as houses, farm houses, factories and workshops. The per-capita number of fields has reduced from nine to only two and size of land-holdings has reduced from 46 *kanals* to only 6 *kanals* between 1884 and 2016 (Table 3). This is due to increasing population pressure in the study village and also by the entrance of female land-owners made possible by the amendment of the Hindu Act which lays down that daughters are entitled to share equally in their father's property.

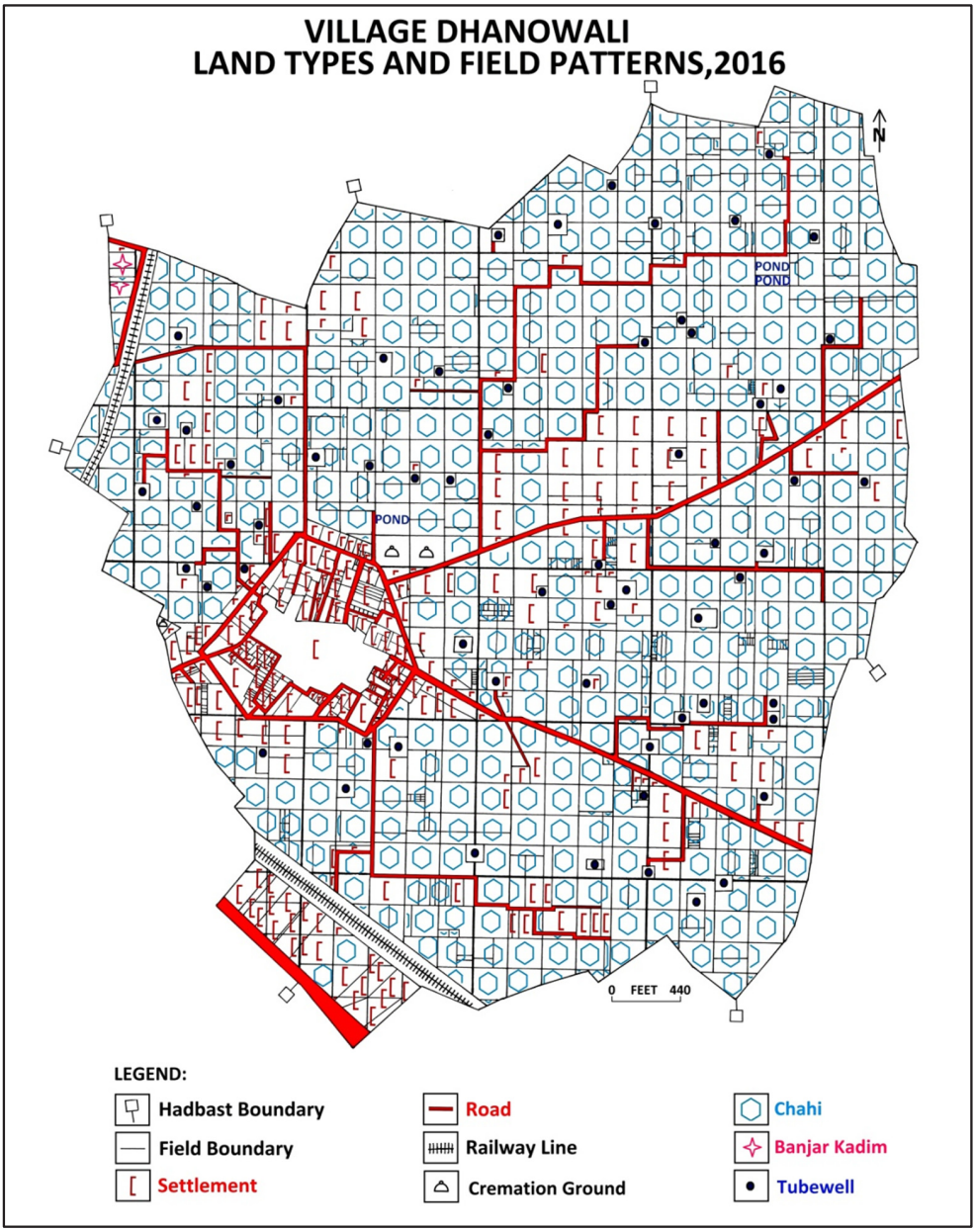

Figure 6

Table 3
Village Dhanowali: Per-Capita Number of Fields and Per-Capita Size of Land-Holdings

Year	*Per Capita Number of Fields*	*Per Capita Size of Land-Holdings (in Kanal)*
1884	9	46
1914	8	29
1958	4	12
1990	3	9
2016	2	6

Source: Jamabandi of Village Dhanowali-1884, 1914, 1958, 1990 and 2016.

5. CONCLUSIONS

Land types influence field patterns both in space and time even at village level having uniform ecological setting. In the initial map of 1884 of the study village land types and field patterns were intimately related to each other. This phase was dominated by poor quality land types with large size fields scattered all over the village territory. The fields were smaller in size more in the good quality land types situated near the *abadi-deh* (settlement). Land types and field patterns have experienced a big change from the pre-consolidation (1914) phase to the post-consolidation (1958) phases in the study village due to increase in the area under irrigation. In the 1958 field map of post-consolidation phase the *chahi* (irrigated) fields were relatively smaller than the *barani* (rain-fed) fields due to their better quality resulting into their more sub-divisions. This relationship has faded away in the study area after the implementation of Green Revolution technology. Nearly the entire cultivated area and all the fields have been brought under tube-well irrigation in the 1990 field map. The fields of different size and shape are found near the source of irrigation and in different parts of the village territory irrespective of their land types. The existing field map (2016) of the study village reveals that the number and area of cultivated fields is declining at an alarming rate due to fast urbanization and encroachment of precious cultivated land by fast expanding settlements.

6. RECOMMENDATIONS

The number of *chahi* (irrigated) fields and area under cultivation is declining fast in the study village due to encroachments by fast expanding settlements due to the relative nearness of village Dhanowali to Jalandhar city. This will eliminate the centuries old rural cultural landscape of agricultural fields with precious and most fertile irrigated land types of the study village. The fertile cultivated land should not be permitted to be used for *gairmumkin* (uncultivable) land uses such as houses, farm houses, palaces, workshops and factories. Vacant *panchayat* lands, waste lands and other poor land types may be used for such activities. Dense and high rise buildings should be allowed in the village to reduce pressure on agricultural land. The future requirement of housing provisions should be dominated by small housing units to save precious agricultural land. Minimum land should be allowed to be used as a farm house and no other activity should be permitted here except agriculture. Agricultural land situated outside *phirni* (A circular road around *abadi-deh*, settlement) should be declared as no-construction zone. Agriculture related land uses should only be allowed in the village territory. Separate zonal plans for villages should be made to save agricultural lands. Efficient use of vacant government lands within the municipal limits of the city will lower down the pressure on agricultural land of villages situated on its periphery. A re-development strategy to accommodate more population within the city limits should be framed. The Master Plans of the city areas must give due recognition to rural areas to save agricultural lands.

Appendix

Abadi-deh: Settlement.

Banjar Jadid: The land which has been left without cultivation for three crop seasons.

Banjar Kadim: Land which has not been cultivated for more than eight crop seasons.

Barani: Non-irrigated rain-fed land.

Barani Awal: Superior, first ranking *barani* land adjacent to the *abadi-deh* (settlement).

Barani Daum: Inferior, second ranking *barani* land away from the *abadi-deh* (settlement).

Barani Saum: The most inferior, third ranking *barani* land near the village territory.

Bist Doab: Land situated between the rivers Beas and Sutlej in Punjab, India.

Chahi: Land irrigated by *chah* (well or tube-well).

Gairmumkin: uncultivable land.

Jat: A yeoman, peasant community of north- west India.

Kanal: A unit of land measurement, comprising an area of 600 yards.

Kandi: Foot- hill land.

Kanungo: Tehsil level government official in revenue department.

Kharif: Summer season crops, also known as *Saoni.*

Khasra Gardavari: Crop harvest inspection book.

Khasra number: Identification Number.

Killa: A unit of land measurement comprising an area of 198 feet x 220 feet or 8 *kanals* equivalent to acre.

Marla: A unit of land measurement comprising an area of about 30 square yards.

Meera Chahi: *Chah* (well or tube-well) irrigated land generally found away from the *abadi-deh* (settlement).

Misalhakiat/Jamabandi: Book of land property records.

Nyayi: The best quality highly manured land situated in the close proximity to the *abadi-deh* (the settlement).

Nyayi Chahi: Chah (well or tube-well) irrigated land adjacent to the *abadi-deh* (settlement).

Panchayat: Village level elected government.

Patwari: Village level government official.

Phirni: A circular road around *abadi-deh*(the settlement).

Rabi: Winter season crops, also known as *Harri.*

Randhawa: A *gotra* (clan) of the *Jat* community.

Shajra Kishtawar: Village map showing the fields and their boundaries with *Khasra* numbers, also known as *massavi.*

Shajra Nasab: Genealogical tree of owners of the land also known as *Vanshavali* or *Kursinama.*

*Tibba :*An irregular sandy land through which water percolates very fast.

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