

Changes in Landuse of Chiraigaon Village

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チライガオン村における土地利用の変化

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CONTENTS

- | | |
|-------------------------|------------------|
| I. Introduction | VI. Land holding |
| II. Outline of landuse | V. Discussion |
| III. Changes in landuse | |

I. Introduction

In this quarter of century Indian village have been transformed, particularly in the urban-rural fringe. (see Christians et al., 1989) In this chapter the rural change is discussed from the view point of landuse. The study area is Chiraigaon village in Varanasi district U.P. where urbanization have progressed in this 25 years. Using the data of village survey in 1967 and 1991, this study presents one situation of Indian suburbanization process. At the end of this analysis the author focused on particularly the decision making for landuse management in order to integrate the patterns of landuse under the rapid socio-economic changes.

Chiraigaon village is situated about 15 kilometers from Varanasi city in U.P. It was already argued that there was the dominant tendency of commoditization of agricultural production. It was considered to be occurred by the influence of urbanization and

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urban impact of Varanasi city. (see Yonekura et al., 1973) And the populational explosion is the most important change in social and economical interest. The whole population was 1552 in 1967 and 3070 in 1991, and 192 households in 1967 and 494 households in 1991.

II. Outline of landuse

In 1991 the landuse of this village was characterized by the predominance of orchard. Lemon, *karaunda* and guava were three main fruits in this village. Such fruits are mainly sold in the market and the parts of them are processed into juice or jam at the factory in village. Similarly vegetables and flowers are also commoditised and their cropping area is not so small. Some kinds of pumpkin and cucumber are economical vegetables in this village. Especially one kind of pumpkin is most economical crop in this village. In the 1967's survey it had already pointed out that such tendency of commoditization is predominant in Chiraigaon and it was one of the main characteristics of this village. (see Yonekura et al.) On the contrary there is not so much cereals, paddy, *bajra*, *jowar*, maize and *arhar* that is mainly consumed in self-support use. And the landuse patterns of such crops is indicated in Figure 1-6.

According to the *Khasara* data (see Table 1) there are the obvious tendency that the cropping area of cereals has decreased. In *kariff* crops this tendency is serious particularly in paddy. In 1971, 25.51 acre was area under rice cropping but in 1985 only 1.46 acre. In maize this tendency is also clear. Same tendency can be seen in *rabi* crops, especially in wheat. In 1971 60.48 acre was the area under wheat cropping but in 1985 only 30.09 acre. From this data it was revealed that the commercializing agricultural operation progressed in this 25 years in this village.

III. Changes in landuse

1. Settlement

There are four settlements in the village and each of them is segregated by *jati* group. The largest settlement is situated in the north-central part of this village. *Kusuwaha* is the main *jati* group who lived in this settlement. Next largest settlement is situated south-east direction of settlement. This settlement is surrounded by the orchard and *Kathik*, the *jati* of vegetable peddler, lives there. Third largest settlement is situated in

Table 1 Change in cropped area (acre)

<i>Kariff</i>	1971	1975	1980	1985
paddy	25.51	48.66	17.07	1.46
<i>bajra</i>	0.36	1.49	1.22	1.57
<i>jowar</i>	—	—	4.15	3.7
<i>jowar + arhar</i>	2.9	2.4	—	0.38
<i>bajra + arhar</i>	3.86	0.24	—	1.47
maize	31.85	11.93	11.2	16.7
fruits	39.7	42.85	—	—
vegetable	29.39	17.46	21.21	19.05
<i>arhar</i>	—	—	1.15	2.45
<i>phalsa</i>	—	—	8.71	—
<i>Rabi</i>	1971	1975	1980	1985
wheat	60.48	71.31	37.11	30.09
gram	1.4	—	0.96	1.18
pea	2.58	2.02	2.11	6.19
fruits	0.45	1.4	—	—
potato	23.27	17.62	20.09	10.0
vegetable	0.15	1.87	2.96	11.99

the west direction of the first settlement. A narrow path runs through this settlement and it is paved by tiles in the eastern part of the settlement but the western part has not yet. The SC(Scheduled Caste) group lives in this settlement. The smallest settlement is situated in the south direction of the SC's settlement. This settlement is constructed by very coarse house in which ST (Scheduled Tribe) group lives.

Figure 1 reveals the expansion of the area under settlement between 1967 and 1991. There can be found two patterns of the expansion area. One is the area around old settlement and the other is along the *balwa* road that crosses in the southern part of this village.

2. Cereals

In 1991 paddy field was only identified in the south-western end of this village. Though it is impossible to identified the paddy field in 1967, due to the limitation of the landuse map in that time, it can be conjectured to reduce the area under paddy cropping from the data of *khasara* and interviews in 1991. The census survey in 1967 revealed that the area under paddy cropping was 20.834 *bigha* and 17 households operated the field. But our survey in 1991 can identified only 7.5 *bigha* of the paddy field and 10 households operating paddy field(see Table 2). One large farmer had 4 *bigha* of paddy field and this

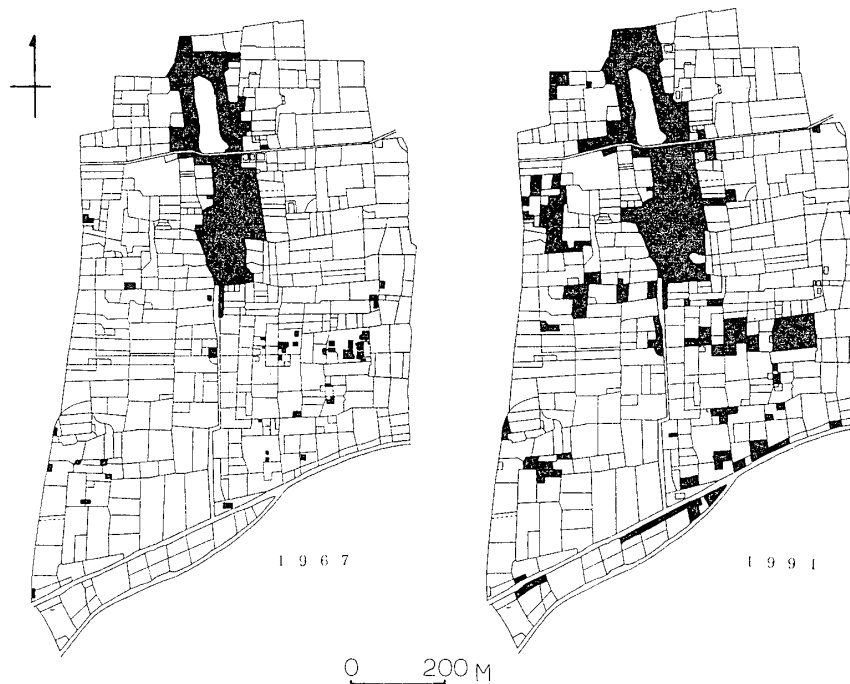


Fig. 1 Land use change in settlement

is over 50% of whole paddy field in the village. In 1967 this farmer had 4.5 *bigha* of paddy field and the other farmers cultivated smaller fields which were under only one *bigha*. The area under paddy cropping had decreased in this 25 years, but it could not be changed the difference between small number of upper farming households and large number of lower farming households about land holding structure of paddy field.

Wheat is the most popular crop in both 25 years ago and today in the village. In 1991 survey we could not make the land use map of *rabi* season, but it was considered to be under the same condition of the paddy. Though the number of household who operated the wheat field had increased from 54 in 1967 to 66 in 1991, the area under wheat had decreased from 116.5 in 1967 to 57.1 in 1991. The average of area per one operating farmer has decreased from 2.2 *bigha* in 1967 to 0.87 *bigha* in 1991. The largest was the farming household who operated 15.13 *bigha* of wheat field in 1967. But this farming household operated only 4 *bigha* in 1991. And this household is the same household who had the largest paddy field. And wheat showed the same structural pattern with paddy. In other words it can be recognized the landholding structure that can be divided into small number of large landholder and large number of small landholder. And each case the

Table 2 Operating area and number of households by main crops

name of crop	area (<i>bigha</i>)	T	number of household				
			0 - 1	1 - 3	3 - 5	5 - 10	10 -
lemon (1967)	50.058	41	22	16	1	2	0
(1991)	140	138	79	52	5	0	2
guava	25.444	17	6	9	1	1	0
	77.6	79	55	22	0	1	1
<i>karaunda</i>							
	36.6	45	27	17	1	0	0
paddy	20.834	17	7	9	1	0	0
	7.5	10	9	0	1	0	0
wheat	116.50	54	17	29	4	2	2
	57.1	66	43	20	3	0	0
<i>jowar</i>	18.46	12	7	4	0	0	1
	2	4	3	1	0	0	0
<i>bajra</i>	11.33	13	9	3	1	0	0
	1.3	4	4	0	0	0	0
maize	130.77	75	28	36	8	1	2
	0.55	3	3	0	0	0	0
<i>arhar</i>	9.95	10	6	4	0	0	0
	3.45	7	6	1	0	0	0
eggplant	44.606	46	30	13	3	0	0
	9.41	20	19	1	0	0	0
potato	36.334	34	18	15	0	1	0
	14.1	30	26	4	0	0	0
pumpkin	1.5	1	0	1	0	0	0
	3.3	8	8	0	0	0	0
ladyfinger	7.678	10	8	1	1	0	0
	2.9	12	12	0	0	0	0
cucumber							
	22.1	55	51	4	0	0	0
flower							
	7.62	10	7	3	0	0	0

area of operating land became smaller as a whole.

But in *bajra* and *jowar* such structure is also destroyed. In 1967 it could identified the upper farming households who which operates the area over 4 *bigha* of *bajra* cropping or 10 *bigha* of *jowar* cropping. In this 25 years the area under such crops had been decreased from 23.69 *bigha* to 1.3 *bigha* in *bajra* and from 18.46 *bigha* to 2 *bigha* in *jowar*. Such tendency can be seen from the landuse map(see Figure 2). And the operating household had also decreased from 13 to 4 in *bajra* and from 12 to 4 in *jowar*. There can not be seen the landholding structure which can be seen in paddy and wheat. But from the Figure 2 such structure can be seen in 1967 about *jowar*. Therefore the destruction of such



Fig. 2 Landuse change in *bajra* and *jowar*



Fig. 3 Landuse change in maize

structure was consider to bring by the tendency of decreasing cereals cropping and this tendency was affected from the increasing the area under commercialized crops such as fruits and vegetables. And in these crops, especially in *jowar*, the range of decreasing is so much that the difference between high and low farming households cannot be identified.

In maize this tendency is identified most clearly. We can recognize the large area under maize spreading over the village area from the Figure 3 that indicates the cropping area in 1967. But we can not find out the area under maize from the land use map in 1991. Because from the census survey in this 25 years the area had decreased from 130.77 *bigha* to only 0.55 *bigha* and the number of farming households had decreased from 75 to only three.

3. Orchard

The main trees identified in this village are lemon, guava and karaunda.

At first the area under lemon cropping has spread over the south-easternpart of this village(see Figure 4). The area under lemon cropping was 50.058 *bigha* and 41

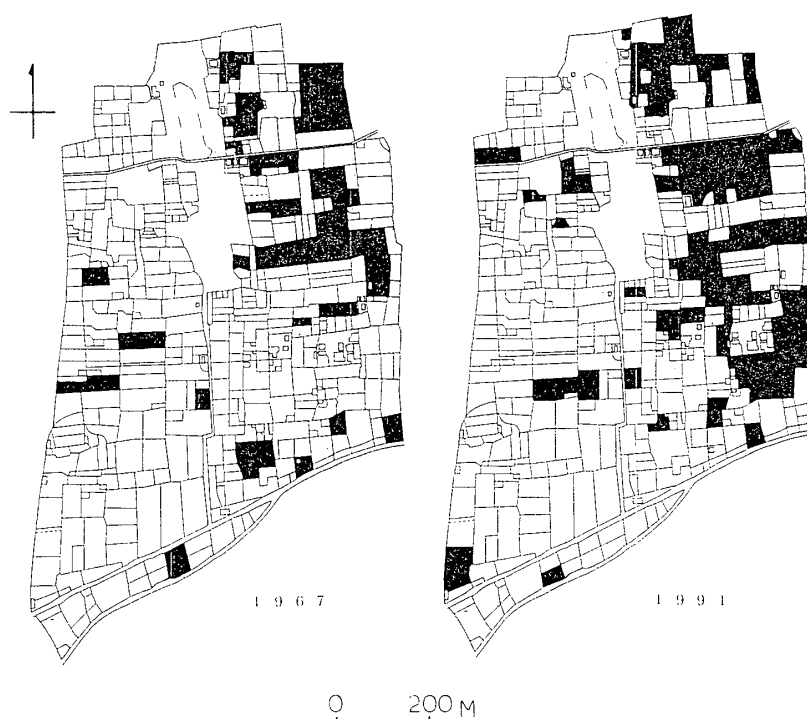


Fig. 4 Landuse changc in lemon

households (21%) operating it in 1967, but in 1991 the area under lemon cropping is 140 *bigha* and 138 households (28%) operated that field. This is over the twice of area under operator and three times of the households.

The area under guava was situated in the south-east direction of the main settlement in 1967(see Figure 5). But in 1991 the area is expanded over the west direction of the settlement. The area under guava cropping was 25.444 *bigha* and only 17 households operated in the fields in 1967, but in 1991 the area is 77.6 *bigha* and 79 households operation. The largest farming household operates 14 *bigha* of the guava orchard. Second largest one operates 9 *bigha* orchard and the others have under one *bigha* orchard. It can divide upper and lower farming households and this showed the same structure of land holding with paddy and wheat.

Excepting lemon and guava, *karaunda* is the most popular fruit in this village. But this tree was not identified in 1967. In 1991 the area under *karaunda* was 36.6 *bigha* and 45 households managed it. The largest farming household operated only 3 *bigha* of orchard. In this orchard there can not be obvious difference of orchard size among the farmers. The reason can be considered that this tree is planted only around the plot in many case and so it has not be main commercializing crop yet.

Without these trees following can be identified, papaya, mango and jack fruit. In 1991 the area under mango cropping was 35.1 *bigha* and 15 households operated. The area under papaya cropping was 3.51 *bigha* and 7 households operated. And the area under jack fruit cropping was 2.35 *bigha* and 11 households operated.

4. Vegetable

In 1991 the area under vegetable cropping was spread over the village area(see Figure 6). But it is difficult to find evidential division between 1967 and 1991 from the land use map because of the confusion of the *rabi* crops and *kariff* crop in 1967. But Table 2 revealed that eggplant and potato is the most popular vegetable in this village in 1967. Such vegetables were still main product in 1991, but the scale has become smaller. The area has decreased from 44.606 *bigha* to 9.41 *bigha* in eggplant and from 36.334 *bigha* to 14.1 *bigha* in potato. And the farming households has also decreased from 46 to 20 in eggplant and from 34 to 30 in potato. Such tendency can be find in ladyfinger.

In comparison with above mentioned vegetables,pumpkin, cucumber and flower have

Hitoshi ARAKI : Changes in Landuse of Chiraigaon Village

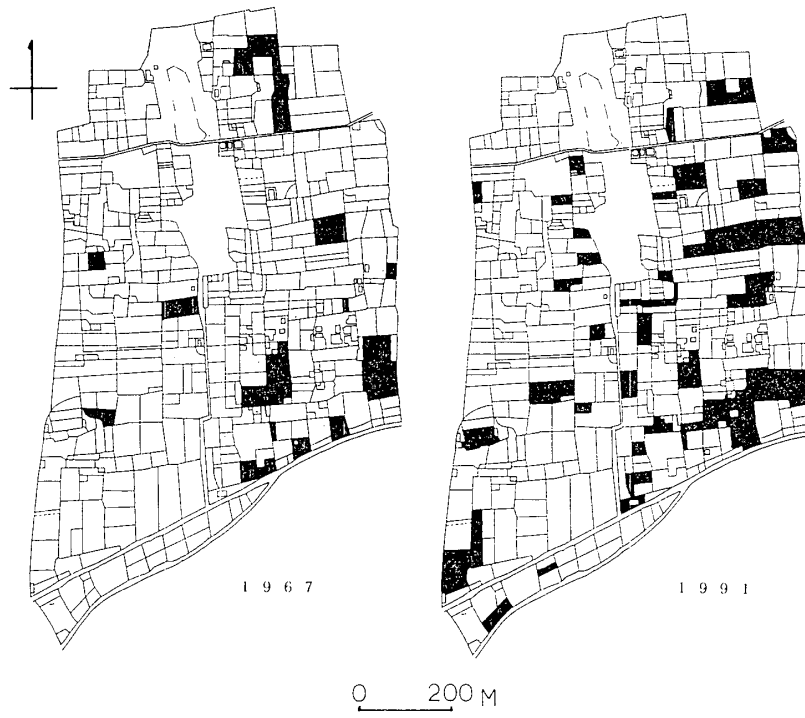


Fig. 5 Landuse change in guava



Fig. 6 Landuse change in vegetable

increased both the operating area and the number of farming household. Particularly there was no description about flower in 1967. In 1991 we could identified at least three kinds of flower, rose, *genda* and *gulmehdi*, which cultivated in commercial use.

As a whole it is characterized by the tendency of increasing the variety of vegetables and decreasing the operating land per single crop.

IV. Land holding

Plot pattern can be pointed out from the land use map addition to the cropping pattern. 419 plots is identified from the land use map investigated in 1967. But in November 1991 549 plots is identified from the field survey proved plot by plot. In comparison with the land use map of 1967 it is increased 130 plots and in details 134 plots were divided and 4 plots were combined.

Table 3 indicates the area of operating land by the farm size. In 1967 the number of households who have under one *bigha* land is 23 and this is 12% of whole households of this village. But in 1991 the number of household increased from 23 to 93. This is big change in the number, but it is not so big change in land holding structure. Because the percentage of this category do not indicate in large range change. More over there is larger change in the category 0. In this category the number of householder increased

Table 3 Number of households by operating cultivated area

area (<i>bigha</i>)	1967		1991	
	households	%	households	%
0	72	37.5	308	64.9
0-0.9	23	12.0	93	19.6
-1.9	24	12.5	41	8.6
-2.9	18	9.4	23	4.9
-3.9	18	9.4	11	2.3
-4.9	14	7.3	0	0
-9.9	17	8.9	12	2.5
-19.9	2	1.0	5	1.1
-29.9	2	1.0	0	0
-39.9	1	0.5	0	0
-49.9	0	0	1	0.2
50-	1	0.5	0	0
total	192	100	494	100
(pop)	1552		3070	
(pop/t)	8.08		6.21	

from 72 to 308 in this 25 years. And the percentage increased from 37.5 in 1967 to 64.9 in 1991. Another structural change is the decrease or the disappear of the households that operate large area. Such a large farming household particularly operate over 20 *bigha* were only one in 1991. These changes indicate the tendency of downsizing of operating land. The reason of such tendency is considered to embodied by the division of the operating land in this 25 years. And this division is occurred under the Indian traditional inheritance system that is characterized in even division of the property.

V. Discussion

The analysis of the landuse change revealed next three points, decreasing cereals, increasing orchards and increasing variety of the vegetable. And each crops can be characterized by the purpose of cultivationg. Those are cereals for self consumption, fruits for selling in the market and vegetables for the both cases.

Changes in landuse could be considered to link the agricultural management. Following tendency can be found in connection with agricultural management. The first one is the tendency of the decreasing the operating land per single farming household. The second one is the tendency of decreasing the operating land per single crop.

In this background there is the influence of the rapid increasing in the population and the division of the household property. The decision of householder is supposed to become more commercialized management of agriculture under the condition of increasing population and division of household. Because it is impossible to maintain the household economy by means of the cereal cropping of the self support use in the small divided land. It is necessary to introduce commercialized crops such as fruits and vegetables in order to keep living in the small divided land.

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